

Effluent Quality Assessment

Mosaic Fertilizer, L.L.C.-Noralyn Mine Complex

(Formerly IMC Phosphate Co.-Noralyn Mine)

Polk County

NPDES #FL0000230

Sampled September 22, 2008

January 2009

Re-Issued with Phytoplankton Results February 2009, and with corrected tables in March 2011

Biology Section
Bureau of Laboratories
Division of Environmental Assessment and Restoration

Quality Manual No. 870346G
NELAC Certification No. E31780

Mosaic Fertilizer, L.L.C.-Noralyn Mine Complex, 3301 Noralyn Mine Road, Bartow, Polk County, Florida, NPDES #FL0000230. Effluent samples for this facility were collected on September 22, 2008.

Introduction

Mosaic Fertilizer, L.L.C.-Noralyn Mine Complex was previously operated as a phosphate mine and now consists of completed reclamation activities. Discharge from the facility is intermittent and rainfall dependent. The facility discharges through three outfalls. Outfall D-003, discharging into Six Mile Creek, is located approximately at latitude 27º 51' 48.308" N, longitude 81º 48' 31.452" W; Outfall D-004, discharging into Barber Branch, is located approximately at latitude 27º 50' 17.847" N, longitude 81º 48' 43.634" W; and Outfall D-005, discharging into the Peace River, is located approximately at latitude 27º 50' 39.453" N, longitude 81º 47' 52.980" W. The receiving waters are classified as Class III Freshwaters.

The facility does not have a permitted flow limit. The monthly average flows from October 2007 through September 2008 were 3.7667 million gallons per day (MGD), 0.6125 MGD and 1.0736 MGD, respectively, for Outfalls D-003, D-004 and D-005.

The facility has no Administrative Orders, Consent Orders or mixing zones. A review of Discharge Monitoring Report (DMR) data for the past year, revealed no permit violations. A FYI5 inspection in September 2002 included macroinvertebrate collection in the Peace River upstream and downstream of the three outfalls. Taxa richness, diversity and qualitative measurements were all higher at the test site. The dissolved oxygen was low at D-004 and D-005 and in the control and test sites. Nutrient concentrations were higher in the test site than the control site. The outfalls contributed to sulfate and fluoride concentrations downstream. (Facility information provided by Jacquelyn Champion, FDEP BMMR Phosphate Management Southwest District).

Methods

Samples were collected from the respective NPDES sampling points (EFF-03, EFF-04 and EFF-05) for each of the three Outfalls (D-003, D-004 and D-005) by Jacki Champion and George Sharrock (FDEP BMMR Phosphate Management 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/qa/sops.htm.

See Appendix A for the completed chain of custody form.

The 48-hour acute screening toxicity tests and algal growth potential tests 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.

Prior to test initiation, the bioassay sample from Outfall D-004 was aerated for 20 minutes at approximately 100 bubbles per minute, to increase the dissolved oxygen concentration from 2.5 mg/L to 7.7 mg/L.

Toxicity Test Results

Tests were performed September 23 - 25, 2008.

Outfall D-003

Ceriodaphnia dubia 48-hour acute screening bioassay – LC_{50} > 100%, 5% mortality* in 100% sample at 48 hours

Cyprinella leedsi 48-hour acute screening bioassay – LC_{50} > 100%, 0% mortality* in 100% sample at 48 hours

Outfall D-004

Ceriodaphnia dubia 48-hour acute screening bioassay –	LC_{50} > 100%, 5% mortality* in 100% sample at 48 hours
Cyprinella leedsi 48-hour acute screening bioassay –	LC_{50} > 100%, 0% mortality* in 100% sample at 48 hours

Outfall D-005

Ceriodaphnia dubia 48-hour acute screening bioassay –	LC_{50} > 100%, 0% mortality* in 100% sample at 48 hours
Cyprinella leedsi 48-hour acute screening bioassay –	LC_{50} > 100%, 0% mortality* in 100% sample at 48 hours

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

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.

*NOTE: In a 48-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.).

Algal Growth Potential

The Algal Growth Potentials (AGP) for each of the three effluents were, respectively, for Outfalls D-003, D-004 and D-005 27.2, 47.0 and 26.9 mg dry wt/L of the unicellular green alga, *Pseudokirchneriella subcapitata*, formerly known as *Selenastrum capricornutum*. Raschke and Shultz (1987) found that AGP values above 5.0 mg dry weight/L represent a "problem" threshold for fresh receiving waters, implying nutrient enrichment. The analytical chemistry suggests that the effluent from each Outfall is nitrogen limited. The predicted AGP(s) based on inorganic nitrogen concentrations were 17.2 (±20%), 49.6 (±20%) and 19.5 (±20%) mg dry wt/L, respectively, for the samples from Outfall D-003, D-004 and D-005 (Table 1; Miller et al. 1978).

See Table 1 for AGP results.

Phytoplankton Results

See Appendix F-1 and F-2 for taxa lists.

The phytoplankton communities in all three outfalls reflected the high levels of nutrients found there. The phytoplankton community at Outfall D-004 was dominated by the blue-green alga *Planktothrix agardhii*, which is likely due to the higher nitrogen levels in this effluent. Outfall D-003 was dominated by diatoms, and Outfall D-005 was dominated by the green algal species *Chlorella vulgaris*. Diatom communities in both Outfall D-003 and D-005 were dominated by the eutraphentic diatom *Cyclotella meneghiana* (van Dam, et al, 1994), and the diatom community at Outfall D-004 was dominated by diatoms in the genus *Nitzschia*. Although most of the diatoms in this genus could not be identified to species, the species *Nitzschia amphibia*, a eutraphentic diatom, and *Nitzschia palea*, a hypereutraphentic diatom, were identified in Outfall D-004.

Chemistry Results

Total residual chlorine was not detected in any of the bioassay samples in the laboratory. Total ammonia concentrations measured in the bioassay samples in the bioassay laboratory were 0.383 mg/L, 1.30 mg/L and 0.451 mg/L, respectively, in the samples from Outfalls D-003, D-004 and D-005. The total ammonia concentrations in the samples collected and preserved for chemical analysis were 0.41 mg/L, 1.30 mg/L and 0.51 mg/L, respectively, in the samples from Outfalls D-003, D-004 and D-005 mg/L. Based on the pH, salinity, and temperature of the effluents as collected, the calculated unionized ammonia concentration was < 0.02 mg/L in each sample.

The effluent dissolved oxygen (DO) as measured in the field for Outfall D-004 (4.3 mg/L) and Outfall D-005 (1.6 mg/L) violated the DO criteria for Class III freshwaters (≥ 5.0 mg/L; 62-302.530(30), F.A.C.).

Outfall D-003

Arsenic, fluoride and nickel were detected in the effluent at levels that comply with Class III fresh water quality criteria (62-302.530, F.A.C.). Aluminum and iron were detected between the laboratory method detection limits (MDL) and practical quantitation limits (PQL). Sulfate was also detected in the effluent.

Outfall D-004

Iron and fluoride were detected in the effluent at levels that comply with Class III fresh water quality criteria (62-302.530, F.A.C.). Arsenic and nickel were detected between the laboratory method detection limits (MDL) and practical quantitation limits (PQL). Sulfate was also detected in the effluent.

Outfall D-005

Iron and fluoride were detected in the effluent at levels that comply with Class III fresh water quality criteria (62-302.530, F.A.C.). Arsenic and nickel were detected between the laboratory method detection limits (MDL) and practical quantitation limits (PQL). Sulfate was also detected in the effluent.

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.

Conclusion

The effluent samples collected from Outfalls D-003, D-004 and D-005 for this facility on September 23, 2008, were not acutely toxic to either test species during the 48-hour acute screening bioassays. The effluent AGP results for each outfall exceeded the "problem" threshold for fresh receiving waters. The effluent dissolved oxygen (DO) as measured in the field for Outfall D-004 (4.3 mg/L) and Outfall D-005 (1.6 mg/L) violated the DO criteria for Class III freshwaters (≥ 5.0 mg/L; 62-302.530(30), F.A.C.). Effluent water quality samples analyzed in the laboratory 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.

Van Dam, H., A. Mertens, and J. Sinkeldam. 1994. A coded checklist and ecological indicator values of freshwater diatoms from the Netherlands. Netherlands Journal of Aquatic Ecology (28)1 117-133.

Table 1. Measured and predicted algal growth potential (AGP; mg dry weight/L) for total soluble inorganic nitrogen (TSIN), orthophosphate (OP), total nitrogen (TN) and total phosphorus (TP) limitation of the freshwater species *Pseudokirchneriella subcapitata* and ratios of nitrogen to phosphorus for samples collected from the Mosaic Fertilizer, L.L.C.-Noralyn Mine Complex on September 22, 2008.

Mosaic Fertilizer, L.L.C.-Noralyn Mine Complex					
Location	AGP (measured)	Predicted AGP (TSIN) ± 20%	Predicted AGP (OP) ± 20%	Predicted AGP (TN) ± 20%	Predicted AGP (TP) ± 20%	Inorganic N:P ratio	Total N:P ratio
Outfall 003	27.2	17.2 ± 3.4	1161.0 ± 232.2	58.6 ± 11.7	1204.0 ± 240.8	0.2	0.6
Outfall 004	47.0	49.6 ± 9.9	399.9 ± 80.0	83.8 ± 16.8	430.0 ± 86.0	1.4	2.2
Outfall 005	26.9 A	19.5 ± 3.9	305.3 ± 61.1	57.2 ± 11.4	369.8 ± 74.0	0.7	1.7

A - Value reported is the mean of two or more determinations.

Table 2. Effluent limits, Class III Freshwater Criteria and chemical data for samples collected from the Mosaic Fertilizer, L.L.C.-Noralyn Mine Complex on September 22, 2008.

Mosaic Fertilizer, L.L.C.-Noralyn Mine Complex NPDES #FL0000230	Outfall 003 Class III Criteria	Outfall 003	Outfall 004 Class III Criteria	Outfall 004	Outfall 005 Class III Criteria	Outfall 005
Organic Constituents (µg/L)						
None Detected	-	-	-	-	-	-
Metals (µg/L unless otherwise noted)						
Aluminum	-	87 I	-	60 U	-	60 U
Arsenic	≤ 50	2.3	≤ 50	0.92 I	≤ 50	0.58 I
Cadmium	≤ 0.49 b	0.02 U	≤ 0.45 b	0.02 U	≤ 0.41 b	0.02 U
Calcium (mg/L)	-	48.5	-	39.7	-	32.8
Chromium-III	≤ 166.1 b	0.5 U	≤ 152.31 b	0.5 U	≤ 137.58 b	0.5 U
Copper	≤ 18.5 b	0.5 U	≤ 16.9 b	0.5 U	≤ 15.2 b	0.5 U
Iron	≤ 1,000	79 I	≤ 1,000	170	≤ 1,000	240
Lead	≤ 8.82 b	0.2 U	≤ 7.71 b	0.2 U	≤ 6.58 b	0.2 U
Magnesium (mg/L)	-	24.7	-	24.6	-	23.1
Nickel	≤ 102.74 b	1.02	≤ 93.94 b	0.43 I	≤ 84.57 b	0.25 I
Selenium	≤ 5.0	0.5 U	≤ 5.0	0.5 U	≤ 5.0	0.5 U
Silver	≤ 0.07	0.025 U	≤ 0.07	0.025 U	≤ 0.07	0.025 U
Zinc	≤ 236.23 b	5 U	≤ 215.96 b	5 U	≤ 194.39 b	5 U

b - Value is calculated based on hardness

I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit

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

Table 2. (continued)

Mosaic Fertilizer, L.L.C.-Noralyn Mine Complex NPDES #FL0000230	Class III Criteria	Effluent Limits**	Outfall 003	Outfall 004	Outfall 005
Nutrients (mg/L)					
Ortho-phosphate	-	-	2.7	0.93	0.71
Total Phosphorus	-	5 s	2.8	1	0.86
Total Ammonia	-	-	0.41	1.3	0.51
Un-ionized Ammonia	≤ 0.02 s	-	≤ 0.02 c	≤ 0.02 c	≤ 0.02 c
Nitrate and Nitrite	-	-	0.043	0.004 U	0.004 U
Total Kjeldahl Nitrogen	-	-	1.5	2.2	1.5
Organic Nitrogen	-	-	1.09 c	0.9 c	0.99 c
Total Nitrogen	-	3 s	1.543 c	2.202 c	1.502 c
General Physical and Chemical Parameters					
Dissolved Oxygen (mg/L)	≥ 5.0	≥ 5.0 s	5.6	4.3	1.6
pH (SU)	6.0 - 8.5	6.0 - 8.5 s	7.2	7.3	7.1
Conductivity (µmhos/cm)	≤ 1,275	≤ 1,275 s	685	512	457
Temperature °C	-	Report	27.6	26.2	26.8
Total Residual Chlorine (mg/L)	≤ 0.01	-	0.03 UQ£	0.03 UQ£	0.03 UQ£
Chlorophyll a (µg/L) - Corrected	-	Report	23 A	11	22
Phaeophytin (µg/L)	-	-	12 A	3	9.4
Total Suspended Solids (mg/L)	-	60 s	6 I	5 I	4 UY
Total Dissolved Solids (mg/L)	-	-	429	272	265 Y
Turbidity (NTU)	< 29 t	-	3.45 *	4.05 *	3.46 *
Fluoride (mg/L)	≤ 10.0	10 s	2.7	1.7	0.98
Sulfate (mg/L)	-	Report	160	29	68 Y
Alpha, Total (pCi/L)	≤ 15	-	2.1 U	2.7	2.1 U
Alpha-Counting Error (pCi/L)	-	-	1.6	1.8	1.5
Radium 226 (pCi/L)	-	-	0.4	0.6	0.5
Radium 226-Counting Error (pCi/L)	-	-	0.2	0.1	0.1
Radium 228 (pCi/L)	-	-	0.8 U	0.7 U	0.7 U
Radium 228-Counting Error (pCi/L)	-	-	0.5	0.4	0.5
Radium 226 + 228 (pCi/L)	≤ 5	-	0.4 c	0.6 c	0.5 c
Flow (MGD)	-	Report	-	-	-
Hardness (mg $CaCO_3$)	-	-	222.82 c	200.43 c	177.03 c

Value exceeds the Class III Water Quality Criteria or permit limits

a - Annual average
c - Value is calculated
s - Single sample
t - Shall not exceed 29 NTUs above background
A - Value reported is the mean of two or more determinations
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
Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
£ - Analysis performed in bioassay laboratory
* - Analyses performed in the field at time of sample collection
** - Limits are applicate to each of the three outfalls

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2008-09-22-14
Mosaic Noralyn Mine

Requester: Jennifer Paris
Field Report Prepared By: Jacki Champion

Customer: BMR-TAMPA
Collected By: Jacki Champion / George Shamock
Send Final Report To Vishwas Sathe

Project ID: FYI3
Sampling Agency: FDEP

PMAS: 1143

Lab ID *	Location	Comp / Grab	Collection (begin) Date Time Eastern Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
	Mosaic Noralyn Mine	☐ Comp ☒ Grab	Date 9/22/08 Time 10:40	Date Time	
	Field ID: Outfall 003	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L): 5.58	Storet Station Number	A
	Matrix (Include type e.g. Salt, Fresh, etc): Fresh H2O	Temp (C): 29.64	pH: 7.20	Sample Depth ☐ m ☐ ft: 685	☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm)
	Latitude o ' "	Longitude o ' "	Comments		

Lab ID *	Location	Comp / Grab	Collection (begin) Date Time Eastern Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
	Mosaic Noralyn Mine	☐ Comp ☒ Grab	Date 9/22/08 Time	Date Time	
	Field ID: BLANK	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	B
	Matrix (Include type e.g. Salt, Fresh, etc): Fresh H2O	Temp (C)	pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
	Latitude o ' "	Longitude o ' "	Comments		

Lab ID *	Location	Comp / Grab	Collection (begin) Date Time Eastern Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
	Mosaic Noralyn Mine	☐ Comp ☒ Grab	Date 9/22/08 Time 9:50	Date Time	
	Field ID: Outfall 004	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L): 4.33	Storet Station Number	A
	Matrix (Include type e.g. Salt, Fresh, etc): Fresh H2O	Temp (C): 26.16	pH: 7.27	Sample Depth ☐ m ☐ ft: 512	☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm)
	Latitude o ' "	Longitude o ' "	Comments		

Lab ID *	Location	Comp / Grab	Collection (begin) Date Time Eastern Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
	Mosaic Noralyn Mine	☐ Comp ☒ Grab	Date 9/22/08 Time 11:20	Date Time	
	Field ID: Outfall 005	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L): 1.55	Storet Station Number	A
	Matrix (Include type e.g. Salt, Fresh, etc): Fresh H2O	Temp (C): 26.76	pH: 7.11	Sample Depth ☐ m ☐ ft: 457	☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm)
	Latitude o ' "	Longitude o ' "	Comments: 6 Diversity Replicates by SJ 1120 9.23.08		

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	9/22/08 3:00pm	DHL					SK	9.23.08 1020

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

FDEP Biology Laboratory - Acute Screen Bioassay Bench Sheets

Facility: Mosaic Noralyn Mine outfall 003 2

Address: 3301 Noralyn Mine Road

City: Bartow **County:** Polk

Contact/District: J. Champion / SW

NPDES Permit #: FL 0000230

LIMS Job #: TLH-2008-09-23-55 **LIMS Sample #:** 1134405

Lims Data Entry: 9.29.08 MF

Data Entry Verification: 9.29.08 JD 10.2.08 Re-verified MF

Sample Collection: Date: 9.22.08 Time: 1040

Hold Time Start: Date: 9.22.08 Time: 1040

Comments:
Temperature of cooler ~~taken~~ as received was 8°C. Chemistry receiving wrote NCR 2947 MF 9-26-08 District Data reported as requested by ~~District~~ MF qualified with V and J.
V- improperly preserved
J- estimated value. MF 9-26-08

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

Test Type: (Screen)
(Static) / Static Renewal / Flow-through
Test Duration: (48) 96 Hours.

Test 1 validation: **Test 1:** SOP TA 07_01
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No

Test 2 validation: **Test 2:** SOP TA 07_02
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No

(√one)
Test 1 incubated in: [√] Incubator #: 2 [ ] Waterbath #:_____
Test 2 incubated in: [√] Incubator #: 2 [ ] Waterbath #:_____

Initial sample handling:
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: ____

Light Intensity : 50 - 100 ft. candles
Photoperiod : 16 light 8 dark
Temperature Range °C: (If used)
Incubator # 2 min. 25.8 max. 26.7 mean 26.2
Incubator # ____ min.____ max.____ mean____
Waterbath # ____ min.____ max.____ mean____
Room B246 min. 25.1 max. 25.7 mean 25.4

Sample Validation:
Temperature: Shipped ≤6°C Yes (No) — IF Hand Delivered: Cooling (received °C < collected °C) (Yes) No MF Not applicable 9-24-08
Holding Time: ≤36 Hours (Yes) No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Investigaters' Signatures
James Daniels
Bruce Davis
Marshall Faircloth

Loretta Cichocki
REVIEWER

Batch #	9.23.08	9.15.08							
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		MF
Lab Total Residual Cl_2 (mg/L):	<0.03	<0.03					<0.03	JD	BA
Alkalinity (mg/L as $CaCO_3$):	82	155					167	BA	JD
Hardness (mg/L as $CaCO_3$):	91	144					234	BA	JD
Total Ammonia (mg/L as N):	<0.017	<0.017					0.383	BA	JD
Conductivity: (µmhos) mmhos	180	278					691	JD	BA
Salinity (ppth):	<1	<1					<1	JD	BA

V 1.6 7/8/08

MF 10-23-08 Reprinting correction
~~000013~~ 00 019

Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1134405 Test #: 1/2 SOP#:TA 07 01 Test Started: Date 9-23-08 Time: 13:20

Organism/Batch/Age: cdubia / 35-08 / <24hrs Test Ended: Date 9-25-08 Time: 12:15

Chamber/Test Volume: 30 / 20 ml Diluent/ Batch: DMW / 9,23,08 Test Duration: ~~48~~ hr 96 hr

Food/Batch: [✓] YCT 6.18.08 [✓] P.sub 7.18.08

[ ] Artemia Lot#____ Batch #: 0hr____ 24hr____ 48hr____ 72hr____

Feeding: [X] Prior to Test [ ] Prior to Renewal [ ] 0 hr [ ] 24 hr [ ] 48 hr [ ] 72 hr

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Ctrl	A	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5	5			
	D	D	5	5	5			
100%	A	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5	5			
	D	D	5	5	4 1D			
Checked by:			BK	BA	BA			

Loaded/Verified by: BW/ D

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: 5% LC50: >100%

If Calculated: 95% CI____ Method____

V 2.3 7/15/2008

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

Page ~~000014~~ 00 020 MF 10-23-08 pagination correction

Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1134405 **Test #:** 2/2 **SOP#:TA 07** 02 **Test Started:** Date 9.23.08 Time: 1305

Organism/Batch/Age: C.leels / 9.23.08 / 9.23.08 / Beky S **Test Ended:** Date 9.25.08 Time: 1835 to 9.25.08 Transcription error

Chamber/Test Volume: 1000 / 500 ml **Diluent/ Batch:** Well / 9.15.08 **Test Duration:** (48) hr 96 hr

Food/Batch: [ ] YCT______ [ ] P.sub______

[X] **Artemia Lot#** 38438 **Batch #: 0hr** 140 **24hr**______ **48hr**______ **72hr**______

Feeding: [X] Prior to Test [ ] Prior to Renewal [ ] 0 hr [ ] 24 hr [ ] 48 hr [ ] 72 hr

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Ctrl	A	A9	5	5	5			
	B	A10	5	5	5			
	C	A11	5	4(1)	4			
	D	A12	5	5	5			
100%	A	A13	5	5	5			
	B	A14	5	5	5			
	C	A15	5	5	5			
	D	A16	5	5	5			
Checked by:			JD	JD	JD			

Loaded/Verified by: JD / BA

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%

If Calculated: 95% CI__________ Method__________

Comments:

V 2.3 7/15/2008

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

MF 10-23-08 Pagination correction

Page ~~000015~~ 00 021

Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 1134405 Test #: 1 of 2

TEST SOP #: TA07_01 Test Species: ☒ *Ceriodaphnia dubia* ☐ *Cyprinella leedsi* ☐ *Pimephales promelas*

Test aerated: yes (no) (circle one) Check 1: ☐ *Americamysis bahia* ☐ *Menidia beryllina* ☐ Other:

Concentration Ctrl	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	M		A			
pH (S.U.)	8.1		8.3			
Temperature °C	24.0		24.0			
Dissolved Oxygen mg/L aerate if < 4	7.1		6.3			
Conductivity µmhos mmhos	180		203			
Salinity ppth	—	+	—			
(initials) Measured by:	BA		BA			
(initials) Recorded by:	BA		BA			

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	M		A			
pH (S.U.)	7.6		8.5			
Temperature °C	24.0		24.0			
Dissolved Oxygen mg/L aerate if < 4	7.2		6.5			
Conductivity µmhos mmhos	686		709			
Salinity ppth	—		—			
(initials) Measured by:	BA		BA			
(initials) Recorded by:	BA		BA			

Comments:

Salinity only needs measuring if saltwater.

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 aerate if < 4						
Conductivity µmhos mmhos						
Salinity ppth						
(initials) Measured by:						
(initials) Recorded by:						

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 aerate if < 4						
Conductivity µmhos mmhos						
Salinity ppth						
(initials) Measured by:						
(initials) Recorded by:						

Comments:
STC Alk 10-33-41 Aeration Corrected 00 0122

Page

FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 1134405 Test #: 2 of 2

TEST SOP #: TA07_02_ Test Species: ☐ Ceriodaphnia dubia ☒ Cyprinella leedsi ☐ Pimephales promelas

Test aerated: yes (no) (circle one) Check 1: ☐ 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			
pH (S.U.)	8.3	8.3	8.4			
Temperature °C	24.0	24.1	24.6			
Dissolved Oxygen mg/L aerate if < 4	7.5	7.1	7.0			
Conductivity (µmhos) mmhos	278	282	287			
Salinity ppth						
(initials) Measured by:	JD	JD	JD			
(initials) Recorded by:	JD	JD	JD			

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	7.5	8.1	8.3			
Temperature °C	25.3	24.1	24.4			
Dissolved Oxygen mg/L aerate if < 4	5.3	7.3	7.2			
Conductivity (µmhos) mmhos	691	697	699			
Salinity ppth						
(initials) Measured by:	JD	JD	JD			
(initials) Recorded by:	JD	JD	JD			

Comments:

Salinity only needs measuring if saltwater.

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 aerate if < 4						
Conductivity µmhos mmhos						
Salinity ppth						
(initials) Measured by:						
(initials) Recorded by:						

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 aerate if < 4						
Conductivity µmhos mmhos						
Salinity ppth						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

MF 10-23-08 Aspiration Correction

FDEP Biology Laboratory - Acute Screen Bioassay Bench Sheets

Facility: Mosaic Noralyn Mine outfall 004 1

Address : 3301 Noralyn Mine Road

City: Bartow **County:** ~~FL~~ JD Polk

Contact/District: J. Champion / SW

NPDES Permit #: FL 0000230

LIMS Job #: TLH-2008-09-23-55 **LIMS Sample #:** 1134406

Lims Data Entry: 9-29-08 MF Data Entry Verification: 9.29.08 JD

Sample Collection: Date: 9.22.08 Time: 9:50

Hold Time Start: Date: 9.22.08 Time: 9:50

Comments:

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

Test Type: (Screen) Definitive

(Static) / Static Renewal / Flow-through

Test Duration: (48) 96 Hours.

Test 1 validation: **Test 1:** SOP TA 07_01

Control survival ≥90%: (Yes) No

Temperature Range ≤3°C: (Yes) No

Test 2 validation: **Test 2:** SOP TA 07_02

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: 2.7 mg/L Final DO: 7.7 mg/L Duration: 30 minutes Rate: ~ 100 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:

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)

Light Intensity : 50 - 100 ft. candles

Photoperiod : 16 light 8 dark

Temperature Range °C: 25.8 9.25.08 Transferred to other

Incubator # 6 min ~~25.2~~ JD max. 26.7 mean 26.2

Incubator # ____ min.____ max.____ mean____

Room B246 min. 25.1 max. 25.7 mean 25.4

Test 1:% mortality in 100% sample: ____ LC50: ____

Test 2:% mortality in 100% sample: ____ LC50: ____

Investigators' Signatures

James Daniels

Marshall Faircloth

REVIEWER

Water Quality Parameters	20% DMW	Moderately Hard Water/ (Well Water)	Salt Water ASW NSW Test 1	Salt Water ASW NSW Test 2	Other:	Original Sample	Method	Measured by	Verified by
Field Total Residual Cl_2 (mg/L):	N/A	N/A	N/A	N/A		—	Not measured		MF
Lab Total Residual Cl_2 (mg/L):	<0.03	<0.03				<0.03	HACH	JD	BA
Alkalinity (mg/L as $CaCO_3$):	82	155				235	HACH	BA	JD
Hardness (mg/L as $CaCO_3$):	91	144				197	HACH	BA	JD
Total Ammonia (mg/L as N):	<0.417	<0.017				1.30	DENVER	BA	JD
Salinity (ppth):	<1	<1				<1	YSI / Mettler	JD	BA

V 1.4 9/12/05

Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 113406 Test #: 1/2 SOP#:TA 07 01 Test Started: Date 9-23-08 Time: 13:15
Organism/Batch/Age: C.dubia/3508/<24hrs Test Ended: Date 9-25-08 Time: 12:05
Chamber/Test Volume: 30 / 20 ml Diluent/ Batch: DMW / 9.23.08
Food/Batch: YCT 6.18.08 P.sub 7.8.08 Artemia 0hr____ 24hr____ 48hr____ 72hr____ Artemia Lot#________
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	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5	5			
	D	D	5	5	5			
100%	A	A	5	4 1D	4			
	B	B	5	5	5			
	C	C	5	5	5			
	D	D	5	5	5			
Loaded/Verified by: BA/JD		Checked by:	JD	BA	BA			

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: 5% LC50: >100%
If Calculated: 95% CI________ Method__________

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

PAGE V 2.1 11/01/2005

J0 014

Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1134406 Test #: 2/2 SOP#:TA 07 02 Test Started: Date 9.23.08 Time: 1300

Organism/Batch/Age: Cleds/9.23.08/8 hrs Test Ended: Date 9.25.08 Time: 1130

Chamber/Test Volume: 1000/500 ml Diluent/ Batch: Well / 9.15.08

Food/Batch: YCT____ P.sub____ Artemia 0hr 140 24hr____ 48hr____ 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 hr
Ctrl	A	A1	5	5	5			
	B	A2	5	5	5			
	C	A3	5	5	5			
	D	A4	5	5	5			
100%	A	A5	5	5	5			
	B	A6	5	5	5			
	C	A7	5	5	5			
	D	A8	5	5	5			
Loaded/Verified by: JD / BA		Checked by:	JD	JD	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: 0% LC50: >100%

If Calculated: 95% CI________ Method________

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

PAGE V 2.1 11/01/2005

00 C15

FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 1134406 **Test #:** 1 of 2

TEST SOP #: TA07_01 **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	M		A			
pH (S.U.)	8.0		8.0			
Temperature °C	24.0		24.1			
Dissolved Oxygen mg/L	7.6		7.4			
Conductivity (µmhos) mmhos	180		193			
(initials) Measured by:	BA		BA			
(initials) Recorded by:	BA		BA			

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	M		A			
pH (S.U.)	8.1		8.6			
Temperature °C	24.7		24.0			
Dissolved Oxygen mg/L	7.3		7.1			
Conductivity (µmhos) mmhos	506		514			
(initials) Measured by:	BA		BA			
(initials) Recorded by:	BA		BA			

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:

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:

00 016

V 2.0 2/24/04

FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 1134406 **Test #:** 2 of 2

TEST SOP #: TA07_02 **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			
pH (S.U.)	8.3	8.3	8.4			
Temperature °C	24.0	24.2	24.6			
Dissolved Oxygen mg/L	7.5	7.0	7.1			
Conductivity (µmhos) mmhos	275	284	287			
(initials) Measured by:	[illegible]	[illegible]	[illegible]			
(initials) Recorded by:	[illegible]	[illegible]	[illegible]			

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	8.1	8.4	8.5			
Temperature °C	24.8	24.7	24.9			
Dissolved Oxygen mg/L	7.7	7.1	7.2			
Conductivity (µmhos) mmhos	518	510	522			
(initials) Measured by:	[illegible]	[illegible]	[illegible]			
(initials) Recorded by:	[illegible]	[illegible]	[illegible]			

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:

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:

00 017

FDEP Biology Laboratory - Acute Screen Bioassay Bench Sheets

Facility: Mosaic Noralyn Mine outfall 005 3

Address: 3301 Noralyn Mine Rd

City: Bartow County: Polk

Contact/District: J. champion / SW

NPDES Permit #: FL 0000230

LIMS Job #: TLH-2008-09-23-55 LIMS Sample #: 1134407

Lims Data Entry: 9.29.08 MF Data Entry Verification: 9.29.08 JD

Sample Collection: Date: 9.22.08 Time: 1120

Hold Time Start: Date: 9.22.08 Time: 1120

Comments:

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

Test Type: (Screen) Static / Static Renewal / Flow-through

Test Duration: (48) 96 Hours.

Test 1 validation: Test 1: SOP TA 07_01

Control survival ≥90%: (Yes) No

Temperature Range ≤3°C: (Yes) No

Test 2 validation: Test 2: SOP TA 07_02

Control survival ≥90%: (Yes) No

Temperature Range ≤3°C: (Yes) No

(√one)

Test 1 incubated in: [√] Incubator #: 2 [√] Waterbath #:_____

Test 2 incubated in: [√] Incubator #: 2 [ ] Waterbath #:_____

Initial sample handling:

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:

Temperature: Shipped ≤6°C (Yes) No — IF Hand Delivered: Cooling (received °C < collected °C) (Yes) No MF not applicable

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

Light Intensity : 50 - 100 ft. candles

Photoperiod : 16 light 8 dark

Temperature Range °C: (If used)

Incubator # 2 min. 25.8 max. 26.7 mean 26.2

Incubator # ____ min._____ max._____ mean_____

Waterbath # ____ min._____ max._____ mean_____

Room B246 min. 25.1 max. 25.7 mean 25.4

Batch #	9.23.08	9.19.08							
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		MF
Lab Total Residual Cl_2 (mg/L):	<0.03	<0.03					<0.03	JD	BA
Alkalinity (mg/L as $CaCO_3$):	32	195					138	BA	JD
Hardness (mg/L as $CaCO_3$):	91	144					139	BA	JD
Total Ammonia (mg/L as N):	<0.017	<0.017					0.451	BA	JD
Conductivity: µmhos mmhos	180	279 @					460	JD	BA
Salinity (ppth):	<1	<1					<1	JD	BA

Investigators' Signatures

James Daniel

Carl Nance

Marshall Faircloth

Brittel C. Wolfe

REVIEWER

@ JD. 9.23.08 Transcription error

MF 10-23-08 Pagination correction

V 1.6 7/8/08

Page ~~000019~~ 00 025

Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1134407 Test #: 1/2 SOP#:TA 07 01 Test Started: Date 9 23-08 Time: 13:30

Organism/Batch/Age: c.dubia / 35-08 / <24hrs Test Ended: Date 9-25-08 Time: 12:25

Chamber/Test Volume: 30 / 20 ml Diluent/ Batch: DMW / 9-23-08 Test Duration: 48 hr / 96 hr

Food/Batch: [✓] YCT 6.18.08 [✓] P.sub 7.18.08

[ ] Artemia Lot#____ Batch #: 0hr____ 24hr____ 48hr____ 72hr____

Feeding: [✓] Prior to Test [ ] Prior to Renewal [ ] 0 hr [ ] 24 hr [ ] 48 hr [ ] 72 hr

Concentration	Replicate	Chamber #	Test Hour: 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
ctrl	A	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5	5			
	D	D	5	5	5			
100%	A	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5	5			
	D	D	5	5	5			
Loaded/Verified by: BA / [illegible]		Checked by:	[illegible]	BA	BA			

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: 0% LC50: >100%

If Calculated: 95% CI____ Method____

V 2.3 7/15/2008

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

Page ~~000020~~ [illegible] 10-23-08 Pagination correction

00 026

Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1134407 Test #: 2/2 SOP#:TA 07 02 Test Started: Date 9.23.08 Time: 1310

Organism/Batch/Age: c.leedsi / 92308 / 8 days Test Ended: Date 9.25.08 Time: 1145

Chamber/Test Volume: 1000 / 500 ml Diluent/ Batch: Well / 9.15.08 Test Duration: (48) hr 96 hr

Food/Batch: [ ] YCT____ [ ] P.sub____

[X] Artemia Lot# 38438 Batch #: 0hr 140 24hr____ 48hr____ 72hr____

Feeding: [X] Prior to Test [ ] Prior to Renewal [ ] 0 hr [ ] 24 hr [ ] 48 hr [ ] 72 hr

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Ctrl	A	A17	5	5	5			
	B	A18	5	4/1D	4			
	C	A19	5	5	5			
	D	A20	5	5	5			
100%	A	A21	5	5	5			
	B	A22	5	5	5			
	C	A23	5	5	5			
	D	A24	5	5	5			
Loaded/Verified by: JD BA		Checked by:	JD	JD	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: Ø% LC50: >100%

If Calculated: 95% CI________ Method________

V 2.3 7/15/2008

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

Page ~~000054~~ 00 021 mf 10-23-08 pagination correction

FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 1134407 Test #: 1 of 2

TEST SOP #: TA07 01 Test Species: [X] *Ceriodaphnia dubia* [ ] *Cyprinella leedsi* [ ] *Pimephales promelas*

Test aerated: yes (no) (circle one) Check 1: [ ] *Americamysis bahia* [ ] *Menidia beryllina* [ ] Other:

Concentration ctrl	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	M		A			
pH (S.U.)	7.9		8.2			
Temperature °C	24.0		24.0			
Dissolved Oxygen mg/L aerate if < 4	7.7		8.4 (A) 6.1			
Conductivity (µmhos) mmhos	180		197			
Salinity ppth	—		—			
(initials) Measured by:	BA		BA			
(initials) Recorded by:	BA		BA			

Comments: Week PH 100% sample 48hr. in brown box DO is 6.1 BA 9.25.08

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	M		A			
pH (S.U.)	7.5		8.4			
Temperature °C	24.0		24.0			
Dissolved Oxygen mg/L aerate if < 4	4.1		5.9			
Conductivity (µmhos) mmhos	456		464			
Salinity ppth	—		—			
(initials) Measured by:	BA		BA			
(initials) Recorded by:	BA		BA			

Comments:

Salinity only needs measuring if saltwater.

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 aerate if < 4						
Conductivity µmhos mmhos						
Salinity ppth						
(initials) Measured by:						
(initials) Recorded by:						

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 aerate if < 4						
Conductivity µmhos mmhos						
Salinity ppth						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

mf 10-23-08 ~~022~~ Pagination correction

00 028

Page

FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

IMS Sample # : 1134407 Test #: 2 of 2

EST SOP #: TA07_02_ Test Species: ☐ *Ceriodaphnia dubia* ☒ *Cyprinella leedsi* ☐ *Pimephales promelas*

est aerated: yes (no) (circle one) Check 1: ☐ *Americamysis bahia* ☐ *Menidia beryllina* ☐ Other:_____

Concentration Ctrl	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
eplicate	A	B	C			
H (S.U.)	8.2	8.3	8.4			
emperature °C	24.0	24.0	24.0			
issolved Oxygen mg/L erate if < 4	7.5	7.3	7.4			
onductivity µmhos mmhos	279	285	287			
alinity ppth						
(initials) Measured by:	JM	JM	JM			
(initials) Recorded by:	JM	JM	JM			

omments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	7.5	8.0	8.2			
Temperature °C	24.1	24.0	24.3			
Dissolved Oxygen mg/L aerate if < 4	4.5	7.1	7.0			
Conductivity µmhos mmhos	460	465	475			
Salinity ppth						
(initials) Measured by:	JM	JM	JM			
(initials) Recorded by:	JM	JM	JM			

Comments:

Salinity only needs measuring if saltwater.

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
eplicate						
H (S.U.)						
emperature °C						
issolved Oxygen mg/L erate if < 4						
onductivity µmhos mmhos						
alinity ppth						
(initials) Measured by:						
(initials) Recorded by:						

omments:

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 aerate if < 4						
Conductivity µmhos mmhos						
Salinity ppth						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

MF 10-23-08 Regression correction

Page ~~000023~~ 00 029

Appendix B. (continued)

Bioassay Instrument ID

Test ID: Mysis Acartia mixed 9-26-08 Dates: Sept 23 - 25

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 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)

V 1.1 6/12/08 MF

PAGE

Appendix C. SRT Bench Sheets and Statistical Analysis

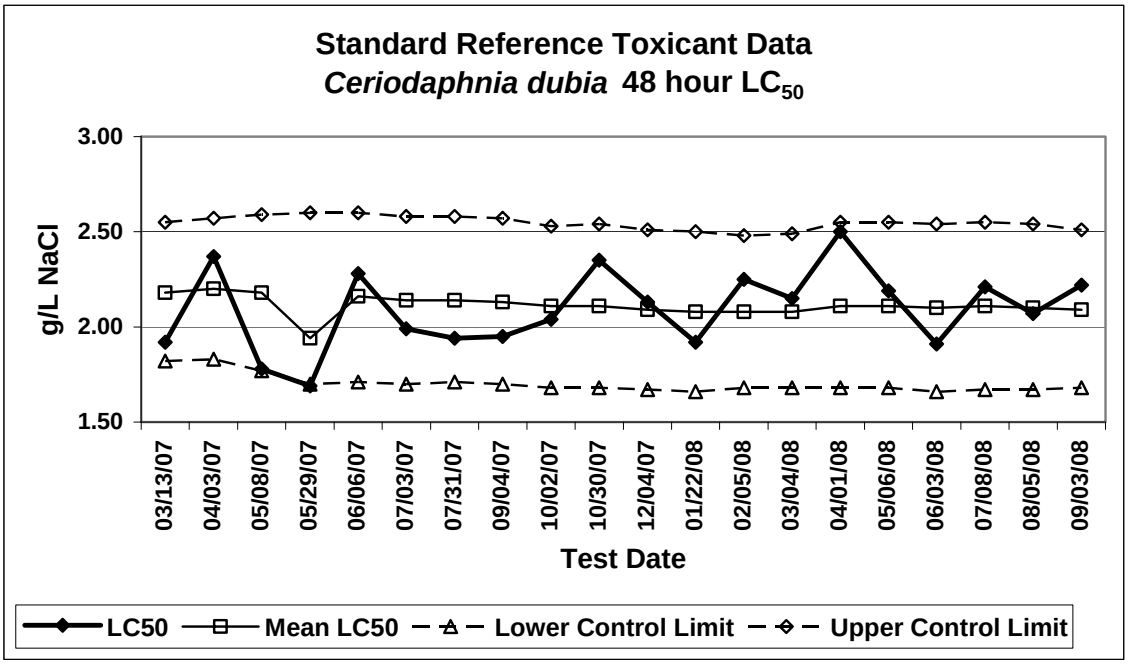
Florida Department of Environmental Protection
Bureau of Laboratories

Standard Reference Toxicant (SRT) Test Data - 48-hour Acute Toxicity
Ceriodaphnia dubia (water flea) - Sodium Chloride (NaCl)

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
03/13/07	1.92	2.18	0.18	1.82	2.55
04/03/07	2.37	2.20	0.18	1.83	2.57
05/08/07	1.78	2.18	0.21	1.77	2.59
05/29/07	1.69	1.94	0.23	1.70	2.60
06/06/07	2.28	2.16	0.22	1.71	2.60
07/03/07	1.99	2.14	0.22	1.70	2.58
07/31/07	1.94	2.14	0.22	1.71	2.58
09/04/07	1.95	2.13	0.22	1.70	2.57
10/02/07	2.04	2.11	0.21	1.68	2.53
10/30/07	2.35	2.11	0.21	1.68	2.54
12/04/07	2.13	2.09	0.20	1.67	2.51
01/22/08	1.92	2.08	0.20	1.66	2.50
02/05/08	2.25	2.08	0.20	1.68	2.48
03/04/08	2.15	2.08	0.20	1.68	2.49
04/01/08	2.50	2.11	0.22	1.68	2.55
05/06/08	2.19	2.11	0.22	1.68	2.55
06/03/08	1.91	2.10	0.22	1.66	2.54
07/08/08	2.21	2.11	0.22	1.67	2.55
08/05/08	2.07	2.10	0.22	1.67	2.54
09/03/08	2.22	2.09	0.21	1.68	2.51

Means are of the last 20 SRT tests.
Lower Control Limit = mean - 2 * Std Dev
Upper Control Limit = mean + 2 * Std Dev

CV = 9.95
EPA reference 75th quartile CV = 29%



Appendix C. (continued)

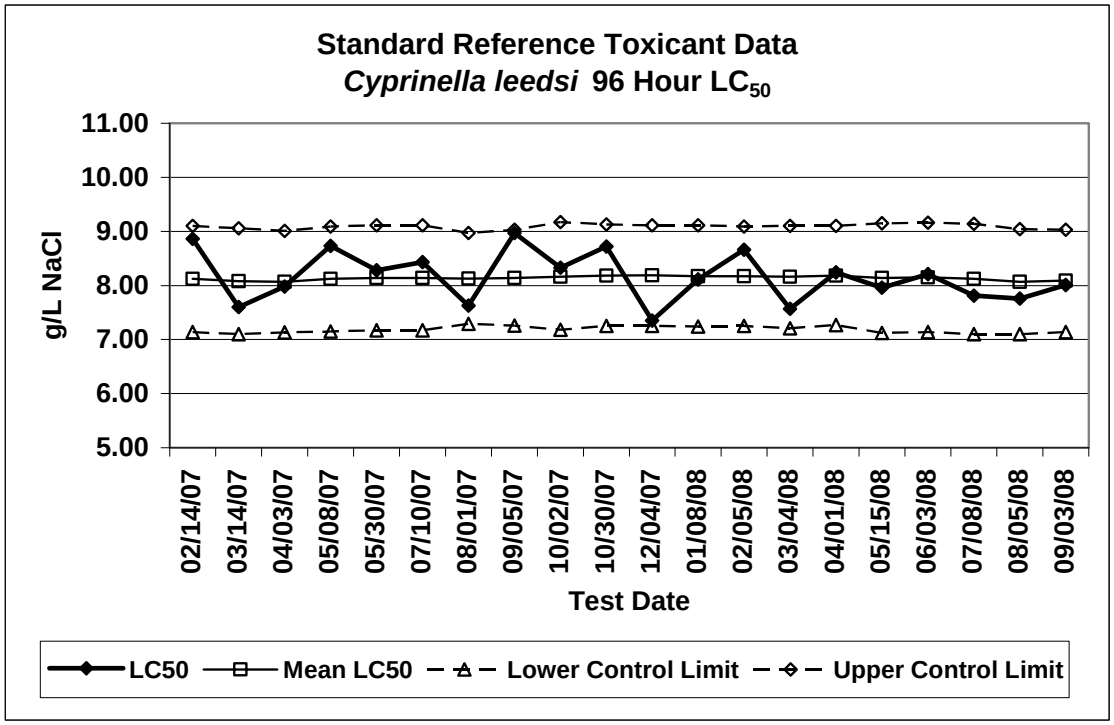
Florida Department of Environmental Protection
Bureau of Laboratories

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

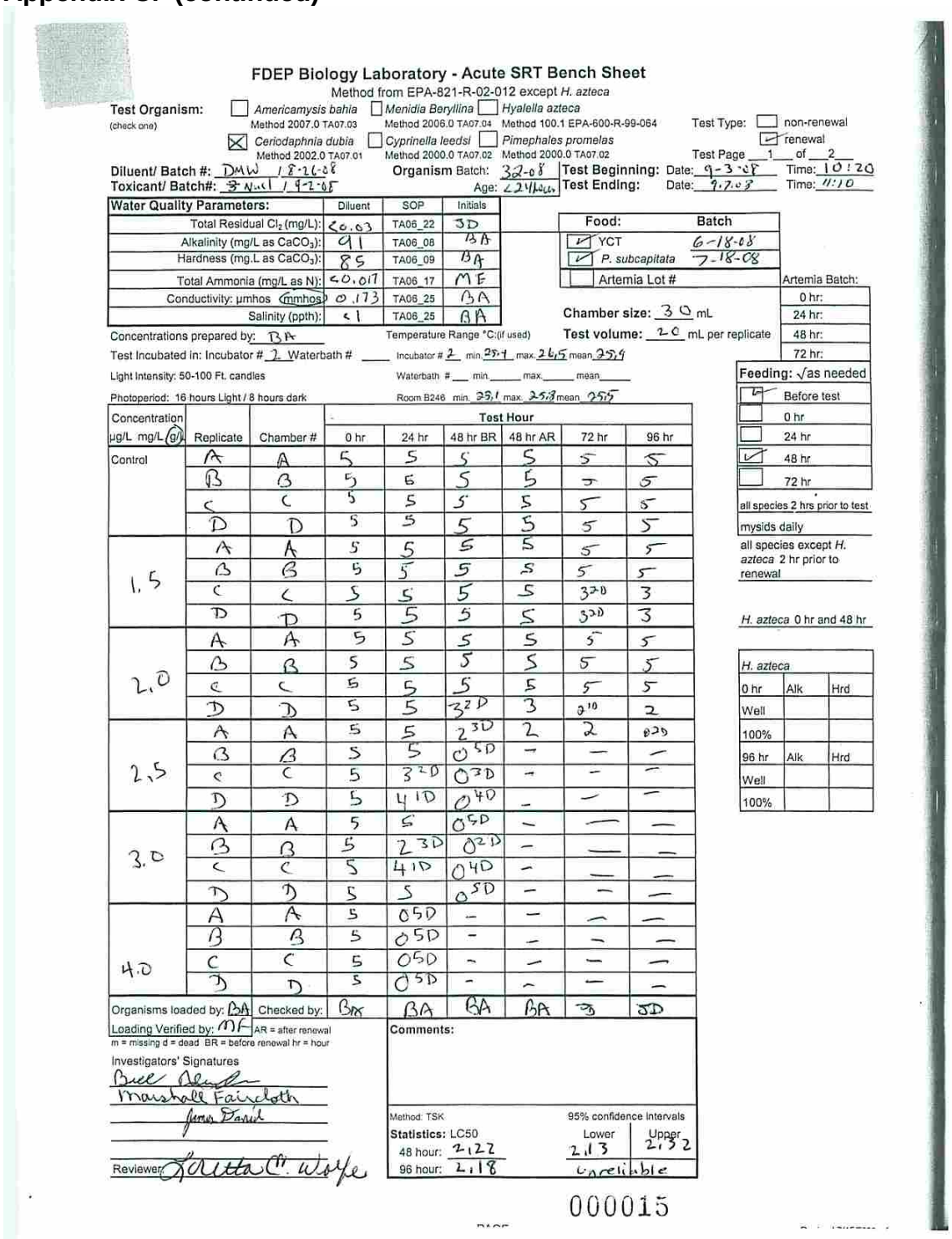
Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
02/14/07	8.86	8.12	0.49	7.14	9.10
03/14/07	7.60	8.08	0.49	7.10	9.06
04/03/07	7.98	8.07	0.47	7.13	9.01
05/08/07	8.73	8.12	0.48	7.15	9.09
05/30/07	8.28	8.14	0.48	7.17	9.11
07/10/07	8.43	8.14	0.48	7.17	9.11
08/01/07	7.63	8.13	0.42	7.29	8.97
09/05/07	8.97	8.14	0.44	7.26	9.03
10/02/07	8.33	8.16	0.50	7.18	9.17
10/30/07	8.72	8.18	0.47	7.25	9.13
12/04/07	7.35	8.19	0.47	7.25	9.11
01/08/08	8.11	8.17	0.47	7.24	9.11
02/05/08	8.66	8.17	0.47	7.25	9.09
03/04/08	7.57	8.16	0.47	7.21	9.10
04/01/08	8.24	8.18	0.46	7.27	9.10
05/15/08	7.96	8.14	0.51	7.12	9.15
06/03/08	8.21	8.15	0.51	7.14	9.16
07/08/08	7.81	8.12	0.51	7.10	9.14
08/05/08	7.76	8.07	0.48	7.10	9.04
09/03/08	8.01	8.09	0.47	7.14	9.03

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

CV = 5.84
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 1.8-26-08
Toxicant/ Batch#: 3-Nacl 1-9-2-08
Organism Batch: 32-08
Age: <24hrs
Test Beginning: Date: 9-3-08 Time: 10:20
Test Ending: Date: 9.7.08 Time: 11:10

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	<0.03	TA06_22	JD
Alkalinity (mg/L as $CaCO_3$):	91	TA06_08	BA
Hardness (mg.L as $CaCO_3$):	85	TA06_09	BA
Total Ammonia (mg/L as N):	<0.017	TA06_17	MF
Conductivity: µmhos (mmhos)	0.173	TA06_25	BA
Salinity (ppth):	<1	TA06_25	BA

Food:	Batch
☑ YCT	6-18-08
☑ *P. subcapitata*	7-18-08
☐ 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: BA
Temperature Range °C:(if used)
Test Incubated in: Incubator # 2 Waterbath # ____ Incubator # 2 min. 25.1 max. 26.5 mean 25.9
Light Intensity: 50-100 Ft. candles Waterbath # ___ min. ____ max. ____ mean ____
Photoperiod: 16 hours Light / 8 hours dark Room B246 min. 25.1 max. 25.8 mean 25.5

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	3 2D	3
	D	D	5	5	5	5	3 2D	3
2.0	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	3 2D	3	2 1D	2
2.5	A	A	5	5	2 3D	2	2	2 2D
	B	B	5	5	0 5D	—	—	—
	C	C	5	3 2D	0 3D	—	—	—
	D	D	5	4 1D	0 4D	—	—	—
3.0	A	A	5	5	0 5D	—	—	—
	B	B	5	2 3D	0 2D	—	—	—
	C	C	5	4 1D	0 4D	—	—	—
	D	D	5	5	0 5D	—	—	—
4.0	A	A	5	0 5D	—	—	—	—
	B	B	5	0 5D	—	—	—	—
	C	C	5	0 5D	—	—	—	—
	D	D	5	0 5D	—	—	—	—
Organisms loaded by: BA	Checked by:		BA	BA	BA	BA	JD	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

Investigators' Signatures
Bill Blank
Marshall Faircloth
James Daniel

Reviewer: Loretta M. Wolfe

Comments:

Method: TSK
95% confidence intervals

Statistics: LC50	Lower	Upper
48 hour: 2.122	2.13	2.132
96 hour: 2.118	unreliable	

000015

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: 9-3-08 Time: 10:20
Test Ending: Date: 9-7-08 Time: 11:10
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 ☑µmhos	Salinity (ppth)
Control	M	0 hr	7.9	24.0	7.3	0.173	0.0
	—	24 hr	—	~~BR 24.3~~	—	~~BR 0.194~~	~~0.5~~
	M	48 hr ~~BR~~ AR	8.1	24.3	7.7	0.174	—
	A	48 hr ~~AR~~ BR	8.0	24.0	6.4	0.181	—
		72 hr					
	M	96 hr	7.8	24.7	7.2	0.192	
1.5	M	0 hr	7.9	24.3	7.3	2.94	1.50
	—	24 hr	—	—	—	—	—
	M	48 hr ~~BR~~ AR	8.1	24.7	7.7	2.95	—
	A	48 hr ~~AR~~ BR	8.0	24.0	6.4	3.16	—
		72 hr					
	M	96 hr	7.9	~~24.8~~	7.4	3.13	
2.0	M	0 hr	8.0	24.6	7.1	3.87	2.02
	—	24 hr	—	—	—	—	—
	M	48 hr ~~BR~~ AR	8.1	24.7	7.5	3.87	—
	A	48 hr ~~AR~~ BR	8.0	24.0	6.5	4.2	—
		72 hr					
	M	96 hr	8.0	24.9	7.5	4.3	
2.5	M	0 hr	8.1	24.6	7.2	4.79	2.5A
	—	24 hr	—	—	—	—	—
	M	48 hr ~~BR~~ AR	8.1	24.7	7.4	4.66	—
	A	48 hr ~~AR~~ BR	8.0	24.0	6.7	5.25	—
		72 hr					
	M	96 hr	8.1	24.7	7.5	4.74	
3.0	M	0 hr	8.1	24.6	7.3	5.62	3.01
	—	24 hr	—	—	—	—	—
	A	48 hr BR	8.0	24.0	6.6	5.24	—
		48 hr AR					
		72 hr					
		96 hr					
4.0	M	0 hr	8.1	24.6	7.3	7.36	4.03
	A	24 hr	7.9	24.0	7.2	7.48	—
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					

Investigators Signatures
Brian Atwater
James Dane
Marshall Faircloth

Reviewed By: Anita Culpepper

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

Measure/record salinity for marine tests

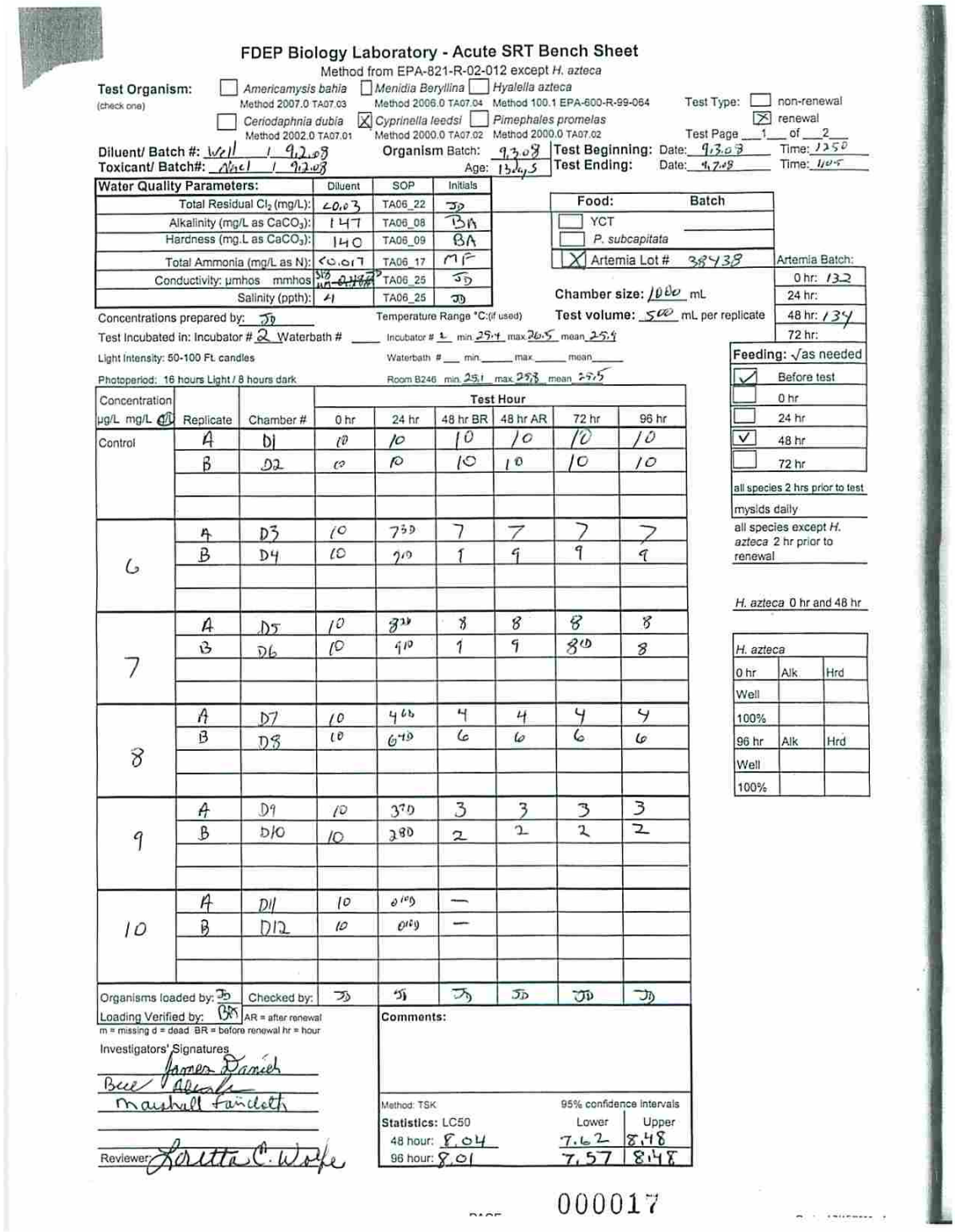
Comments: M = Meter Vial

000016

PAGE

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 #: Well / 9.2.03

Toxicant/ Batch#: NaCl / 9.2.03

Organism Batch: 9.3.03 Age: 13-24 hrs

Test Beginning: Date: 9.3.03 Time: 1250

Test Ending: Date: 9.7.03 Time: 1105

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	<0.03	TA06_22	JD
Alkalinity (mg/L as $CaCO_3$):	147	TA06_08	BM
Hardness (mg/L as $CaCO_3$):	140	TA06_09	BA
Total Ammonia (mg/L as N):	<0.017	TA06_17	MF
Conductivity: µmhos mmhos	318 0.318	TA06_25	JD
Salinity (ppth):	1	TA06_25	JD

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

Artemia Batch:

0 hr: 13.2

24 hr:

48 hr: 13.4

72 hr:

Chamber size: 1000 mL

Test volume: 500 mL per replicate

Concentrations prepared by: JD

Temperature Range °C:(if used)

Test Incubated in: Incubator # 2 Waterbath # ____ Incubator # 2 min 25.4 max 26.5 mean 25.9

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

Photoperiod: 16 hours Light / 8 hours dark Room B246 min 25.1 max 25.8 mean 25.5

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	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Control	A	D1	10	10	10	10	10	10
	B	D2	10	10	10	10	10	10
6	A	D3	10	7sp	7	7	7	7
	B	D4	10	9sp	9	9	9	9
7	A	D5	10	8sp	8	8	8	8
	B	D6	10	9sp	9	9	8sp	8
8	A	D7	10	4sp	4	4	4	4
	B	D8	10	6sp	6	6	6	6
9	A	D9	10	3sp	3	3	3	3
	B	D10	10	2sp	2	2	2	2
10	A	D11	10	0sp	—			
	B	D12	10	0sp	—			
Organisms loaded by: JD		Checked by:	JD	JD	JD	JD	JD	JD
Loading Verified by: BM		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

James Daniel

Bree Abeals

Marshall Faircloth

Reviewer: Loretta C. Wolfe

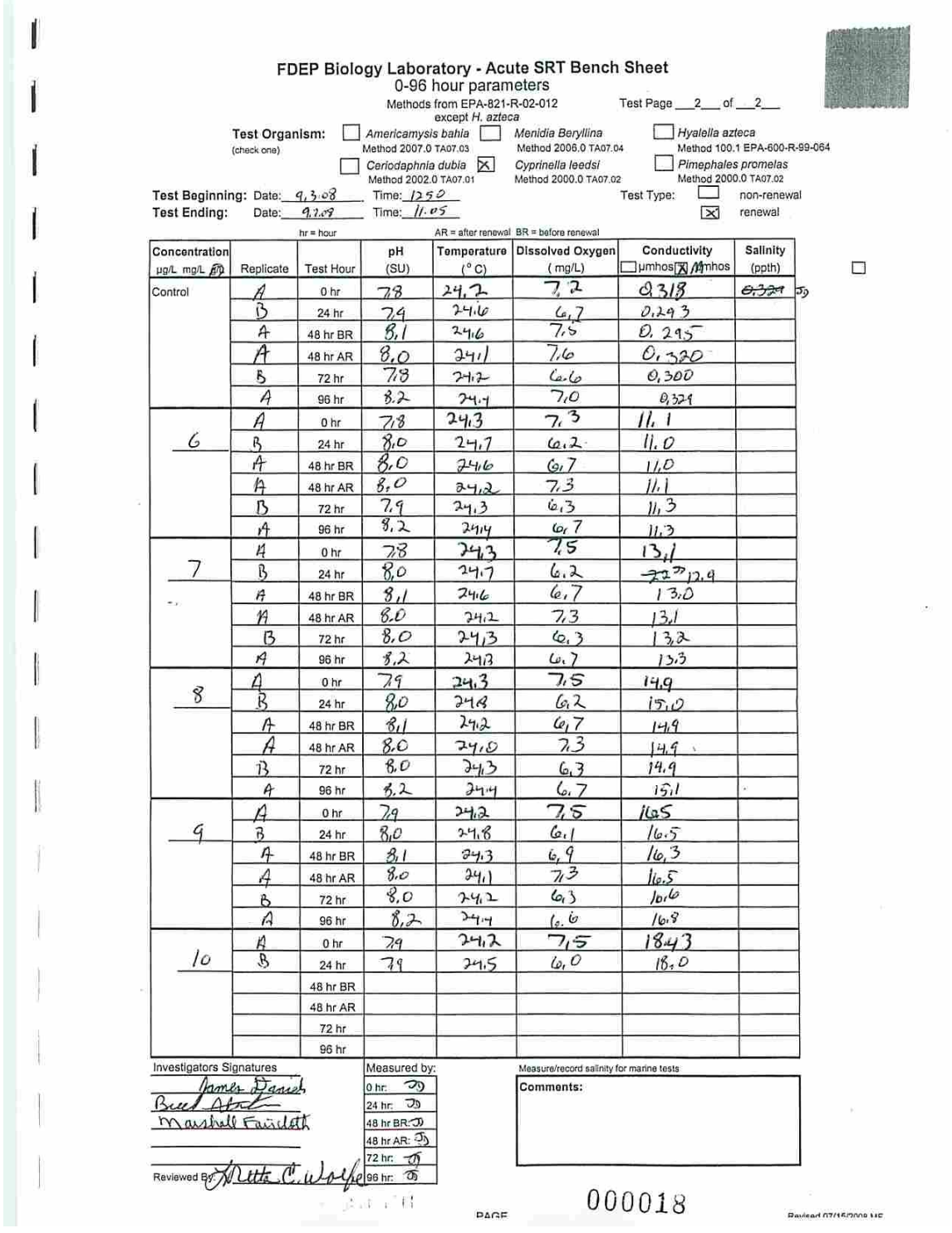
Comments:

Method: TSK

Statistics: LC50	95% confidence intervals Lower	Upper
48 hour:	8.04	7.62	8.48
96 hour:	8.01	7.57	8.48

000017

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: 9.3.08 Time: 1250
Test Ending: Date: 9.7.08 Time: 11.05
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	A	0 hr	7.8	24.2	7.2	0.318	~~0.329~~ 30
	B	24 hr	7.4	24.6	6.7	0.293	
	A	48 hr BR	8.1	24.6	7.5	0.295	
	A	48 hr AR	8.0	24.1	7.6	0.320	
	B	72 hr	7.8	24.2	6.6	0.300	
	A	96 hr	8.2	24.4	7.0	0.329	
6	A	0 hr	7.8	24.3	7.3	11.1	
	B	24 hr	8.0	24.7	6.2	11.0	
	A	48 hr BR	8.0	24.6	6.7	11.0	
	A	48 hr AR	8.0	24.2	7.3	11.1	
	B	72 hr	7.9	24.3	6.3	11.3	
	A	96 hr	8.2	24.4	6.7	11.3	
7	A	0 hr	7.8	24.3	7.5	13.1	
	B	24 hr	8.0	24.7	6.2	~~12.7~~ 12.9	
	A	48 hr BR	8.1	24.6	6.7	13.0	
	A	48 hr AR	8.0	24.2	7.3	13.1	
	B	72 hr	8.0	24.3	6.3	13.2	
	A	96 hr	8.2	24.3	6.7	13.3	
8	A	0 hr	7.9	24.3	7.5	14.9	
	B	24 hr	8.0	24.8	6.2	15.0	
	A	48 hr BR	8.1	24.2	6.7	14.9	
	A	48 hr AR	8.0	24.0	7.3	14.9	
	B	72 hr	8.0	24.3	6.3	14.9	
	A	96 hr	8.2	24.4	6.7	15.1	
9	A	0 hr	7.9	24.2	7.5	16.5	
	B	24 hr	8.0	24.8	6.1	16.5	
	A	48 hr BR	8.1	24.3	6.9	16.3	
	A	48 hr AR	8.0	24.1	7.3	16.5	
	B	72 hr	8.0	24.2	6.3	16.6	
	A	96 hr	8.2	24.4	6.6	16.8	
10	A	0 hr	7.9	24.2	7.5	18.43	
	B	24 hr	7.9	24.5	6.0	18.0	
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					

Investigators Signatures
James Daniel
Brent Aho
Marshall Faircloth
Reviewed By: Mitch C. Wolfe

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

Measure/record salinity for marine tests

Comments:

PAGE 000018

Revised 07/15/2008 HE

Appendix C. (continued)

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

DATE: 9-3-08 DURATION: 48 hr 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	18
3.00	20	20
4.00	20	20

SPEARMAN-KARBER TRIM: .00%

SPEARMAN-KARBER ESTIMATES: LC50: 2.22
95% LOWER CONFIDENCE: 2.13
95% UPPER CONFIDENCE: 2.32

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

DATE: 9-3-08 DURATION: 48 hr TOXICANT : NaCl
SPECIES: *Cyprinella leedsi*

RAW DATA: Concentration (g/L)	Number Exposed	Mortalities
.00	20	0
6.00	20	4
7.00	20	3
8.00	20	10
9.00	20	15
10.00	20	20

SPEARMAN-KARBER TRIM: 17.50%

SPEARMAN-KARBER ESTIMATES: LC50: 8.04
95% LOWER CONFIDENCE: 7.62
95% UPPER CONFIDENCE: 8.48

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

Appendix D. Test Organism Receipt(s)

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Organism Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Date: 9/2/08

Shipped to: FDEP

P.O. No: N/A

Species	Quantity	Age	Brood Number	Temp.	pH	Salinity
Mysidopsis bahia	150	4 DAYS	MS080829	25°C	7.9 s.u.	20‰
Menidia beryllina	150	12 DAYS	SS080821	25°C	7.9 s.u.	20‰
						Hardness
Cyprinella leedsi	150	12 DAYS	CL080821	25°C	7.8 s.u	80mg/L
Pimephales promelas	150	9 DAYS	FM080824	25°C	7.8 s.u	80mg/L

Packed by: MP

Shipped Via: FedEx

Notes:

Thank you for your order.

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

Appendix D. (continued)

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Organism Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Date: 9/22/08

Shipped to: FDEP

P.O. No: N/A

Species	Quantity	Age	Brood Number	Temp.	pH	Salinity
Mysidopsis bahia	100	4 DAYS	MS080918	25°C	7.9 s.u.	10 ‰
Menidia beryllina	100	12 DAYS	MS080910	25°C	7.9 s.u	10 ‰
						Hardness
Cyprinella leedsi	200	7 DAYS	CL080915	25°C	7.7 s.u	84 mg/L
Pimephales promelas						

Packed by: DJ

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 Mosaic Fertilizer, L.L.C.-Noralyn Mine Complex Outfalls D-003, D-004 and D-005, sampled on September 22, 2008.

Date	Field ID	Analysis	Component	Result	Remark	Units	MDL	PQL
9/22/2008 11:35	Blank	Metals	Silver	0.025	U	ug/L	0.025	0.1
9/22/2008 11:35	Blank	Metals	Arsenic	0.5	U	ug/L	0.5	2
9/22/2008 11:35	Blank	Metals	Iron	30	U	ug/L	30	120
9/22/2008 11:35	Blank	Metals	Selenium	0.5	U	ug/L	0.5	2
9/22/2008 11:35	Blank	Metals	Cadmium	0.02	U	ug/L	0.02	0.08
9/22/2008 11:35	Blank	Metals	Chromium	0.5	U	ug/L	0.5	2
9/22/2008 11:35	Blank	Metals	Zinc	5	U	ug/L	5	20
9/22/2008 11:35	Blank	Metals	Nickel	0.25	U	ug/L	0.25	1
9/22/2008 11:35	Blank	Metals	Calcium	0.075	U	mg/L	0.075	0.3
9/22/2008 11:35	Blank	Metals	Sodium	0.5	U	mg/L	0.5	2
9/22/2008 11:35	Blank	Metals	Copper	0.5	U	ug/L	0.5	2
9/22/2008 11:35	Blank	Metals	Magnesium	0.04	U	mg/L	0.04	0.16
9/22/2008 11:35	Blank	Metals	Aluminum	60	U	ug/L	60	240
9/22/2008 11:35	Blank	Metals	Lead	0.2	U	ug/L	0.2	0.8
9/22/2008 11:35	Blank	Nutrients	Fluoride	0.05	U	mg F/L	0.05	0.1
9/22/2008 11:35	Blank	Nutrients	Total-P	0.02	U	mg P/L	0.02	0.06
9/22/2008 11:35	Blank	Nutrients	O-Phosphate-P	0.004	U	mg P/L	0.004	0.01
9/22/2008 11:35	Blank	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
9/22/2008 11:35	Blank	Nutrients	Kjeldahl Nitrogen	0.08	U	mg N/L	0.08	0.2
9/22/2008 11:35	Blank	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
9/22/2008 11:35	Blank	Nutrients	Sulfate	0.2	U	mg SO4/L	0.2	0.5
9/22/2008 11:35	Blank	Overflow	Radium 226-Counting Error	0.1		pCi/L		
9/22/2008 11:35	Blank	Overflow	Alpha, Total	0.7	U	pCi/L		
9/22/2008 11:35	Blank	Overflow	Alpha-Counting Error	0.4		pCi/L		
9/22/2008 11:35	Blank	Overflow	Radium 228-Counting Error	0.5		pCi/L		
9/22/2008 11:35	Blank	Overflow	Radium 228	0.7	U	pCi/L		
9/22/2008 11:35	Blank	Overflow	Radium 226	0.2	U	pCi/L		
9/22/2008 10:40	Outfall 003	AGP/LN	Algal Growth Potential	27.2		mg DryWt/L	0.3	0.9
9/22/2008 10:40	Outfall 003	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	23	A	ug/L	0.6	1.8
9/22/2008 10:40	Outfall 003	Chlorophyll/Grain Size/BOD	Phaeophytin-a	12	A	ug/L	0.26	0.77
9/22/2008 10:40	Outfall 003	Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	LJY	LC50		
9/22/2008 10:40	Outfall 003	Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	LJY	LC50		
9/22/2008 10:40	Outfall 003	Metals	Selenium	0.5	U	ug/L	0.5	2

Appendix E. (continued)

Date	Field ID	Analysis	Component	Result	Remark	Units	MDL	PQL
9/22/2008 10:40	Outfall 003	Metals	Chromium	0.5	U	ug/L	0.5	2
9/22/2008 10:40	Outfall 003	Metals	Iron	79	I	ug/L	30	120
9/22/2008 10:40	Outfall 003	Metals	Cadmium	0.02	U	ug/L	0.02	0.08
9/22/2008 10:40	Outfall 003	Metals	Zinc	5	U	ug/L	5	20
9/22/2008 10:40	Outfall 003	Metals	Sodium	66.3		mg/L	0.5	2
9/22/2008 10:40	Outfall 003	Metals	Aluminum	87	I	ug/L	60	240
9/22/2008 10:40	Outfall 003	Metals	Arsenic	2.3		ug/L	0.5	2
9/22/2008 10:40	Outfall 003	Metals	Silver	0.025	U	ug/L	0.025	0.1
9/22/2008 10:40	Outfall 003	Metals	Lead	0.2	U	ug/L	0.2	0.8
9/22/2008 10:40	Outfall 003	Metals	Nickel	1.02		ug/L	0.25	1
9/22/2008 10:40	Outfall 003	Metals	Magnesium	24.7		mg/L	0.04	0.16
9/22/2008 10:40	Outfall 003	Metals	Calcium	48.5		mg/L	0.075	0.3
9/22/2008 10:40	Outfall 003	Metals	Copper	0.5	U	ug/L	0.5	2
9/22/2008 10:40	Outfall 003	Nutrients	Kjeldahl Nitrogen	1.5		mg N/L	0.08	0.2
9/22/2008 10:40	Outfall 003	Nutrients	TDS	429		mg/L	15	60
9/22/2008 10:40	Outfall 003	Nutrients	Ammonia-N	0.41		mg N/L	0.01	0.02
9/22/2008 10:40	Outfall 003	Nutrients	NO2NO3-N	0.043		mg N/L	0.004	0.01
9/22/2008 10:40	Outfall 003	Nutrients	O-Phosphate-P	2.7		mg P/L	0.08	0.2
9/22/2008 10:40	Outfall 003	Nutrients	Sulfate	160		mg SO4/L	2	5
9/22/2008 10:40	Outfall 003	Nutrients	Total-P	2.8		mg P/L	0.1	0.3
9/22/2008 10:40	Outfall 003	Nutrients	TSS	6	I	mg/L	4	16
9/22/2008 10:40	Outfall 003	Nutrients	Fluoride	2.7		mg F/L	0.05	0.1
9/22/2008 10:40	Outfall 003	Overflow	Radium 226-Counting Error	0.2		pCi/L		
9/22/2008 10:40	Outfall 003	Overflow	Radium 228	0.8	U	pCi/L		
9/22/2008 10:40	Outfall 003	Overflow	Radium 226	0.4		pCi/L		
9/22/2008 10:40	Outfall 003	Overflow	Radium 228-Counting Error	0.5		pCi/L		
9/22/2008 10:40	Outfall 003	Overflow	Alpha-Counting Error	1.6		pCi/L		
9/22/2008 10:40	Outfall 003	Overflow	Alpha, Total	2.1	U	pCi/L		
9/22/2008 10:40	Outfall 003	Field Parameter	pH	7.2				
9/22/2008 10:40	Outfall 003	Field Parameter	Dissolved Oxygen	5.58		mg/L		
9/22/2008 10:40	Outfall 003	Field Parameter	Temperature	27.64		C		
9/22/2008 10:40	Outfall 003	Field Parameter	Specific Conductance	685		umhos/cm		
9/22/2008 9:50	Outfall 004	AGP/LN	Algal Growth Potential	47		mg DryWt/L	0.3	0.9
9/22/2008 9:50	Outfall 004	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	11		ug/L	0.55	1.7

Appendix E. (continued)

Date	Field ID	Analysis	Component	Result	Remark	Units	MDL	PQL
9/22/2008 9:50	Outfall 004	Chlorophyll/Grain Size/BOD	Phaeophytin-a	3		ug/L	0.24	0.71
9/22/2008 9:50	Outfall 004	Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	L	LC50		
9/22/2008 9:50	Outfall 004	Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	L	LC50		
9/22/2008 9:50	Outfall 004	Metals	Zinc	5	U	ug/L	5	20
9/22/2008 9:50	Outfall 004	Metals	Aluminum	60	U	ug/L	60	240
9/22/2008 9:50	Outfall 004	Metals	Sodium	32.7		mg/L	0.5	2
9/22/2008 9:50	Outfall 004	Metals	Cadmium	0.02	U	ug/L	0.02	0.08
9/22/2008 9:50	Outfall 004	Metals	Copper	0.5	U	ug/L	0.5	2
9/22/2008 9:50	Outfall 004	Metals	Calcium	39.7		mg/L	0.075	0.3
9/22/2008 9:50	Outfall 004	Metals	Iron	170		ug/L	30	120
9/22/2008 9:50	Outfall 004	Metals	Silver	0.025	U	ug/L	0.025	0.1
9/22/2008 9:50	Outfall 004	Metals	Arsenic	0.92	I	ug/L	0.5	2
9/22/2008 9:50	Outfall 004	Metals	Lead	0.2	U	ug/L	0.2	0.8
9/22/2008 9:50	Outfall 004	Metals	Magnesium	24.6		mg/L	0.04	0.16
9/22/2008 9:50	Outfall 004	Metals	Chromium	0.5	U	ug/L	0.5	2
9/22/2008 9:50	Outfall 004	Metals	Selenium	0.5	U	ug/L	0.5	2
9/22/2008 9:50	Outfall 004	Metals	Nickel	0.43	I	ug/L	0.25	1
9/22/2008 9:50	Outfall 004	Nutrients	Fluoride	1.7		mg F/L	0.05	0.1
9/22/2008 9:50	Outfall 004	Nutrients	Total-P	1		mg P/L	0.1	0.3
9/22/2008 9:50	Outfall 004	Nutrients	TDS	272		mg/L	15	60
9/22/2008 9:50	Outfall 004	Nutrients	O-Phosphate-P	0.93		mg P/L	0.08	0.2
9/22/2008 9:50	Outfall 004	Nutrients	Ammonia-N	1.3		mg N/L	0.05	0.1
9/22/2008 9:50	Outfall 004	Nutrients	Kjeldahl Nitrogen	2.2		mg N/L	0.08	0.2
9/22/2008 9:50	Outfall 004	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
9/22/2008 9:50	Outfall 004	Nutrients	TSS	5	I	mg/L	4	16
9/22/2008 9:50	Outfall 004	Nutrients	Sulfate	29		mg SO4/L	0.2	0.5
9/22/2008 9:50	Outfall 004	Overflow	Alpha-Counting Error	1.8		pCi/L		
9/22/2008 9:50	Outfall 004	Overflow	Alpha, Total	2.7		pCi/L		
9/22/2008 9:50	Outfall 004	Overflow	Radium 228-Counting Error	0.4		pCi/L		
9/22/2008 9:50	Outfall 004	Overflow	Radium 228	0.7	U	pCi/L		
9/22/2008 9:50	Outfall 004	Overflow	Radium 226-Counting Error	0.1		pCi/L		
9/22/2008 9:50	Outfall 004	Overflow	Radium 226	0.6		pCi/L		
9/22/2008 9:50	Outfall 004	Field Parameter	Dissolved Oxygen	4.33		mg/L		
9/22/2008 9:50	Outfall 004	Field Parameter	Specific Conductance	512		umhos/cm		

Appendix E. (continued)

Date	Field ID	Analysis	Component	Result	Remark	Units	MDL	PQL
9/22/2008 9:50	Outfall 004	Field Parameter	Temperature	26.16		C		
9/22/2008 9:50	Outfall 004	Field Parameter	pH	7.27				
9/22/2008 11:20	Outfall 005	AGP/LN	Algal Growth Potential	26.9	A	mg DryWt/L	0.3	0.9
9/22/2008 11:20	Outfall 005	Chlorophyll/Grain Size/BOD	Phaeophytin-a	9.4		ug/L	0.24	0.71
9/22/2008 11:20	Outfall 005	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	22		ug/L	0.55	1.7
9/22/2008 11:20	Outfall 005	Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	L	LC50		
9/22/2008 11:20	Outfall 005	Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	L	LC50		
9/22/2008 11:20	Outfall 005	Metals	Cadmium	0.02	U	ug/L	0.02	0.08
9/22/2008 11:20	Outfall 005	Metals	Nickel	0.25	I	ug/L	0.25	1
9/22/2008 11:20	Outfall 005	Metals	Chromium	0.5	U	ug/L	0.5	2
9/22/2008 11:20	Outfall 005	Metals	Aluminum	60	U	ug/L	60	240
9/22/2008 11:20	Outfall 005	Metals	Silver	0.025	U	ug/L	0.025	0.1
9/22/2008 11:20	Outfall 005	Metals	Selenium	0.5	U	ug/L	0.5	2
9/22/2008 11:20	Outfall 005	Metals	Magnesium	23.1		mg/L	0.04	0.16
9/22/2008 11:20	Outfall 005	Metals	Calcium	32.8		mg/L	0.075	0.3
9/22/2008 11:20	Outfall 005	Metals	Lead	0.2	U	ug/L	0.2	0.8
9/22/2008 11:20	Outfall 005	Metals	Arsenic	0.58	I	ug/L	0.5	2
9/22/2008 11:20	Outfall 005	Metals	Iron	240		ug/L	30	120
9/22/2008 11:20	Outfall 005	Metals	Zinc	5	U	ug/L	5	20
9/22/2008 11:20	Outfall 005	Metals	Sodium	24.9		mg/L	0.5	2
9/22/2008 11:20	Outfall 005	Metals	Copper	0.5	U	ug/L	0.5	2
9/22/2008 11:20	Outfall 005	Nutrients	TDS	265	Y	mg/L	15	60
9/22/2008 11:20	Outfall 005	Nutrients	Sulfate	68	Y	mg SO4/L	0.2	0.5
9/22/2008 11:20	Outfall 005	Nutrients	Fluoride	0.98		mg F/L	0.05	0.1
9/22/2008 11:20	Outfall 005	Nutrients	Total-P	0.86		mg P/L	0.02	0.06
9/22/2008 11:20	Outfall 005	Nutrients	TSS	4	UY	mg/L	4	16
9/22/2008 11:20	Outfall 005	Nutrients	Ammonia-N	0.51		mg N/L	0.01	0.02
9/22/2008 11:20	Outfall 005	Nutrients	O-Phosphate-P	0.71		mg P/L	0.04	0.1
9/22/2008 11:20	Outfall 005	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
9/22/2008 11:20	Outfall 005	Nutrients	Kjeldahl Nitrogen	1.5		mg N/L	0.08	0.2
9/22/2008 11:20	Outfall 005	Overflow	Radium 228	0.7	U	pCi/L		
9/22/2008 11:20	Outfall 005	Overflow	Radium 226-Counting Error	0.1		pCi/L		
9/22/2008 11:20	Outfall 005	Overflow	Alpha-Counting Error	1.5		pCi/L		
9/22/2008 11:20	Outfall 005	Overflow	Alpha, Total	2.1	U	pCi/L		

Appendix E. (continued)

Date	Field ID	Analysis	Component	Result	Remark	Units	MDL	PQL
9/22/2008 11:20	Outfall 005	Overflow	Radium 228-Counting Error	0.5		pCi/L		
9/22/2008 11:20	Outfall 005	Overflow	Radium 226	0.5		pCi/L		
9/22/2008 11:20	Outfall 005	Field Parameter	Temperature	26.76		C		
9/22/2008 11:20	Outfall 005	Field Parameter	Specific Conductance	457		umhos/cm		
9/22/2008 11:20	Outfall 005	Field Parameter	pH	7.11				
9/22/2008 11:20	Outfall 005	Field Parameter	Dissolved Oxygen	1.55		mg/L		

Appendix F-1

Taxa list and density (number/mL) for phytoplankton collected from Outfalls D-003, D-004, and D-005 at Mosaic Fertilizer, L.L.C. – Noralyn Mine Complex on September 22, 2008.

	Outfall D-003 # counted	Outfall D-003 #/mL	Outfall D-004 # counted	Outfall D-004 #/mL	Outfall D-005 # counted	Outfall D-005 #/mL
Bacillariophyta						
Bacillariophyta	47	1,858	32	433	33	946
Chlorophycota						
Actinastrum hantzschii	-	-	-	-	2	57
Ankistrodesmus sp.	-	-	-	-	2	57
Ankistrodesmus falcatus	1	40	-	-	10	287
Chlamydomonas sp.	-	-	-	-	1	29
Chlorella sp.	-	-	-	-	2	57
Chlorella vulgaris	26	1,028	20	271	61	1,748
Chlorococcum humicola	4	158	1	14	-	-
Coelastrum microporum	3	119	-	-	1	29
Crucigenia rectangularis	-	-	1	14	3	86
Crucigenia tetrapedia	8	316	-	-	13	372
Dictyosphaerium ehrenbergianum	-	-	-	-	6	172
Dictyosphaerium pulchellum	-	-	3	41	-	-
Gloeocystis gigas	3	119	1	14	3	86
Golenkinia sp.	3	119	-	-	-	-
Golenkinia paucispina	4	158	-	-	-	-
Kirchneriella contorta	2	79	-	-	-	-
Nannochloris sp.	1	40	-	-	-	-
Oocystis sp.	4	158	2	27	3	86
Scenedesmus sp.	6	237	-	-	11	315
Scenedesmus abundans	12	474	-	-	-	-
Scenedesmus bicaudatus	4	158	-	-	1	29
Scenedesmus bijuga	3	119	3	41	8	229
Scenedesmus dimorphus	4	158	1	14	-	-
Scenedesmus quadricauda	15	593	-	-	8	229
Schroederia setigera	3	119	1	14	2	57
Selenastrum sp.	40	1,581	11	149	18	516
Selenastrum westii	4	158	-	-	3	86
Sphaerocystis sp.	3	119	-	-	-	-
Tetradesmus wisconsinensis	1	40	-	-	-	-
Tetraedron minimum	5	198	1	14	-	-
Tetraedron muticum	6	237	-	-	-	-
Tetrallantos sp.	1	40	-	-	5	143
Unknown Chlorophyceae	-	-	-	-	28	802
Westella sp.	3	119	2	27	11	315
Cryptophycophyta						
Cryptomonas ovata	-	-	1	14	-	-
Cyanophycota						
Aphanocapsa sp.	9	356	5	68	1	29
Cyanobium parvum	-	-	4	54	-	-
Cylindrospermopsis raciborskii	-	-	44	596	-	-
Gloeocapsopsis sp.	8	316	-	-	7	201
Gloeothece sp.	2	79	-	-	-	-
Jaaginema sp.	1	40	16	217	3	86
Merismopedia tenuissima	1	40	1	14	-	-
Merismopedia warmingiana	13	514	2	27	5	143
Microcystis sp.	22	870	-	-	-	-
Microcystis wesenbergii	6	237	-	-	-	-
Planktothrix agardhii	-	-	103	1,395	25	716
Rhabdogloea sp.	6	237	10	135	14	401
Snowella sp.	6	237	3	41	-	-
Synechocystis sp.	8	316	27	366	10	287
Euglenophycota						
Euglena sp.	-	-	2	27	-	-
Lepocinclis sp.	-	-	2	27	-	-
Phacus sp.	-	-	1	14	-	-
Trachelomonas sp.	-	-	-	-	1	29
Trachelomonas planctonica	-	-	1	14	-	-
Prasinophyta						
Spermatozoopsis exultans	3	119	-	-	-	-

Appendix F-2

Diatom taxa list and number of valves counted to a target of 500 valves for phytoplankton collected from Outfalls D-003, D-004, and D-005 at Mosaic Fertilizer, L.L.C. – Noralyn Mine Complex on September 22, 2008.

	Outfall D-003 # counted	Outfall D-004 # counted	Outfall D-005 # counted
Bacillariophyceae			
Achnanthes sp.	1	1	5
Achnanthes fluviatilis	-	3	2
Achnanthidium exiguum	1	-	2
Amphora sp.	-	5	-
Amphora veneta	-	29	3
Cocconeis placentula	1	1	2
Craticula minusculoides	-	1	-
Diadesmis confervacea	2	2	-
Eunotia sp.	-	2	3
Gomphonema sp.	-	11	2
Gomphonema parvulum	-	28	2
Lemnicola hungarica	-	1	-
Luticola mutica	1	-	-
Navicula sp.	2	6	5
Navicula cryptotenella	-	1	-
Navicula exigua	1	-	-
Navicula festiva	-	-	1
Navicula minima	-	5	2
Navicula seminulum	6	12	13
Nitzschia sp.	82	250	132
Nitzschia acicularis	-	1	1
Nitzschia amphibia	-	14	-
Nitzschia gracilis	-	1	-
Nitzschia intermedia	-	8	1
Nitzschia palea	-	32	57
Planothidium rostratum	2	-	-
Stauroneis phoenicenteron	-	2	-
Unknown Naviculaceae	-	4	6
Coscinodiscophyceae			
Aulacoseira granulata	-	-	1
Cyclostephanos sp.	-	1	-
Cyclostephanos invisitatus	9	-	-
Cyclotella sp.	1	5	1
Cyclotella atomus	159	12	1
Cyclotella meneghiniana	227	59	255
Cyclotella pseudostelligera	1	-	-
Melosira sp.	-	1	-
Stephanocostis chantaicus	3	-	-
Stephanodiscus sp.	-	1	-
Thalassiosira weissflogii	2	-	3
Unknown Coscinodiscophyceae	-	1	-

The Bioassay of the Mosaic Fertilizer, L.L.C.-Noralyn Mine Complex effluent sampled on September 22, 2008. NPDES #FL0000230.

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 F L 0 0 0 0 2 3 0 11	12 0 8 0 9 2 2	18 **B**	19 **S**	20 2

Remarks

66

The Priority Pollutants Analysis of the Mosaic Fertilizer, L.L.C.-Noralyn Mine Complex effluent sampled on September 22, 2008. NPDES #FL0000230.

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 F L 0 0 0 0 2 3 0 11	12 0 8 0 9 2 2	18 **X**	19 **S**	20 2

Remarks

66

Biological Analyses of the Mosaic Fertilizer, L.L.C.-Noralyn Mine Complex effluent sampled on September 22, 2008. NPDES #FL0000230.

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 F L 0 0 0 0 2 3 0 11	12 0 8 0 9 2 2	18 **S**	19 **S**	20 2

Remarks

66