

Effluent Quality Assessment

Lowry Park Zoological Society of Tampa, Inc.

Hillsborough County

NPDES #FL0186651

Sampled May 16, 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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Lowry Park Zoological Society of Tampa, Inc., 1101 West Sligh Avenue, Tampa, Hillsborough County, Florida, 33604. NPDES #FL0186651. Effluent grab samples for biological and chemical analyses for this facility were collected on May 16, 2011.

Introduction

Lowry Park Zoological Society of Tampa's zoological garden has an industrial wastewater treatment plant which treats wastewater generated on-site and storm water runoff from the site. (See Appendix F for detailed facility information provided by Jason Cohen of FDEP Southwest District.)

Methods

Samples were collected from the EFF-01 NPDES sampling point for Outfall D-001 by Jason Cohen and Peter Wenner (FDEP Southwest 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.

See Appendix A for the completed chain of custody form.

The 96-hour acute screening toxicity tests and algal growth potential test were performed following internal DEP SOPs TA07_01, TA07_02, 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.

Results and Discussion

- **Toxicity Test Results**
  Tests were performed May 17 - 21, 2011.

Ceriodaphnia dubia 96-hour acute screening bioassay –	LC_{50} > 100%, 0%* mortality in 100% sample at 96 hours
Cyprinella leedsi 96-hour acute screening bioassay –	LC_{50} > 100%, 0%* mortality in 100% sample at 96 hours

  The bioassay samples were not acutely toxic to the test organisms.

  *NOTE: In a 96-hour acute screening test of 100% effluent, mortality of <20% provides confidence that the effluent meets the acute toxicity criterion of Florida's Surface Water Quality Standards (Rule 62-302.500 (1) (a) 4, F.A.C.). Mortality between 20-50% indicates low to moderate levels of toxicity, and further action may be required. Mortality of >50% indicates that the effluent fails to meet the minimum requirement to discharge to waters of the state (Rule 62-4.244(3) (a), F.A.C.).

  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 20.1 A mg dry wt/L of the unicellular green alga, *Pseudokirchneriella subcapitata*, formerly known as *Selenastrum capricornutum*. Raschke and Schultz (1987) determined that AGP values above 5.0 mg dry weight/L represent a "problem" threshold for fresh receiving waters, implying nutrient enrichment. The ratio (4.7:1) of total nitrogen to total phosphorus suggests that the effluent is nitrogen - limited.

  See Table 1 for AGP results and qualifiers.

- **Chemistry Results**
  Total residual chlorine was not detected in the bioassay sample in the laboratory. Total ammonia (0.048 mg N/L) was detected in the bioassay sample in the bioassay laboratory. The total ammonia concentration in the grab sample collected and preserved for chemical analysis was 0.1 mg N/L. Based on the pH, salinity, and temperature of the effluent as collected, the calculated unionized ammonia concentration was < 0.02 mg/L.

  Arsenic, copper, iron, and zinc were detected in the effluent at levels that comply with Class III fresh water quality criteria (62-302.530, F.A.C.). Chromium- III, lead, nickel, and silver were detected between the laboratory method detection limits (MDL) and practical quantitation limits (PQL). Aluminum, total alpha particles, Radium 226 and fecal coliforms were also detected in the effluent.

  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 effluent sample collected from the EFF-01 NPDES sampling point for Outfall D-001 for this facility on May 16, 2011, was not acutely toxic to either test species during the 96-hour acute screening bioassays. The effluent AGP result was greater than the "problem" threshold for fresh receiving waters suggesting that nutrient enrichment may be an issue. Effluent water quality samples collected on May 16, 2011, did not exceed any applicable water quality standards or violate any permit conditions.

Literature Cited

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.

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.

Table 1. Measured and predicted algal growth potential (AGP; mg dry weight/L) for total soluble inorganic nitrogen (TSIN) and total nitrogen (TN) limitation of the freshwater species *Pseudokirchneriella subcapitata* and ratios of nitrogen to phosphorus for samples collected from the Lowry Park Zoological Society of Tampa, Inc., facility on May 16, 2011.

Lowry Park Zoological Society of Tampa, Inc. NPDES# FL0186651					
Location	AGP (measured)	Predicted AGP (TSIN) ± 20%	Predicted AGP (TN) ± 20%	Inorganic N:P ratio	Total N:P ratio
EFF-01	20.1 A	13.7 ± 2.7	35.3 ± 7.1	3.6	4.7

Table 2. Effluent limits, Class III Freshwater Criteria and chemical and microbiological data for samples collected from the Lowry Park Zoo on May 16, 2011.

Lowry Park Zoological Society of Tampa NPDES # FL0186651	Class III Criteria	Effluent Limits	EFF-01	
Metals (µg/L unless otherwise noted)				
Aluminum	-	-	205	
Arsenic	≤ 50	-	1.07	
Cadmium	≤ 0.6 b	-	0.05	U
Calcium (mg/L)	-	-	92.1	
Chromium-III	≤ 206.9 b	-	1.0	I
Copper	≤ 23.3 b	-	6.03	
Iron	≤ 1,000	-	140	
Lead	≤ 12.4 b	-	0.42	I
Magnesium (mg/L)	-	-	14.9	
Nickel	≤ 128.9 b	-	0.48	I
Selenium	≤ 5.0	-	0.2	U
Silver	≤ 0.07	-	0.029	I
Zinc	≤ 296.5 b	-	53	
Nutrients (mg/L)				
Ortho-phosphate	-	-	0.1	
Total Phosphorus	-	Report	0.2	
Total Ammonia	-	Report	0.1	
Un-ionized Ammonia	≤ 0.02 s	≤ 0.02 s	< 0.02	c
Nitrate and Nitrite	-	-	0.26	
Total Kjeldahl Nitrogen	-	-	0.67	
Organic Nitrogen	-	-	0.57	c
Total Nitrogen	-	Report	0.93	c
General Physical and Chemical Parameters				
Dissolved Oxygen (mg/L)	≥ 5.0	≥ 5.0 s	7.7	
pH (SU)	6.0 - 8.5	6.0 - 8.5 s	8.2	
Conductivity (µmhos/cm)	≤ 1,275	-	1245	
Temperature (°C)	-	Report	24.5	
Salinity	-	-	< 0.63	c
Total Residual Chlorine (mg/L)	≤ 0.01	≤ 0.01 s	≤ 0.03	£Q
Chlorophyll *a* (µg/L) - Corrected	-	-	27	
Phaeophytin (µg/L)	-	-	8.9	
Total Suspended Solids (mg/L)	-	-	13	A
CBOD, 5 day (mg/L), N - inhibited	-	-	1.0	I
Alpha, Total (pCi/L)	≤ 15	-	2.6	
Alpha-Counting Error (pCi/L)	-	-	1.7	
Radium 226 (pCi/L)	-	-	2.0	
Radium 226-Counting Error (pCi/L)	-	-	0.2	
Radium 228 (pCi/L)	-	-	0.9	U
Radium 228-Counting Error (pCi/L)	-	-	0.5	
Radium 226 + 228 (pCi/L)	≤ 5	-	2.0	c
Flow (MGD)	-	Report	0.107	a*
Hardness (mg $CaCO_3$)	-	-	291.33	c
Microbiology (Number of colony forming units/100ml)				
Fecal Coliforms ¥	≤ 400s #	≤ 800 s	11	B

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
s - Single 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 field blank
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
Q - Sample held beyond normal holding time
U - Material analyzed for but not detected; value reported is the method detection limit
¥ - Fecal coliform analysis performed by Advanced Environmental Laboratories, Tampa
- If 10 or fewer samples are taken within a month, the single sample limit is 400 CFU (62-302.530(6), F.A.C.)
£ - measurement taken in the FDEP laboratory
* - Measured from 4/1/2010 - 3/1/2011

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2011-05-16-34
Sampling Inspection for Lowry Park Zoological Society FYI3

Requester: Edward Smith
Field Report Prepared By:

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

Collected By: P Wenner, J Cohen
Send Final Report To: Joe Squiteri/ Michele Duggan/

Sampling Agency: FDEP SWD

Lab ID *	Location / Field ID	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Latitude	Longitude	Collection (begin)	Collection (end)	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	Sample Depth	Salinity (PPTh) / Sp Conductance (umho/cm)	NPDES Number	Comments	Bottle Group(s)**
38579	EFF-01	FRESH	24.53	8.20	☐ dd ☐ dms	☐ dd ☐ dms	☑ Comp ☒ Grab Date 5/16/11 Time 1030 Eastern Central	Date Time Eastern Central		7.73		0.62 m / 1.2 ft	☑ Salinity (PPTh) 1245 ☑ Sp Conductance (umho/cm)			A
38580	FIELD BLANK	LAB DI H_2O			☐ dd ☐ dms	☐ dd ☐ dms	☐ Comp ☑ Grab Date 5/16/11 Time 1100 Eastern Central	Date Time Eastern Central				☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)			B
					☐ dd ☐ dms	☐ dd ☐ dms	☐ Comp ☐ Grab Date Time Eastern Central	Date Time Eastern Central				☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)			
					☐ dd ☐ dms	☐ dd ☐ dms	☐ Comp ☐ Grab Date Time Eastern Central	Date Time Eastern Central				☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)		2 bottles Reid by FDV 5/17/11 10:20	

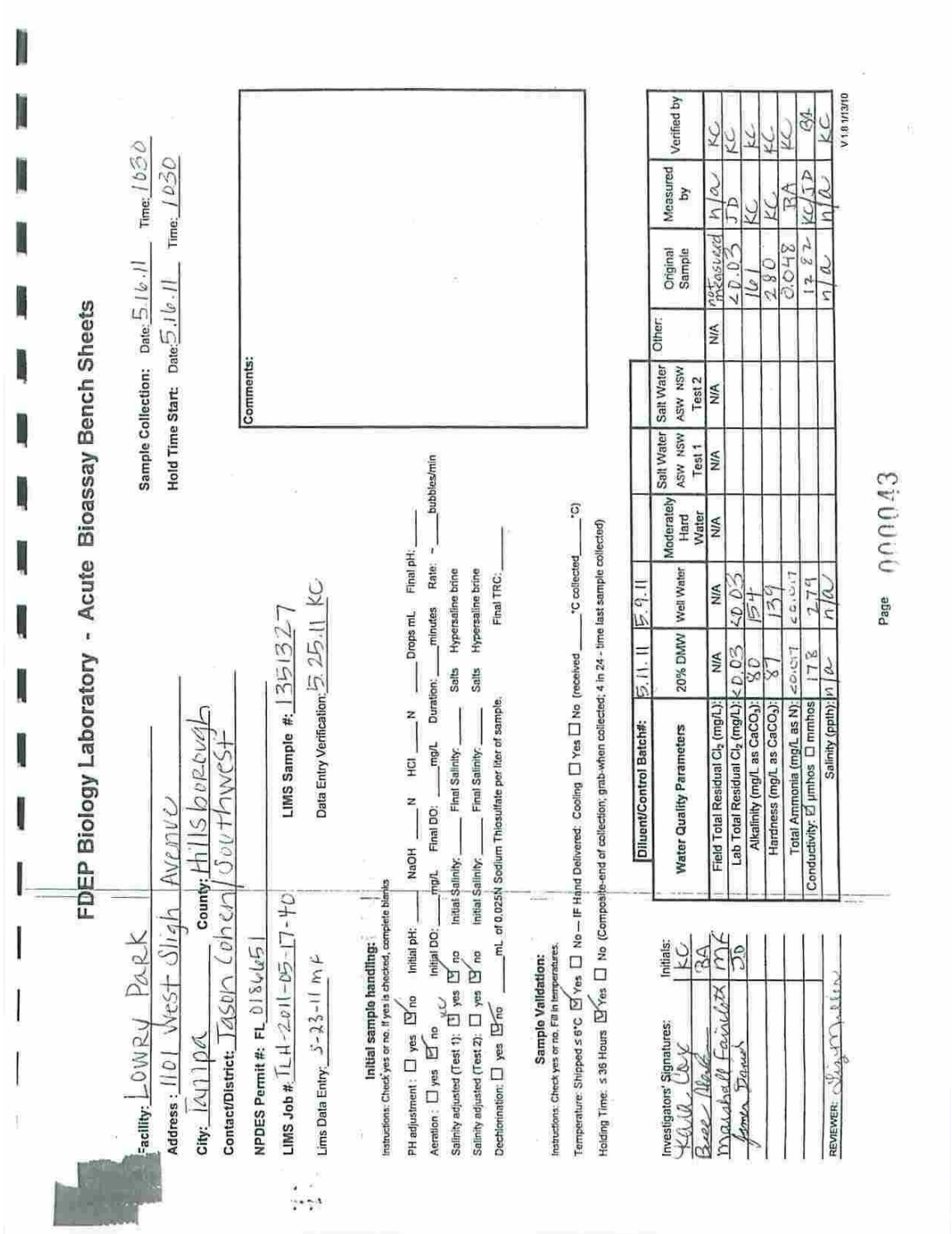
Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
	5/16/11 1400	FED Ex		05-17-11				

*Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Appendix B. Bench Sheets



FDEP Biology Laboratory - Acute Bioassay Bench Sheets

Facility: LOWRY Park
Address: 1101 West Sligh Avenue
City: Tampa County: Hillsborough
Contact/District: Jason Cohen/Southwest
NPDES Permit #: FL 0184651
LIMS Job #: TLH-2011-05-17-40
Lims Data Entry: 5-23-11 MF

Sample Collection: Date: 5.16.11 Time: 1030
Hold Time Start: Date: 5.16.11 Time: 1030

Comments:

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: ____ Final Salinity: ____ Salts Hypersaline brine
Salinity adjusted (Test 2): ☐ yes ☑ no Initial Salinity: ____ Final Salinity: ____ 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:
Kelli Cox KC
Bree Hall BA
Maribeth Faculak MF
Jamie Bennett JD

Diluent/Control Batch#:	5.11.11	5.9.11							
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	<0.03					<0.03	JD	KC
Alkalinity (mg/L as $CaCO_3$):	80	154					161	KC	KC
Hardness (mg/L as $CaCO_3$):	87	139					280	KC	KC
Total Ammonia (mg/L as N):	<0.07	<0.07					0.048	BA	KC
Conductivity: ☑ µmhos ☐ mmhos	178	279					12.82	KC/JD	BA
Salinity (ppth):	n/a	n/a					n/a	n/a	KC

REVIEWER: Sharon Wilson

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Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample # 1351327 **SOP#: TA 07** D1 **Test #** 1 **of** 2

Test Species:
Batch#: 5.17.11 Age: <24hours
☑ *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 # 5.11.11 **)**
☐ ASW ☑ 20% DMW
☐ MHW ☐ Well

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

Test Duration:
☐ 48 hr
☑ 96 hr
☐ __hr

Chamber Size 30 **ml**
Test Volume: 20 **ml**

Test Started: Date 5.17.11 Time 1300

Test Ended: Date 5-21-11 Time 0900

Concentration	Replicate	Chamber #	0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Ctrl.	A	A	5	5	5	5	5	5
	B	B	5	5	5	5	5	5
	C	C	5	5	5	5	5	5
	D	D	5	5	5	5	5	5
100%	A	A	5	5	5	5	5	5
	B	B	5	5	5	5	5	5
	C	C	5	5	5	5	5	5
	D	D	5	5	5	5	5	5
Checked or Verified by:			KC	KC	KC	KC	KC	MF

Food
☑ YCT Batch# 2.11.11
☑ P. subcapitata Batch# 4.18.11
☐ Artemia Lot#______

Feeding and Artemia Batch #
☑ 0 hr____ ☑ Prior to Test
☐ 24 hr____
☑ 48 hr____ ☐ Prior to Renewal
☐ 72 hr____

Temperature Range (°C)

Incubator # 2
min. 25.5 max. 27.1 mean —

Incubator #___
min.______max.______mean______

Waterbath #___
min.______max.______mean______

Room B246
min. 21.9 max. 22.9 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: 0 LC50: >100%
Calculated LC50 (Definitive) 95% CI______ Method______

Comments:

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 # 1351327 SOP#: TA 07.02 Test # 2 of 2

Test Species:
Batch #: 5.17.11 Age: 12 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 #5.9.11)
☐ ASW ☐ 20% DMW
☐ MHW ☑ Well

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

Test Duration:
☐ 48 hr
☑ 96 hr
☐ ___hr

Test Started: Date 5.17.11 Time 1245

Test Ended: Date 5-21-11 Time 0900

Chamber Size 100 ml
Test Volume 100 ml

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL.	A	B1	5	5	5	5	5	5
	B	B2	5	5	5	5	5	5
	C	B3	5	5	5	5	5	5
	D	B4	5	5	5	5	5	5
100%	A	B5	5	5	5	5	5	5
	B	B6	5	5	5	5	5	5
	C	B7	5	5	5	5	5	5
	D	B8	5	5	5	5	5	5
Checked or Verified by:			JD	JD	JD	JD	JD	JD

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

Feeding and Artemia Batch #
- ☑ 0 hr 94-11 ☑ Prior to Test
- ☐ 24 hr___
- ☑ 48 hr 96-11 ☑ Prior to Renewal
- ☐ 72 hr___

Temperature Range (°C)
Incubator # 2
min. 25.5 max. 27.1 mean —

Incubator #___
min.____ max.____ mean____

Waterbath #___
min.____ max.____ mean____

Room B246
min. 21.9 max. 22.9 mean —

Light Intensity (ft. candles): 50-100

Photoperiod (hours): 16 light, 8 dark

Loaded/ Verified by: BAI, 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: Ø LC50: >100 %
Calculated LC50 (Definitive) 95% CI_____ Method_____

Comments:

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

LIMS Sample # 1351327 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	M	0 hr	7.9	24.0	7.8	178	
	—	24 hr	—	—	—	—	
	A	48 hr BR	8.1	24.3	7.9	184	
	M	48 hr AR	8.2	24.0	KC 1609 7.9	1609	
	—	72 hr	—	—	—	—	
	A	96 hr	8.3	24.9	8.3	189	
100%	M	0 hr	8.0	26.2	7.4	1285 KC 1266	
	—	24 hr	—	—	—	—	
	A	48 hr BR	8.5	25.1	8.1	1277	
	M	48 hr AR	8.1	25.7	7.6	1196	
	—	72 hr	—	—	—	—	
	A	96 hr 8.4	8.2 MF	24.9	8.2	1282	
		0 hr					
		24 hr					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					
		0 hr					
		24 hr					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					
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		24 hr					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					
		0 hr					
		24 hr					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					

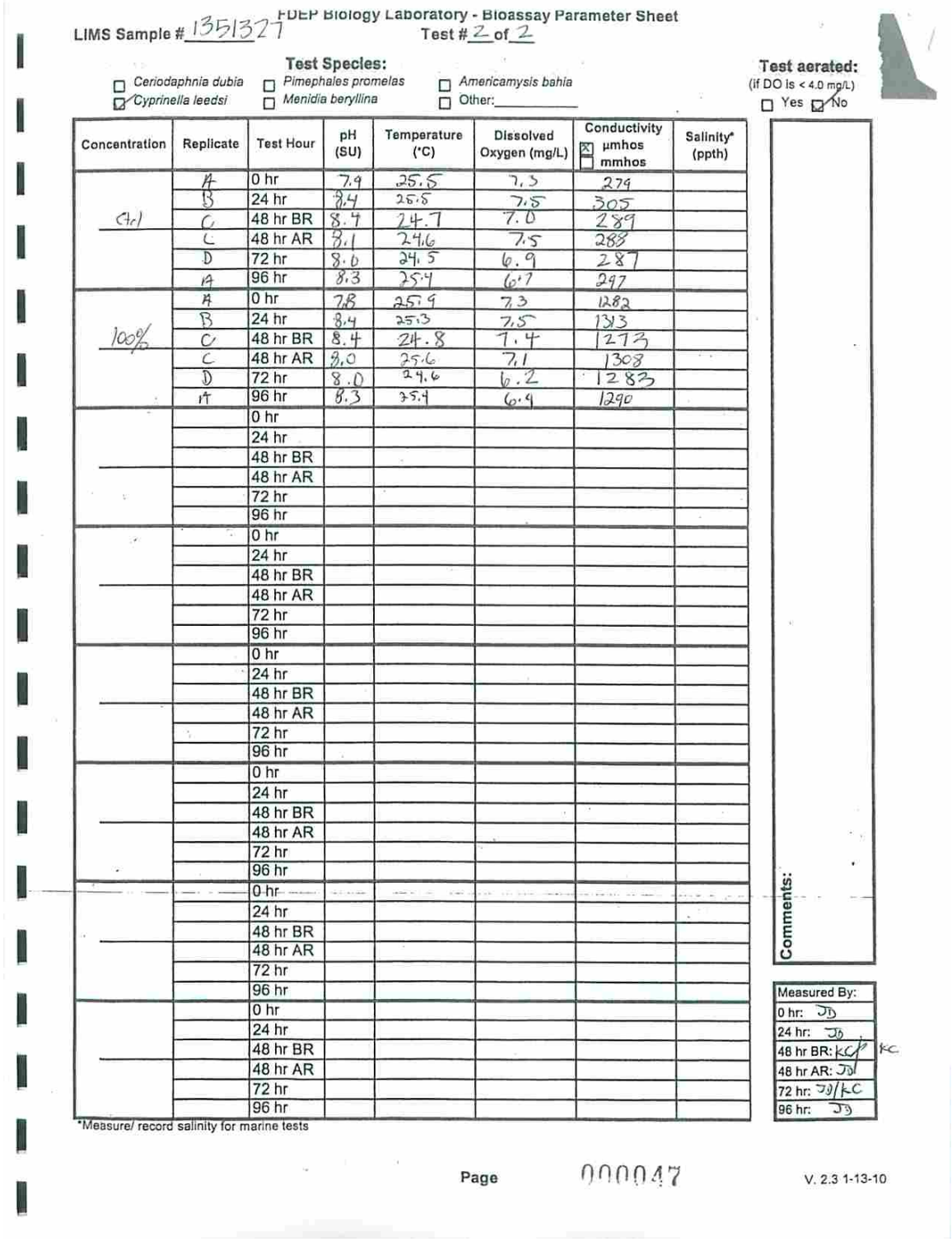
Comments:

Measured By:
0 hr: KC
24 hr: —
48 hr BR: KC
48 hr AR: KC
72 hr: —
96 hr: MF

*Measure/ record salinity for marine tests

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Appendix B. (continued)



FDEP Biology Laboratory - Bioassay Parameter Sheet

LIMS Sample # 1351327 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

Concentration	Replicate	Test Hour	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity ☒ µmhos ☐ mmhos	Salinity* (ppth)
Ctrl	A	0 hr	7.9	25.5	7.3	279	
	B	24 hr	8.4	25.5	7.5	305	
	C	48 hr BR	8.7	24.7	7.0	289	
	C	48 hr AR	8.1	24.6	7.5	288	
	D	72 hr	8.0	24.5	6.9	287	
	A	96 hr	8.3	25.4	6.7	297	
100%	A	0 hr	7.8	25.9	7.3	1282	
	B	24 hr	8.4	25.3	7.5	1313	
	C	48 hr BR	8.4	24.8	7.4	1273	
	C	48 hr AR	8.0	25.6	7.1	1308	
	D	72 hr	8.0	24.6	6.2	1283	
	A	96 hr	8.3	25.4	6.4	1290	
		0 hr					
		24 hr					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					
		0 hr					
		24 hr					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					
		0 hr					
		24 hr					
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		96 hr					
		0 hr					
		24 hr					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					
		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/ KC
48 hr AR: JD
72 hr: JD/KC
96 hr: JD

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V. 2.3 1-13-10

Appendix B. (continued)

Test ID: Lowry Park Dates: 5.17.11 – 5-21-11

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-SN1101686412 #2-SN221295527 #3-SN240116020 #4-SN80361795 #5-SN61990624	TA06_05	Temperature	SM-2530B modified DEP SOP-001/01 FT1400	✓ 2nd #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)

BA · 5.18.11

V 1.1 9/21/10 MFjd

000048

Appendix C. SRT Bench Sheets and Statistical Analysis

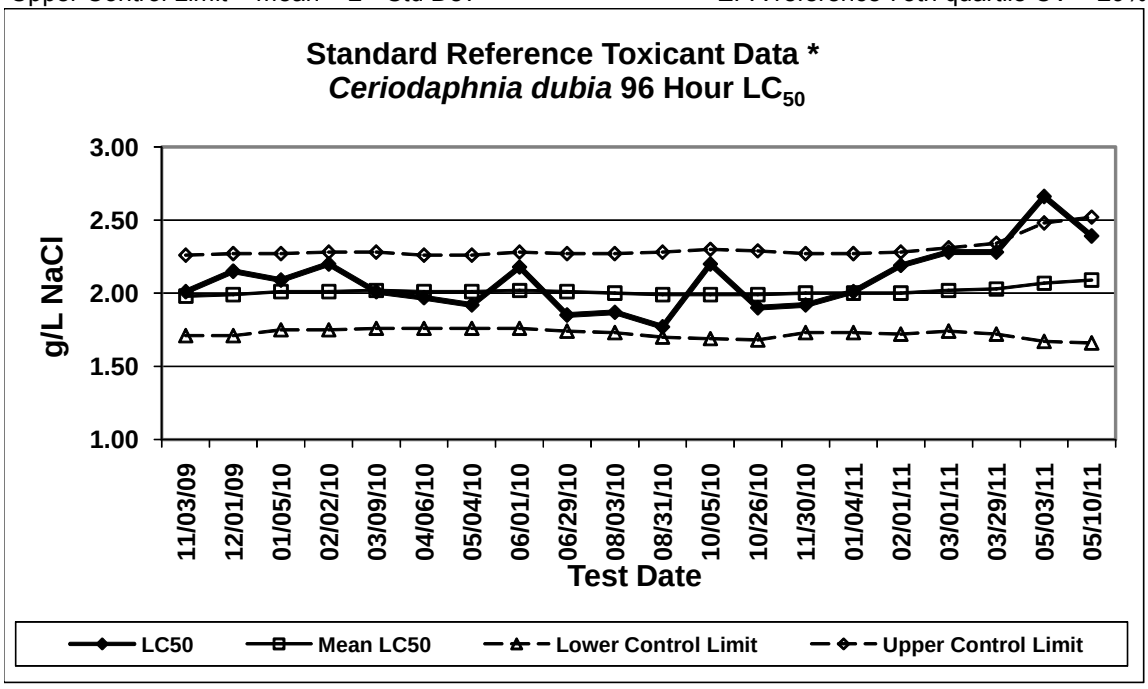
Florida Department of Environmental Protection
Bureau of Laboratories

Standard Reference Toxicant (SRT) Test Data - 96-hour Acute Toxicity
Ceriodaphnia dubia (water flea) - Sodium Chloride (NaCl)

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
11/03/09	2.01	1.98	0.14	1.71	2.26
12/01/09	2.15	1.99	0.14	1.71	2.27
01/05/10	2.09	2.01	0.13	1.75	2.27
02/02/10	2.20	2.01	0.13	1.75	2.28
03/09/10	2.01	2.02	0.13	1.76	2.28
04/06/10	1.97	2.01	0.12	1.76	2.26
05/04/10	1.92	2.01	0.12	1.76	2.26
06/01/10	2.18	2.02	0.13	1.76	2.28
06/29/10	1.85	2.01	0.13	1.74	2.27
08/03/10	1.87	2.00	0.14	1.73	2.27
08/31/10	1.77	1.99	0.14	1.70	2.28
10/05/10	2.20	1.99	0.15	1.69	2.30
10/26/10	1.90	1.99	0.15	1.68	2.29
11/30/10	1.92	2.00	0.14	1.73	2.27
01/04/11	2.01	2.00	0.14	1.73	2.27
02/01/11	2.19	2.00	0.14	1.72	2.28
03/01/11	2.28	2.02	0.14	1.74	2.31
03/29/11	2.28	2.03	0.15	1.72	2.34
05/03/11	2.66	2.07	0.20	1.67	2.48
05/10/11	2.39	2.09	0.21	1.66	2.52

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

CV = 10.22
EPA reference 75th quartile CV = 29%



Appendix C. (continued)

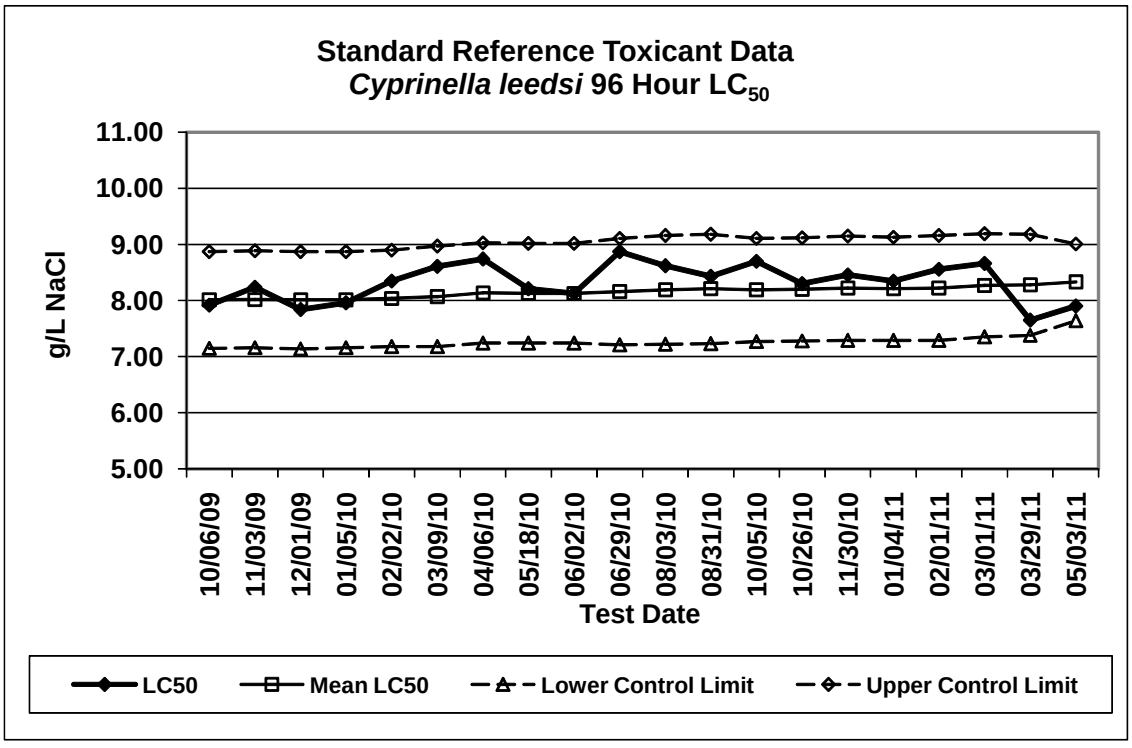
Florida Department of Environmental Protection
Bureau of Laboratories

Standard Reference Toxicant (SRT) Test Data - 96-hour Acute Toxicity
Cyprinella leedsi (bannerfin shiner) - Sodium Chloride (NaCl)

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
10/06/09	7.92	8.01	0.43	7.15	8.87
11/03/09	8.24	8.02	0.43	7.16	8.89
12/01/09	7.84	8.01	0.43	7.14	8.87
01/05/10	7.96	8.01	0.43	7.16	8.87
02/02/10	8.35	8.04	0.43	7.18	8.90
03/09/10	8.61	8.07	0.45	7.18	8.97
04/06/10	8.74	8.14	0.45	7.24	9.03
05/18/10	8.21	8.13	0.45	7.24	9.02
06/02/10	8.13	8.13	0.45	7.24	9.02
06/29/10	8.87	8.16	0.47	7.21	9.11
08/03/10	8.62	8.19	0.48	7.22	9.16
08/31/10	8.43	8.21	0.49	7.23	9.18
10/05/10	8.70	8.19	0.46	7.27	9.11
10/26/10	8.30	8.20	0.46	7.28	9.12
11/30/10	8.46	8.22	0.46	7.29	9.15
01/04/11	8.35	8.21	0.46	7.29	9.13
02/01/11	8.56	8.22	0.47	7.29	9.16
03/01/11	8.66	8.27	0.46	7.35	9.19
03/29/11	7.65	8.28	0.45	7.38	9.18
05/03/11	7.90	8.33	0.34	7.64	9.01

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

CV = 7.64
EPA reference 75th quartile CV = 19%



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 #: DMW 15.6.11
Toxicant/ Batch#: NaCl 15.9.11
Organism Batch: 5.10.11 Age: <24hr
Test Beginning: Date: 5-10-11 Time: 1100
Test Ending: Date: 5-14-11 MF Time: 1040

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	<0.03	TA06_22	KC
Alkalinity (mg/L as $CaCO_3$):	94	TA06_08	KC
Hardness (mg.L as $CaCO_3$):	83	TA06_09	KC
Total Ammonia (mg/L as N):	<0.017	TA06_17	BA
Conductivity: µmhos mmhos	174	TA06_25	KC
Salinity (ppth):	n/a	TA06_25	KC

Food:	Batch
☑ YCT	2·11·11
☑ *P. subcapitata*	4·18·11
☐ Artemia Lot #	

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

Chamber size: 30 mL
Test volume: 20 mL per replicate

Concentrations prepared by: KC
Test Incubated in: Incubator # 2 Waterbath # ____
Light Intensity: 50-100 Ft. candles
Photoperiod: 16 hours Light / 8 hours dark
Temperature Range °C:(if used)
Incubator # 2 min 25.3 max 27.1 mean —
Waterbath # ___ min ____ max ____ mean ____
Room B240 min 22.1 max 23.1 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 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	A	5	5	5	5	5	5
			B	B	5	5	5	5	5	5
			C	C	5	5	5	5	5	5
			D	D	5	5	5	5	5	5
1.5			A	A	5	5	5	5	5	5
			B	B	5	5	5	5	5	5
			C	C	5	5	5	5	5	5
			D	D	5	5	5	5	5	5
2.0			A	A	5	5	4 1D	4	4	4
			B	B	5	5	5	5	5	5
			C	C	5	5	5	5	5	4 1D
			D	D	5	5	5	5	5	5
2.5			A	A	5	5	5	5	5	3 2D
			B	B	5	5	4 1D	4	2 2D	1 1D
			C	C	5	5	5	5	2 2D	2
			D	D	5	5	3 2D	3	3	3
3.0			A	A	5	4 1D	1 3D	1	0 1D	
			B	B	5	5	2 3D	2	0 2D	
			C	C	5	4 1D	1 3D	1	0 1D	
			D	D	5	5	1 4D	1	0 1D	
4.0			A	A	5	1 4D	0 1D	—	—	
			B	B	5	1 4D	0 1D	—	—	
			C	C	5	1 4D	0 1D	—	—	
			D	D	5	2 3D	0 2D	—	—	
Organisms loaded by: KC			Checked by:		BA	BA	BA	BA	BA	MF

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

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

Investigators' Signatures
Brea Alaska
Kaila Cox
Marshall Faircloth
James Daniels

Reviewer: Liz Miller

Comments:

Method: TSK

Statistics: LC50	95% confidence intervals Lower	Upper
48 hour: 2.78	2.62	2.96
96 hour: 2.39	2.26	2.53

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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: 5.16.11 Time: 1100
Test Ending: Date: 5-17-11 Time: 1040

Test Type: ☐ non-renewal ☑ renewal

hr = hour AR = after renewal BR = before renewal

Concentration µg/L mg/L %	Replicate	Test Hour	pH (SU)	Temperature (° C)	Dissolved Oxygen (mg/L)	Conductivity ☐ µmhos ☑ mmhos	Salinity (ppth)
Control	M	0 hr	7.9	24.0	7.1	0.174	
	–	24 hr	–	–	–	–	–
	A	48 hr BR	8.0	24.0	6.6	~~0.173~~ 0.172	0.216 BA
	M	48 hr AR	7.~~8~~ 8	24.0	6.9	0.173	
	~~YMF~~	72 hr					
	A	96 hr	8.0	24.1	7.6	0.201	
1.5	M	0 hr	8.0	24.0	7.0	2.91	
	–	24 hr	–	–	–	–	
	A	48 hr BR	8.1	24.0	6.7	3.09	
	M	48 hr AR	7.~~8~~ 8	24.0	7.0	2.98	
		72 hr					
	A	96 hr	7.9	24.0	7.6	3.08	
2.0	M	0 hr	8.0	24.0	6.9	3.74	
	–	24 hr	–	–	–	–	
	A	48 hr BR	8.1	24.0	6.4	4.11	
	M	48 hr AR	7.8	24.0	7.0	3.79	
		72 hr					
	A	96 hr	8.0	24.2	7.8	4.13	
2.5	M	0 hr	8.0	24.0	7.0	4.54	
	–	24 hr	–	–	–	–	
	A	48 hr BR	8.2	24.0	6.7	4.93	
	M	48 hr AR	7.8	24.0	7.0	4.75	
		72 hr					
	A	96 hr	8.0	24.2	7.8	9 mF 4.99	
3.0	M	0 hr	8.0	~~24.5~~ 24.0	7.2	5.3 ~~10~~ 13 4	
	–	24 hr	–	–	–	–	
	A	48 hr BR	8.2	24.0	6.7	6.15	
	M	48 hr AR	7.9	24.0	6.9	5.38	
	A	72 hr	7.8	24.0	6.6	5.43	
	A	96 hr		~~24.3~~ NA	MF		
4.0	M	0 hr	8.0	24.0	7.5	6.92	
	–	24 hr	–	–	–	–	
	A	48 hr BR	8.2	24.0	6.7	7.81	
		48 hr AR					
		72 hr					
		96 hr					

Investigators Signatures
Brian Alverson
Kaia Loy
Marshall Faircloth
Jana Daniel

Reviewed By: Liz Miller

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

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* ☐ *Hyalella azteca* Method 2006.0 TA07.04 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 #: Well / #5.2.11 **Organism** Batch: #5.3.11 **Test Beginning:** Date: 5.3.11 Time: 1230
Toxicant/ Batch#: NaCl / #5.2.11 Age: 3 days **Test Ending:** Date: 5.7.11 Time: 1250

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	<0.03	TA06_22	KC
Alkalinity (mg/L as $CaCO_3$):	156	TA06_08	KC
Hardness (mg.L as $CaCO_3$):	140	TA06_09	KC
Total Ammonia (mg/L as N):	<0.017	TA06_17	BA
Conductivity (µmhos) mmhos	257	TA06_25	KC
Salinity (ppth):	—	TA06_25	

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

Artemia Batch:
0 hr: 83-11
24 hr:
48 hr: 85-11
72 hr:

Concentrations prepared by: JD
Temperature Range °C:(if used)
Chamber size: 1000 mL
Test volume: 400 mL per replicate

Test Incubated in: Incubator # 3 Waterbath # ___ Incubator # 3 min. 23.3 max. 26.2 mean —
Light Intensity: 50-100 Ft. candles Waterbath # ___ min. ___ max. ___ mean ___
Photoperiod: 16 hours Light / 8 hours dark Room B246 min. 22.5 max. 23.6 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 µg/L mg/L (circle)	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Control	A	A1	10	10	10	10	10	10
	B	A2	10	10	10	10	10	10
6	A	A3	10	10	10	10	10	10
	B	A4	10	9 10D	9	9	9	9
7	A	A5	10	10	10	10	10	10
	B	A6	10	10	10	10	10	10
8	A	A7	10	4 6D	2 3D 4	3 3D 4	4	4
	B	A8	10	5 5D	5 5D	5 5	5	5
9	A	A9	10	0 10D				
	B	A10	10	0 10D				
10	A	A11	10	0 10D				
	B	A12	10	0 10D				
Organisms loaded by: JD		Checked by:	KC	KC	JD	JD	JD	JD
Loading Verified by: KC								

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%		

Investigators' Signatures
Kara Coy
James Daniels
Blair Mercanek
Marshall Faircloth

Reviewer: Kip Miller

Comments:

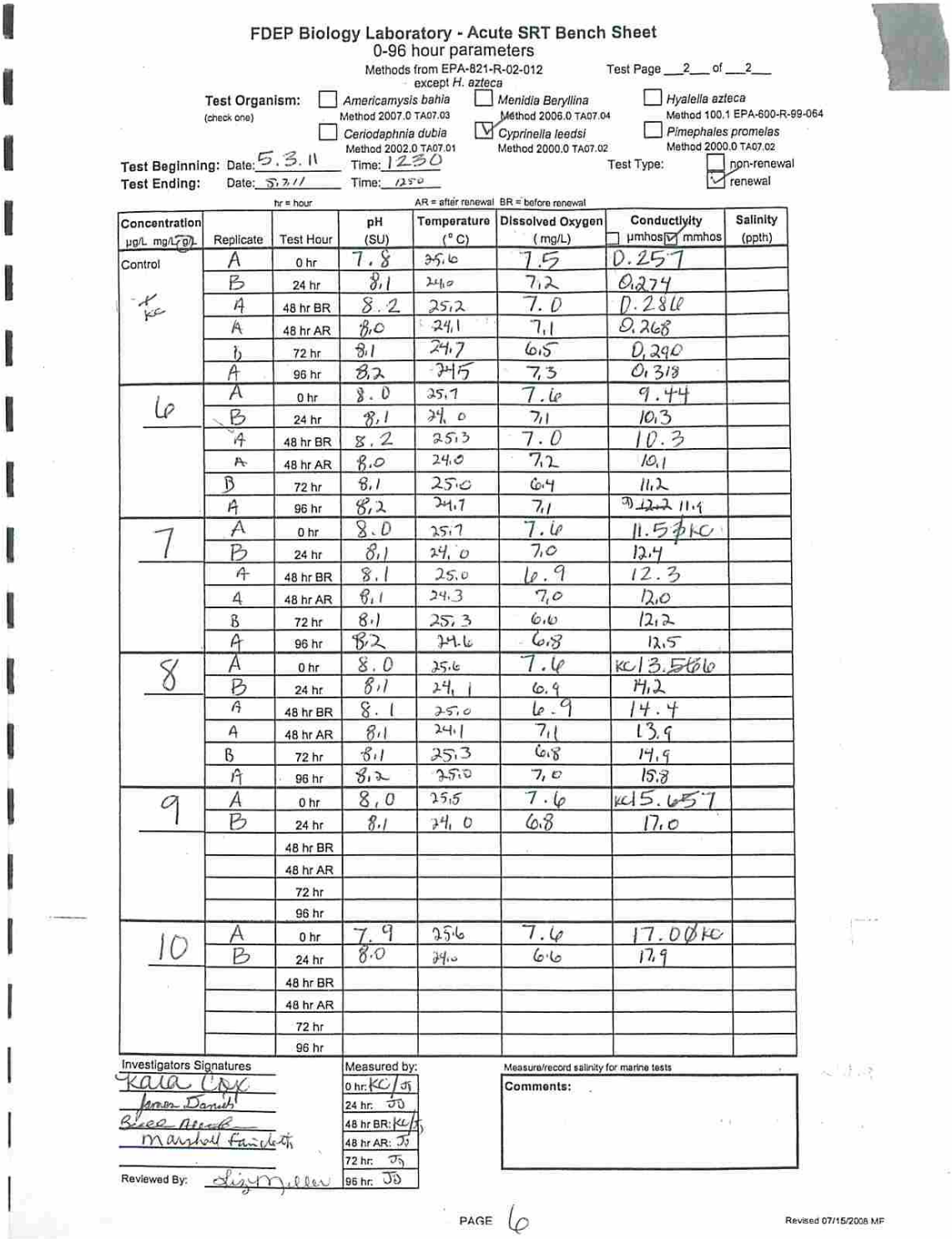
Method: TSK

Statistics: LC50	95% confidence intervals Lower	Upper
48 hour: 7.90	7.67	8.14
96 hour: 7.90	7.67	8.14

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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: 5.3.11 Time: 1230
Test Ending: Date: 5.7.11 Time: 1250

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	7.8	25.6	7.5	0.257	
	B	24 hr	8.1	24.0	7.2	0.274	
	A	48 hr BR	8.2	25.2	7.0	0.286	
	A	48 hr AR	8.0	24.1	7.1	0.268	
	B	72 hr	8.1	24.7	6.5	0.290	
	A	96 hr	8.2	24.5	7.3	0.318	
6	A	0 hr	8.0	25.7	7.6	9.44	
	B	24 hr	8.1	24.0	7.1	10.3	
	A	48 hr BR	8.2	25.3	7.0	10.3	
	A	48 hr AR	8.0	24.0	7.2	10.1	
	B	72 hr	8.1	25.0	6.4	11.2	
	A	96 hr	8.2	24.7	7.1	12.2 11.4	
7	A	0 hr	8.0	25.7	7.6	11.5 KC	
	B	24 hr	8.1	24.0	7.0	12.4	
	A	48 hr BR	8.1	25.0	6.9	12.3	
	A	48 hr AR	8.1	24.3	7.0	12.0	
	B	72 hr	8.1	25.3	6.6	12.2	
	A	96 hr	8.2	24.6	6.8	12.5	
8	A	0 hr	8.0	25.6	7.6	KC 13.566	
	B	24 hr	8.1	24.1	6.9	14.2	
	A	48 hr BR	8.1	25.0	6.9	14.4	
	A	48 hr AR	8.1	24.1	7.1	13.9	
	B	72 hr	8.1	25.3	6.8	14.9	
	A	96 hr	8.2	25.0	7.0	15.8	
9	A	0 hr	8.0	25.5	7.6	KC 15.657	
	B	24 hr	8.1	24.0	6.8	17.0	
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					
10	A	0 hr	7.9	25.6	7.6	17.0 KC	
	B	24 hr	8.0	24.0	6.6	17.9	
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					

Investigators Signatures
Kala Cox
Jason Daniels
Becca Arnold
Marshall Faircloth

Reviewed By: Lizy Miller

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

Measure/record salinity for marine tests

Comments:

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Revised 07/15/2008 MF

Appendix C. (continued)

***Ceriodaphnia dubia* Acute Standard Reference Toxicant Test**

DATE: 5-10-11 DURATION: 96 h TOXICANT : NaCl
SPECIES: ***Ceriodaphnia dubia***

RAW DATA: Concentration (g/L)	Number Exposed	Mortalities
.00	20	0
1.50	20	0
2.00	20	2
2.50	20	11
3.00	20	20
4.00	20	20

SPEARMAN-KARBER TRIM: .00%

SPEARMAN-KARBER ESTIMATES: LC50: 2.39
95% LOWER CONFIDENCE: 2.26
95% UPPER CONFIDENCE: 2.53

***Cyprinella leedsi* Acute Standard Reference Toxicant Test**

DATE: 5-3-11 DURATION: 96 h TOXICANT : NaCl
SPECIES: ***Cyprinella leedsi***

RAW DATA: Concentration (g/L)	Number Exposed	Mortalities
.00	20	0
6.00	20	1
7.00	20	0
8.00	20	11
9.00	20	20
10.00	20	20

SPEARMAN-KARBER TRIM: 2.50%

SPEARMAN-KARBER ESTIMATES: LC50: 7.90
95% LOWER CONFIDENCE: 7.67
95% UPPER CONFIDENCE: 8.14

NOTE: MORTALITY PROPORTIONS WERE NOT MONOTONICALLY INCREASING. ADJUSTMENTS WERE MADE PRIOR TO SPEARMAN-KARBER ESTIMATION.

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: 5/2/11

Ship to: FDEP

P.O. No: _____

Species	Quantity	Age	Brood/Lot Number	Temp. (°C)	pH (S.U.)	Salinity (‰)
Mysidopsis bahia	150 ac	4DAYS	MS 110428	25	7.9	20
Menidia beryllina	150 ac	12 DAYS	SS 110420	25	7.9	20
						Hardness mg/L
Cyprinella leedsi	150 ac	12 DAYS	CL 110420	25	7.8	80
Pimephales promelas	150 ac	8 DAYS	FM 110424	25	7.8	80
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 D. (continued)

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Shipping Date: 5/16/11

Ship to: FDEP

P.O. No: _____

Species	Quantity	Age	Brood/Lot Number	Temp. (°C)	pH (S.U.)	Salinity (‰)
Mysidopsis bahia	150	4 DAYS	MS 110512	25	7.9	20
Menidia beryllina						
						Hardness mg/L
Cyprinella leedsi	100	11 DAYS	CL 110505	25	7.8	80
Pimephales promelas	400-300	<24 HRS	FM 110515-1655	25	7.8	80
Ceriodaphnia dubia						
Daphnia magna						
YCT						
P. subcapitata						

Packed by: PM

Shipped Via: _____

Notes: CL must be less than 12 days

Thank you for your order.

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Appendix E. Chemical Analyses performed on the effluent from the Lowry Park Zoological Society of Tampa, Inc., Outfall D-001, sampled on May 16, 2011.

Date Sampled	Field ID	Analysis Group	Component	Result	Remark	Units	MDL	PQL
5/16/2011 10:30	EFF-01	AGP/LN	Algal Growth Potential	20.1	A	mg DryWt/L	0.3	0.9
5/16/2011 10:30	EFF-01	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	1	I	mg/L	0.2	2
5/16/2011 10:30	EFF-01	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	27		ug/L	0.55	1.7
5/16/2011 10:30	EFF-01	Chlorophyll/Grain Size/BOD	Phaeophytin-a	8.9		ug/L	0.4	1.2
5/16/2011 10:30	EFF-01	Overflow	Fecal Coliforms-Membrane Filter	11	B	cfu/100 mL	1	
5/16/2011 10:30	EFF-01	Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	L	LC50		
5/16/2011 10:30	EFF-01	Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	L	LC50		
5/16/2011 10:30	EFF-01	Metals	Calcium	92.1		mg/L	0.075	0.3
5/16/2011 10:30	EFF-01	Metals	Silver	0.029	I	ug/L	0.025	0.1
5/16/2011 10:30	EFF-01	Metals	Cadmium	0.05	U	ug/L	0.05	0.2
5/16/2011 10:30	EFF-01	Metals	Antimony	0.25	U	ug/L	0.25	1
5/16/2011 10:30	EFF-01	Metals	Lead	0.42	I	ug/L	0.2	0.8
5/16/2011 10:30	EFF-01	Metals	Zinc	53		ug/L	5	20
5/16/2011 10:30	EFF-01	Metals	Nickel	0.48	I	ug/L	0.25	1
5/16/2011 10:30	EFF-01	Metals	Iron	140		ug/L	30	120
5/16/2011 10:30	EFF-01	Metals	Aluminum	205		ug/L	5	20
5/16/2011 10:30	EFF-01	Metals	Chromium	1	I	ug/L	0.3	1.2
5/16/2011 10:30	EFF-01	Metals	Beryllium	0.025	U	ug/L	0.025	0.1
5/16/2011 10:30	EFF-01	Metals	Arsenic	1.07		ug/L	0.25	1
5/16/2011 10:30	EFF-01	Metals	Magnesium	14.9		mg/L	0.04	0.16
5/16/2011 10:30	EFF-01	Metals	Selenium	0.2	U	ug/L	0.2	0.8
5/16/2011 10:30	EFF-01	Metals	Copper	6.03		ug/L	0.5	1
5/16/2011 10:30	EFF-01	Nutrients	Ammonia-N	0.1		mg N/L	0.01	0.02
5/16/2011 10:30	EFF-01	Nutrients	O-Phosphate-P	0.1		mg P/L	0.004	0.01
5/16/2011 10:30	EFF-01	Nutrients	Total-P	0.2		mg P/L	0.005	0.05
5/16/2011 10:30	EFF-01	Nutrients	Kjeldahl Nitrogen	0.67		mg N/L	0.08	0.2
5/16/2011 10:30	EFF-01	Nutrients	NO2NO3-N	0.26		mg N/L	0.004	0.01
5/16/2011 10:30	EFF-01	Nutrients	TSS	13	A	mg/L	2	10
5/16/2011 10:30	EFF-01	Overflow	Alpha, Total	2.6		pCi/L	2.5	
5/16/2011 10:30	EFF-01	Overflow	Radium 226	2		pCi/L	0.1	
5/16/2011 10:30	EFF-01	Overflow	Alpha-Counting Error	1.7		pCi/L		
5/16/2011 10:30	EFF-01	Overflow	Radium 228	0.9	U	pCi/L	0.9	
5/16/2011 10:30	EFF-01	Overflow	Radium 226-Counting Error	0.2		pCi/L		

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Remark	Units	MDL	PQL
5/16/2011 10:30	EFF-01	Overflow	Radium 228-Counting Error	0.5		pCi/L		
5/16/2011 10:30	EFF-01	Pesticides	Atrazine	0.047	U	ug/L	0.047	0.19
5/16/2011 10:30	EFF-01	Pesticides	Fonofos	0.094	U	ug/L	0.094	0.38
5/16/2011 10:30	EFF-01	Pesticides	Malathion	0.14	U	ug/L	0.14	0.57
5/16/2011 10:30	EFF-01	Pesticides	Prometryn	0.14	U	ug/L	0.14	0.57
5/16/2011 10:30	EFF-01	Pesticides	Ametryn	0.047	U	ug/L	0.047	0.19
5/16/2011 10:30	EFF-01	Pesticides	Chlorpyrifos Methyl	0.094	U	ug/L	0.094	0.38
5/16/2011 10:30	EFF-01	Pesticides	Bromacil	0.19	U	ug/L	0.19	0.75
5/16/2011 10:30	EFF-01	Pesticides	Chlorpyrifos Ethyl	0.047	U	ug/L	0.047	0.19
5/16/2011 10:30	EFF-01	Pesticides	Diazinon	0.047	U	ug/L	0.047	0.19
5/16/2011 10:30	EFF-01	Pesticides	Fenamiphos	0.19	U	ug/L	0.19	0.75
5/16/2011 10:30	EFF-01	Pesticides	Mevinphos	0.19	U	ug/L	0.19	0.75
5/16/2011 10:30	EFF-01	Pesticides	Norflurazon	0.14	U	ug/L	0.14	0.57
5/16/2011 10:30	EFF-01	Pesticides	Metalaxyl	0.24	U	ug/L	0.24	0.94
5/16/2011 10:30	EFF-01	Pesticides	Naled	0.75	U	ug/L	0.75	3
5/16/2011 10:30	EFF-01	Pesticides	Phorate	0.047	U	ug/L	0.047	0.19
5/16/2011 10:30	EFF-01	Pesticides	Simazine	0.047	U	ug/L	0.047	0.19
5/16/2011 10:30	EFF-01	Pesticides	Butylate	0.19	UJ	ug/L	0.19	0.75
5/16/2011 10:30	EFF-01	Pesticides	Ethion	0.047	U	ug/L	0.047	0.19
5/16/2011 10:30	EFF-01	Pesticides	Metribuzin	0.094	U	ug/L	0.094	0.38
5/16/2011 10:30	EFF-01	Pesticides	Parathion Ethyl	0.14	U	ug/L	0.14	0.57
5/16/2011 10:30	EFF-01	Pesticides	Azinphos Methyl	0.19	UJ	ug/L	0.19	0.75
5/16/2011 10:30	EFF-01	Pesticides	Metolachlor	0.47	U	ug/L	0.47	1.9
5/16/2011 10:30	EFF-01	Pesticides	Alachlor	0.57	UJ	ug/L	0.57	2.3
5/16/2011 10:30	EFF-01	Pesticides	Ethoprop	0.094	U	ug/L	0.094	0.38
5/16/2011 10:30	EFF-01	Pesticides	Hexazinone	0.094	U	ug/L	0.094	0.38
5/16/2011 10:30	EFF-01	Pesticides	Parathion Methyl	0.094	U	ug/L	0.094	0.38
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.99	U	ug/L	0.99	4
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	2-Nitrophenol	0.99	U	ug/L	0.99	4
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Fluoranthene	0.2	U	ug/L	0.2	0.79
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Di-n-octyl phthalate	0.99	U	ug/L	0.99	4
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Benzo(k)fluoranthene	0.2	U	ug/L	0.2	0.79
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	2-Chlorophenol	0.99	U	ug/L	0.99	4

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Remark	Units	MDL	PQL
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	2-Chloronaphthalene	0.99	U	ug/L	0.99	4
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Naphthalene	0.2	U	ug/L	0.2	0.79
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Hexachloroethane	3	U	ug/L	3	12
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	N-Nitrosodimethylamine	2	U	ug/L	2	7.9
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	2,4-Dinitrotoluene	0.99	U	ug/L	0.99	4
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	2	U	ug/L	2	7.9
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Anthracene	0.2	U	ug/L	0.2	0.79
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Benzo(a)pyrene	0.2	U	ug/L	0.2	0.79
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.99	U	ug/L	0.99	4
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Di-n-butyl phthalate	5	U	ug/L	5	20
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Isophorone	0.99	U	ug/L	0.99	4
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Pyrene	0.2	U	ug/L	0.2	0.79
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.99	U	ug/L	0.99	4
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	3	U	ug/L	3	12
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	3,3'-Dichlorobenzidine	40	UJ	ug/L	40	160
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Benzo(a)anthracene	0.2	U	ug/L	0.2	0.79
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Benzo(b)fluoranthene	0.2	U	ug/L	0.2	0.79
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Butyl benzyl phthalate	5	U	ug/L	5	20
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Hexachlorobenzene	0.99	U	ug/L	0.99	4
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.2	U	ug/L	0.2	0.79
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Phenol	0.99	U	ug/L	0.99	4
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	2,4-Dichlorophenol	0.99	U	ug/L	0.99	4
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	2,4-Dimethylphenol	9.9	U	ug/L	9.9	40
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Acenaphthene	0.2	U	ug/L	0.2	0.79
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.2	U	ug/L	0.2	0.79
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Diethyl phthalate	0.99	U	ug/L	0.99	4
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Hexachlorocyclopentadiene	3	U	ug/L	3	12
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Nitrobenzene	2	U	ug/L	2	7.9
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.99	U	ug/L	0.99	4
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Benzidine	99	U	ug/L	99	400
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.99	U	ug/L	0.99	4
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	3	U	ug/L	3	12
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.2	U	ug/L	0.2	0.79

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Remark	Units	MDL	PQL
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Fluorene	0.2	U	ug/L	0.2	0.79
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Hexachlorobutadiene	3	U	ug/L	3	12
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	2	U	ug/L	2	7.9
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	3	U	ug/L	3	12
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	2,6-Dinitrotoluene	0.99	U	ug/L	0.99	4
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.99	U	ug/L	0.99	4
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	4-Nitrophenol	15	U	ug/L	15	59
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	15	U	ug/L	15	59
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Pentachlorophenol	3	U	ug/L	3	12
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Phenanthrene	0.2	U	ug/L	0.2	0.79
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	2,4-Dinitrophenol	15	U	ug/L	15	59
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Acenaphthylene	0.2	U	ug/L	0.2	0.79
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Chrysene	0.2	U	ug/L	0.2	0.79
5/16/2011 10:30	EFF-01	Priority Organic Pollutants	Dimethyl phthalate	9.9	U	ug/L	9.9	40
5/16/2011 10:30	EFF-01	Field Parameter	Dissolved Oxygen	7.73		mg/L		
5/16/2011 10:30	EFF-01	Field Parameter	Specific Conductance	1245		umhos/cm		
5/16/2011 10:30	EFF-01	Field Parameter	Temperature	24.53		C		
5/16/2011 10:30	EFF-01	Field Parameter	pH	8.2				
5/16/2011 11:00	Field Blank	Metals	Nickel	0.25	U	ug/L	0.25	1
5/16/2011 11:00	Field Blank	Metals	Zinc	5	U	ug/L	5	20
5/16/2011 11:00	Field Blank	Metals	Cadmium	0.05	U	ug/L	0.05	0.2
5/16/2011 11:00	Field Blank	Metals	Copper	0.5	U	ug/L	0.5	1
5/16/2011 11:00	Field Blank	Metals	Calcium	0.075	U	mg/L	0.075	0.3
5/16/2011 11:00	Field Blank	Metals	Aluminum	5	U	ug/L	5	20
5/16/2011 11:00	Field Blank	Metals	Arsenic	0.25	U	ug/L	0.25	1
5/16/2011 11:00	Field Blank	Metals	Beryllium	0.025	U	ug/L	0.025	0.1
5/16/2011 11:00	Field Blank	Metals	Silver	0.025	U	ug/L	0.025	0.1
5/16/2011 11:00	Field Blank	Metals	Lead	0.2	U	ug/L	0.2	0.8
5/16/2011 11:00	Field Blank	Metals	Antimony	0.25	U	ug/L	0.25	1
5/16/2011 11:00	Field Blank	Metals	Iron	30	U	ug/L	30	120
5/16/2011 11:00	Field Blank	Metals	Selenium	0.2	U	ug/L	0.2	0.8
5/16/2011 11:00	Field Blank	Metals	Chromium	0.3	U	ug/L	0.3	1.2
5/16/2011 11:00	Field Blank	Metals	Magnesium	0.04	U	mg/L	0.04	0.16

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Remark	Units	MDL	PQL
5/16/2011 11:00	Field Blank	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
5/16/2011 11:00	Field Blank	Nutrients	Total-P	0.004	U	mg P/L	0.004	0.01
5/16/2011 11:00	Field Blank	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
5/16/2011 11:00	Field Blank	Nutrients	O-Phosphate-P	0.004	U	mg P/L	0.004	0.01
5/16/2011 11:00	Field Blank	Nutrients	Kjeldahl Nitrogen	0.08	U	mg N/L	0.08	0.2
5/16/2011 11:00	Field Blank	Overflow	Radium 228-Counting Error	0.6		pCi/L		
5/16/2011 11:00	Field Blank	Overflow	Radium 226	0.2	U	pCi/L	0.2	
5/16/2011 11:00	Field Blank	Overflow	Alpha-Counting Error	0.6		pCi/L		
5/16/2011 11:00	Field Blank	Overflow	Alpha, Total	0.7	U	pCi/L	0.7	
5/16/2011 11:00	Field Blank	Overflow	Radium 228	0.9	U	pCi/L	0.9	
5/16/2011 11:00	Field Blank	Overflow	Radium 226-Counting Error	0.2		pCi/L		
5/16/2011 11:00	Field Blank	Pesticides	Fenamiphos	0.2	U	ug/L	0.2	0.79
5/16/2011 11:00	Field Blank	Pesticides	Ethoprop	0.099	U	ug/L	0.099	0.4
5/16/2011 11:00	Field Blank	Pesticides	Chlorpyrifos Methyl	0.099	U	ug/L	0.099	0.4
5/16/2011 11:00	Field Blank	Pesticides	Atrazine	0.05	U	ug/L	0.05	0.2
5/16/2011 11:00	Field Blank	Pesticides	Metribuzin	0.099	U	ug/L	0.099	0.4
5/16/2011 11:00	Field Blank	Pesticides	Metalaxyl	0.25	U	ug/L	0.25	0.99
5/16/2011 11:00	Field Blank	Pesticides	Naled	0.79	U	ug/L	0.79	3.2
5/16/2011 11:00	Field Blank	Pesticides	Malathion	0.15	U	ug/L	0.15	0.59
5/16/2011 11:00	Field Blank	Pesticides	Fonofos	0.099	U	ug/L	0.099	0.4
5/16/2011 11:00	Field Blank	Pesticides	Azinphos Methyl	0.2	UJ	ug/L	0.2	0.79
5/16/2011 11:00	Field Blank	Pesticides	Simazine	0.05	U	ug/L	0.05	0.2
5/16/2011 11:00	Field Blank	Pesticides	Parathion Ethyl	0.15	U	ug/L	0.15	0.59
5/16/2011 11:00	Field Blank	Pesticides	Norflurazon	0.15	U	ug/L	0.15	0.59
5/16/2011 11:00	Field Blank	Pesticides	Ethion	0.05	U	ug/L	0.05	0.2
5/16/2011 11:00	Field Blank	Pesticides	Ametryn	0.05	U	ug/L	0.05	0.2
5/16/2011 11:00	Field Blank	Pesticides	Prometryn	0.15	U	ug/L	0.15	0.59
5/16/2011 11:00	Field Blank	Pesticides	Phorate	0.05	U	ug/L	0.05	0.2
5/16/2011 11:00	Field Blank	Pesticides	Alachlor	0.59	UJ	ug/L	0.59	2.4
5/16/2011 11:00	Field Blank	Pesticides	Parathion Methyl	0.099	U	ug/L	0.099	0.4
5/16/2011 11:00	Field Blank	Pesticides	Metolachlor	0.5	U	ug/L	0.5	2
5/16/2011 11:00	Field Blank	Pesticides	Hexazinone	0.099	U	ug/L	0.099	0.4
5/16/2011 11:00	Field Blank	Pesticides	Butylate	0.2	UJ	ug/L	0.2	0.79

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Remark	Units	MDL	PQL
5/16/2011 11:00	Field Blank	Pesticides	Bromacil	0.2	U	ug/L	0.2	0.79
5/16/2011 11:00	Field Blank	Pesticides	Diazinon	0.05	U	ug/L	0.05	0.2
5/16/2011 11:00	Field Blank	Pesticides	Mevinphos	0.2	U	ug/L	0.2	0.79
5/16/2011 11:00	Field Blank	Pesticides	Chlorpyrifos Ethyl	0.05	U	ug/L	0.05	0.2
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	1.9	U	ug/L	1.9	7.6
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	4-Nitrophenol	14	U	ug/L	14	57
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Benzo(a)anthracene	0.19	U	ug/L	0.19	0.76
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Dimethyl phthalate	9.5	U	ug/L	9.5	38
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Naphthalene	0.19	U	ug/L	0.19	0.76
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Pentachlorophenol	2.9	U	ug/L	2.9	11
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	2,4-Dinitrophenol	14	U	ug/L	14	57
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Benzo(b)fluoranthene	0.19	U	ug/L	0.19	0.76
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.19	U	ug/L	0.19	0.76
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Butyl benzyl phthalate	4.8	U	ug/L	4.8	19
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Di-n-butyl phthalate	4.8	U	ug/L	4.8	19
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Hexachlorobenzene	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Hexachlorocyclopentadiene	2.9	U	ug/L	2.9	11
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Hexachloroethane	2.9	U	ug/L	2.9	11
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	14	U	ug/L	14	57
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Chrysene	0.19	U	ug/L	0.19	0.76
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Isophorone	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Acenaphthylene	0.19	U	ug/L	0.19	0.76
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Di-n-octyl phthalate	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Diethyl phthalate	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.19	U	ug/L	0.19	0.76
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	1.9	U	ug/L	1.9	7.6
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Phenanthrene	0.19	U	ug/L	0.19	0.76
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Pyrene	0.19	U	ug/L	0.19	0.76
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	2,4-Dinitrotoluene	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Benzidine	95	U	ug/L	95	380

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Remark	Units	MDL	PQL
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Benzo(a)pyrene	0.19	U	ug/L	0.19	0.76
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Benzo(k)fluoranthene	0.19	U	ug/L	0.19	0.76
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.19	U	ug/L	0.19	0.76
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	N-Nitrosodimethylamine	1.9	U	ug/L	1.9	7.6
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	2.9	U	ug/L	2.9	11
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Nitrobenzene	1.9	U	ug/L	1.9	7.6
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	2,6-Dinitrotoluene	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Anthracene	0.19	U	ug/L	0.19	0.76
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Phenol	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	2,4-Dichlorophenol	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	2,4-Dimethylphenol	9.5	U	ug/L	9.5	38
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	2-Chloronaphthalene	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	2.9	U	ug/L	2.9	11
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Acenaphthene	0.19	U	ug/L	0.19	0.76
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Fluoranthene	0.19	U	ug/L	0.19	0.76
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Hexachlorobutadiene	2.9	U	ug/L	2.9	11
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	2-Chlorophenol	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	2-Nitrophenol	0.95	U	ug/L	0.95	3.8
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	3,3'-Dichlorobenzidine	38	U	ug/L	38	150
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	2.9	U	ug/L	2.9	11
5/16/2011 11:00	Field Blank	Priority Organic Pollutants	Fluorene	0.19	U	ug/L	0.19	0.76

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: Jason Cohen Jason.Cohen@dep.state.fl.us	**Contact Number:** 813-632-7600 x361
Facility Name (as it appears on permit): Lowry Park Zoological Society of Tampa	**Former Names:**
NPDES Permit Number: FL0186651	**Permit Expiration Date:** February 15, 2012
Physical Address: 1101 West Sligh Avenue Tampa, Fl 33604	
District: Southwest	**County:** Hillsborough
Function of Facility: This permit is for the operation of the industrial wastewater treatment and disposal system for a zoological garden	
Facility Type: Zoological Garden	**Permitted Capacity (MGD):** Report
Mean Flow for previous 12 months for all EXTERNAL outfalls listed in permit (list date range including months): 4/01/2010-3/01/2011: 0.107 MGD	
If applicable, Mean Flow for previous 12 months for REUSE outfall(s) (list date range including months):	
Description of type of Discharge: ☐ **Continuous** ☒ **Intermittent** ☐ **Seasonal** ☐ **Rainfall Dependent** ☐ **Other, please specify**	

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Appendix F. (continued)

Description of Sampling Location(s) - actual permit designation of permitted sampling point(s):

Sample Point	Description of Monitoring Location
FLW-1	**Flow meter for Outfall D-001**
EFF-1	**Point of discharge to Hamilton Creek from the 4-inch discharge pipe**
SWB-1	**Background Station for Outfall D-001- upstream of the Outfall in Hamilton Creek**

Description of Permitted Outfall(s):

Surface Water Discharge:

An existing monthly average daily flow (MADF) is discharged from Lake Sharon to Hamilton Creek (Class III Fresh Waters), D-001, which flows to the tidally influenced portion of the Hillsborough River (Class III Marine Waters). The Outfall D-001 is located approximately at latitude 28° 00' 41" N, longitude 82° 28' 14" W.

Land Application:

An existing irrigation system (R-001) consisting of the use of treated wastewater and storm water for irrigation at areas of the park that have restricted public access.

Description of Treatment Process (if multiple discharge points, include a detailed map or diagram of facility):

WASTEWATER TREATMENT:

The industrial wastewater generated on-site from maintenance activities associated with operation of the zoological garden and storm water runoff from the site is routed to Lake Sharon. Wastewater and contact storm water is pumped from the north side of Lake Sharon at 350 gallons per minute into a 2,000-gallon holding tank, and pass through two 42-inch epoxy coated sand filters before entering a UV sterilizer. The disinfected wastewater and storm water is used to irrigate areas of the park that have restricted public access. These areas consist of animal exhibits and the planters surrounding these exhibits. Filter backwash discharges to sanitary sewer. In the event when wastewater and storm water collected in Lake Sharon exceed the irrigation needs of the park and the holding capacity of the lake, the facility is authorized to discharge from Lake Sharon, through Outfall D-001, to Hamilton Creek (Class III fresh waters), which flows to the tidal influenced portion of Hillsborough River (Class III marine waters).

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)

Parameters (units)	Discharge Limitations			Monitoring Requirements		
	Monthly Average	Daily Maximum	Daily Minimum	Monitoring Frequency	Sample Type	Sample Point
Flow Rate (GPD)	Report	Report	--	Continuous	Meter	FLW-1
Oxygen, Dissolved (DO) (MG/L)	--	--	5.0	Weekly, When Discharging	Instantaneous	EFF-1
pH (SU)	--	8.5	6.0	Weekly, When Discharging	Instantaneous	EFF-1
Temperature (C), Water (DEG.C)	Report	Report	--	Weekly, When Discharging	Instantaneous	EFF-1
Phosphorus, Total (as P) (MG/L)	1.0	Report	--	Weekly, When Discharging	Grab	EFF-1
Nitrogen, Total (MG/L)	5.0	Report	--	Weekly, When Discharging	Grab	EFF-1
Ammonia, Unionized (as NH3) (MG/L)	Report	0.02	--	Weekly, When Discharging	Calculated	EFF-1
Nitrogen, Ammonia, Total (as N) (MG/L)	Report	Report	--	Weekly, When Discharging	Grab	EFF-1
Chlorine, Total Residual (MG/L)	Report	0.01	--	Weekly, When Discharging	Instantaneous	EFF-1
Coliform, Fecal (#/100ML)	Report	800	--	Weekly, When Discharging	Grab	EFF-1
Coliform, Total (#/100ML)	Report	Report	--	Weekly, When Discharging	Grab	EFF-1
Specific Conductance (UMHO/CM)	Report	See Cond. I.A.3.	--	Weekly, When Discharging	Instantaneous	EFF-1
Specific Conductance (Background) (UMHO/CM)	Report	Report	--	Weekly, When Discharging	Instantaneous	SWB-1
Turbidity (NTU)	Report	See Cond. I.A.4.	--	Weekly, When Discharging	Instantaneous	EFF-1
Turbidity (Background) (NTU)	Report	Report	--	Weekly, When Discharging	Instantaneous	SWB-1
Whole Effluent Toxicity (Acute)	See Permit Condition I.A.5			--	--	EFF-1

Appendix F. (continued)

PART I: Continued	
Receiving Waters: the facility is authorized to discharge from Lake Sharon, through Outfall D-001, to Hamilton Creek (Class III fresh waters), which flows to the tidal influenced portion of Hillsborough River (Class III marine waters).	**Classification (indicate whether fresh or marine):** Class III Fresh which flows to Class III Marine

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

a. Effluent Limitation
   (1) Whole effluent acute toxicity shall not exceed in any "routine" or in any "additional follow-up" test an LC50 of less than 100% effluent. [Rule 62-302.200(1), Rule 62-302.500(1)(a)4., and Rule 62-4.244(3)(a), F.A.C.]

b. Monitoring Frequency
   (1) "Routine" toxicity tests shall be conducted *bimonthly when discharging* and lasting for the duration of this permit unless a reduction in the frequency of monitoring is granted in writing by the Department.
   (2) Upon completion of six consecutive, valid "routine" tests that demonstrate compliance with the effluent limitation in 5.a.(1) above, the permittee may submit a written request to the Department for a reduction in monitoring frequency. The Department shall review this request within 45 days of receipt and approve or deny the request in writing. Materials submitted to the Department for review should include a summary of the data and the complete bioassay reports for all tests being considered. In no case shall the frequency of monitoring be reduced to less than annually. Requested reductions in monitoring shall only become effective upon Department approval.
   (3) If a test within the sequence of the six is deemed invalid, but is replaced by a repeat valid test initiated within seven days of the invalidation, the invalid test will not be counted against the requirement for six consecutive valid tests for the purpose of evaluating the reduction of monitoring frequency. If two or more invalidations occur, this provision does not apply.

c. Test Requirements
   (1) Routine Tests: All routine tests shall be conducted using a control (0% effluent) and a minimum of five dilutions: 100%, 50%, 25%, 12.5% and 6.25% effluent.
   (2) Additional Follow-up Tests, if required:
      (a) If a routine test does not meet the acute toxicity limitation in 5.a.(1) above, the permittee shall conduct two additional follow-up tests on each species that failed the test.
      (b) The first and second additional follow-up tests shall be conducted using a control (0% effluent) and a minimum of five dilutions: 100%, 50%, 25%, 12.5% and 6.25% effluent. All test results shall be statistically analyzed according to the Appendices in EPA-821-R-02-012.
      (c) The first test shall be initiated within two weeks of the end of the failed routine test. The remaining additional follow-up tests shall be conducted weekly thereafter until a total of two valid additional follow-up tests are completed.
   (3) The permittee shall conduct 96-hour acute static renewal multi-concentration toxicity tests using the daphnid, Ceriodaphnia dubia, and the bannerfin shiner, Cyprinella leedsi, concurrently.
   (4) All test species, procedures and quality assurance criteria used shall be in accordance with Methods for Measuring Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, EPA-821-R-02-012. Any deviation of the bioassay procedures outlined herein shall be submitted in writing to the Department for review and approval prior to use. In the event the above method is revised, the permittee shall conduct acute toxicity testing in accordance with the revised method.
   (5) The control water and dilution water used will be moderately hard water as described in EPA-821-R-02-012, Table 7.

d. Sampling Requirements
   (1) All tests will be conducted on a single grab sample of final effluent. If the duration of the discharge is less than 24-hours, the duration of discharge shall be documented on the chain of custody.
   (2) Results for each additional test shall include the determination of LC50 values with 95% confidence limits.

Appendix F. (continued)

Administrative or Consent Orders (date executed, specific requirements, interim limit dates-if applicable, etc.): OGC 09-3536A; Executed: 8 October 2010 (forwarded as email attachment)			
Facility Mixing Zone Details (if applicable): N/A			
List Permit Violations (DMR data) and plant upsets that occurred at the plant within the last year: Attached as a separate Excel file culled from PCS			
Date	Parameter and Units	Limit	Result
Describe previous FYI and WQBEL study: Copy of 2005 FYI3 report forwarded as email attachment			
Describe previous or current Enforcement Actions (including WLs):			
Describe any violations or problems noted in previous inspection:			
Discuss whether DMR trends within previous five years are improving or declining:			
Additional Comments (this should include a trend of the Effluent, i.e. if the facility is now Reuse):			

Appendix F. (continued)

State of Florida
Department of Environmental Protection
Facility Introduction & Summary

PART II: Sampling Event Information	
Date(s) sample collected: May 16, 2011	**Sampler(s):** Pete Wenner, Jason Cohen
Temperature (Deg C): 24.53	**pH (SU):** 8.20
Dissolved Oxygen (mg/L): 7.73	**Conductivity (umhos/cm):** 1245
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): 0.117	
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): 0.107	
Describe Discharge during Sampling Event: ☐ Continuous ☒ Intermittent ☐ Seasonal ☐ Rainfall Dependent ☐ Other, please specify	

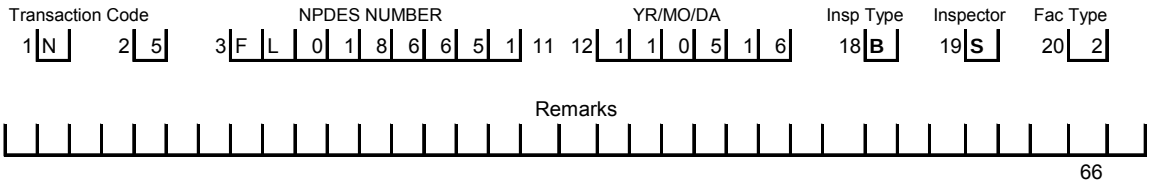
Appendix F. (continued)

Describe any conditions, difficulties or abnormal events that occurred during the sample collection and any other additional comments here:

Appendix G. EPA End Sheet

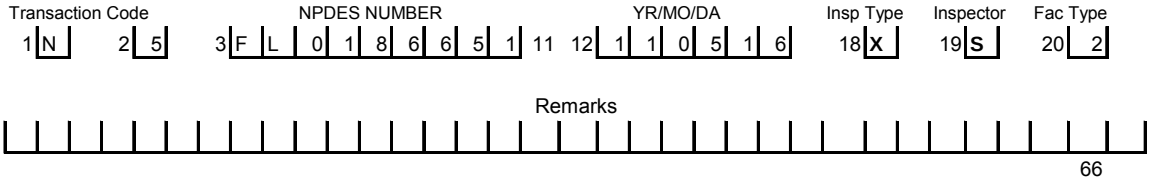
The Bioassay of Lowry Park Zoological Society of Tampa, Inc., effluent sampled on May 16, 2011. NPDES #FL0186651.

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



The Priority Pollutants Analysis of Lowry Park Zoological Society of Tampa, Inc., effluent sampled on May 16, 2011. NPDES #FL0186651.

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



Biological Analyses of Lowry Park Zoological Society of Tampa, Inc., effluent sampled on May 16, 2011. NPDES #FL0186651.

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

