

Effluent Quality Assessment

Bunnell Wastewater Treatment Facility

Flagler County

NPDES #FL0020907

Sampled July 11-12, 2010

October 2010

Biology Section
Bureau of Laboratories
Division of Environmental Assessment and Restoration

Quality Manual No. 870346G
NELAC Certification No. E31780

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Bunnell Wastewater Treatment Facility, 401 Tolman Street, Bunnell, Flagler County, Florida, 32110. NPDES# FL0020907 Effluent grab samples for bioassay and chemical analyses for this facility were collected on July 11-12, 2010.

Introduction

Bunnell Wastewater Treatment Facility (WWTF) is an extended aeration wastewater treatment facility which treats domestic wastewater. (See Appendix F for detailed facility information provided by Max Schwartz of FDEP Northeast District.)

Methods

Samples were collected from the EFD-01 NPDES sampling point for Outfall D-001 by Sharon Piltz and Malton Prifti (FDEP Northeast District) following DEP-SOP-001/01 FS 2400 Wastewater Sampling. All DEP SOPs are available on the web at: http://www.floridadep.org/labs/bars/sas/sop/index.htm.

See Appendix A for the completed chain of custody form.

The 96-hour acute screening 4/24 toxicity tests and algal growth potential (AGP) 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.

Total residual chlorine (1.12 mg/L) was detected in bioassay sample #4 (LIMS # 1285001) in the laboratory. An aliquot of this sample was dechlorinated by the addition of sodium thiosulfate (0.025 N) at a rate of 1.2 mL per liter of sample to neutralize the chlorine. Bioassays were performed on the dechlorinated aliquot in addition to the bioassays performed on the original sample. The same concentration of sodium thiosulfate was added to the dechlorinated test controls. The purpose of the dechlorinated test controls was to confirm that there was no adverse effect of adding sodium thiosulfate to the sample. There was no mortality in the dechlorinated controls of either test species.

Results and Discussion

- **Toxicity Test Results**
  Tests were performed July 13-17, 2010.

  Sample 1 of 4 (Sample # 1284998)
  Ceriodaphnia dubia 96-hour acute screening 4/24 bioassay – LC_{50} > 100%, 0%* mortality in 100% sample at 96 hours

  Cyprinella leedsi 96-hour acute screening 4/24 bioassay – LC_{50} > 100%, 0%* mortality in 100% sample at 96 hours

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

  Sample 2 of 4 (Sample # 1284999)
  Ceriodaphnia dubia 96-hour acute screening 4/24 bioassay – LC_{50} > 100%, 10%* mortality in 100% sample at 96 hours

  Cyprinella leedsi 96-hour acute screening 4/24 bioassay – LC_{50} > 100%, 0%* mortality in 100% sample at 96 hours

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

Sample 3 of 4 (Sample # 1285000)
Ceriodaphnia dubia 96-hour acute screening 4/24 bioassay – LC_{50} > 100%, 0%* mortality in 100% sample at 96 hours

Cyprinella leedsi 96-hour acute screening 4/24 bioassay – LC_{50} > 100%, 0%* mortality in 100% sample at 96 hours

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

Sample 4 of 4 (Sample # 1285001)
Ceriodaphnia dubia 96-hour acute screening 4/24 bioassay – LC_{50} < 100%, 100%* mortality in 100% sample at 24 hours

Cyprinella leedsi 96-hour acute screening 4/24 bioassay – LC_{50} < 100%, 100%* mortality in 100% sample at 24 hours

The bioassay samples were acutely toxic to the test organisms. The cause of toxicity was attributed to the residual chlorine in the sample.

Sample 4 of 4 (dechlorinated) (Sample # 1285001)
Ceriodaphnia dubia dechlorinated 96-hour acute screening 4/24 bioassay – LC_{50} > 100%, 5%* mortality in 100% sample at 96 hours

Cyprinella leedsi dechlorinated 96-hour acute screening 4/24 bioassay – LC_{50} > 100%, 10%* 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 91.3 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 analytical chemistry suggests that the effluent is nitrogen-limited. The predicted AGP based on inorganic nitrogen concentrations was 236.5 (±20%) mg dry wt/L (Table 1; Miller et al. 1978). Growth in an AGP test which is less than predicted yet greater than expected for "inhibited" growth can be due to a nutrient other than nitrogen or phosphorus limiting growth and/or the limited bioavailability of the nitrogen and/or the phosphorus within the sample.

  See Table 1 for AGP results.

- **Chemistry Results**
  Total residual chlorine (TRC) (1.12 mg/L) was detected in bioassay sample # 4 in the laboratory. At the time of effluent collection for bioassay sample #4, the effluent's TRC concentration was (3.9 mg/L) as recorded by the facility's meter. Since the effluent was being routed to the R-001 reuse system and not being discharged into surface water, the TRC concentration, although exceeding the Class III freshwater criterion (limit ≤0.01 mg/L, 62-302.530 (18), F.AC.) was not in violation of the criterion. The concentrations are in compliance with the permitted limit for disinfection (limit ≥ 0.5 mg/L TRC ; permit # FL0020907). TRC was not detected in bioassay samples #1, #2 and #3. Total ammonia was not detected in any of the four bioassay samples in the laboratory. The total ammonia concentration in the composite sample collected and preserved for chemical analysis was 0.023 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.

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

  The conductivity of the effluent collected for bioassay sample #3 (1,320 µmhos-cm) was greater than the Class III freshwater numerical value of 1,275 µmhos-cm. Based on historical background conductivity data from the facility's discharge monitoring report (September 2005 –May 2010; range 155 – 799 µmhos-cm; mean 343 µmhos-cm), the conductivity of the effluent as measured in bioassay sample #3 is thought to have exceeded the Class III freshwater criterion for specific conductance (62-302.530 (22) F.A.C. "Shall not be increased more than 50% above background or to 1275, whichever is greater."). Northeast District personnel have been notified and are following up with the Facility to address the issue of relatively high conductivity in the facility's 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. See Appendix B for bioassay lab equipment.

Conclusion

Effluent sample # 4, collected from the EFD-01 NPDES sampling point for Outfall D-001 for this facility on July 12, 2010, was acutely toxic to both test species, producing 100% mortality within 24-hours of test initiation. The toxicity was attributed to the total residual chlorine in the effluent. An aliquot of sample #4, dechlorinated with sodium thiosulfate, was not acutely toxic to either test species. Effluent samples #1, #2 and #3, collected on July 11-12, 2010, were not acutely toxic to either test species during the 96 hour screening tests. The effluent AGP result was greater than the "problem" threshold for fresh receiving waters suggesting that nutrient enrichment may be an issue. Due to effluent being routed to reuse system R-001 and not being discharged to surface waters, the effluent total residual chlorine (TRC) (3.9 mg/L) was not in violation of Class III freshwater criterion (limit ≤0.01 mg/L, 62-302.500 (18), F.AC.). The effluent TRC was in compliance with the permitted limit for disinfection (≥ 0.5 mg/L, permit # FL0020907). The conductivity of the effluent being discharged when Bioassay sample #3 was collected is thought to exceed the Class III freshwater criterion for specific conductance (62-302.530 (22) F.A.C.). Additional water quality samples collected on July 12, 2010, did not exceed either Class III freshwater quality criteria or the facility's NPDES permit limits.

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 Bunnell WWTF on July 12, 2010.

Bunnell Wastewater Treatment Facility NPDES# FL0020907					
Location	AGP (measured)	Predicted AGP (TSIN) ± 20%	Predicted AGP (TN) ± 20%	Inorganic N:P ratio	Total N:P ratio
Effluent	91.3	236.5 ± 47.3	273.6 ± 54.7	7.7	7.9

Table 2. Effluent limits, Class III Freshwater Criteria and chemical and microbiological data for samples collected from the Bunnell WWTF on July 12, 2010.

Bunnell Wastewater Treatment Facility NPDES# FL0020907	Class III Criteria	Effluent Limits	Effluent	
Metals (µg/L unless otherwise noted)				
Aluminum	-	-	110	I
Arsenic	≤ 50	-	0.82	I
Cadmium	≤ 0.7 b	-	0.03	U
Calcium (mg/L)	-	-	109	
Chromium-III	≤ 227.9 b	-	0.32	I
Copper	≤ 25.7 b	-	2.73	
Iron	≤ 1,000	-	40	I
Lead	≤ 14.4 b	-	0.2	U
Magnesium (mg/L)	-	-	13.5	
Nickel	≤ 142.4 b	-	0.98	I
Selenium	≤ 5.0	-	0.2	U
Silver	≤ 0.07	≤ 0.07 s	0.025	U
Zinc	≤ 327.6 b	-	24	
Nutrients (mg/L)				
Ortho-phosphate	-	Report	0.81	
Total Phosphorus	-	Report	0.91	A
Total Ammonia	-	Report	0.023	
Un-ionized Ammonia	≤ 0.02 s	-	≤ 0.02	c
Nitrate and Nitrite	-	Report	6.2	
Total Kjeldahl Nitrogen	-	≤ 5.0 s*	1	J
Organic Nitrogen	-	Report	0.977	c
Total Nitrogen	-	Report	7.2	c
General Physical and Chemical Parameters				
Dissolved Oxygen (mg/L)	≥ 5.0	≥ 6.0 s	8.0	
pH (SU)	6.0 - 8.5	6.0 - 8.5 s	7.9	
Conductivity (µmhos/cm)	≤ 1,275	-	1,252	
Temperature (°C)	-	Report	28.6	
Salinity	-	-	≥ 0.58	c
Total Residual Chlorine (mg/L)	≤ 0.01	≤ 0.01 s	3.9	
Chlorophyll *a* (µg/L) - Corrected	-	-	0.62	U
Phaeophytin (µg/L)	-	-	0.45	U
Total Suspended Solids (mg/L)	-	≤ 60.0 s*	4	U
Color (pt-Co)	-	-	5	U
CBOD, 5 day (mg/L), N - inhibited	-	≤ 16.0 s*	0.86	I
Chloride (mg/L)	-	-	190	A
Fluoride (mg/L)	≤ 10.0	-	0.61	
Sulfate (mg/L)	-	-	28	A
Flow (MGD)	-	0.3 a	0.179	f
Hardness (mg $CaCO_3$)	-	-	327.77	c
Microbiology (Number of colony forming units/100ml)				
Fecal Coliforms ¥	≤ 400s #	-	2	U

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
f - AADF from June '09 to May'10
s - Single sample
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
J - Estimated value
U - Material analyzed for but not detected; value reported is the method detection limit
¥ - Fecal coliform analysis performed by Central lab
- If 10 or fewer samples are taken within a month, the single sample limit is 400 CFU (62-302.530(6), F.A.C.)
* - 8-hour flow proportioned composite

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2010-07-12-35
Bunnell WWTF FYI3 inspection

Requester: Cari Butler
Field Report Prepared By: S. Piltz
Collected By: Mallon Polk / Sharon Piltz
Send Final Report To: Tom Kallemeyn
Sampling Agency: DEP

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

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Bunnell WWTF EFD-1	☐ Comp ☑ Grab Date 7/11/10 Time 1815 Eastern Central	Date Time Eastern Central	A
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L) 7.83	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc) EFF	Temp (C) 28.69	pH 7.58	Sample Depth ☑ m ☐ ft 0.2
				Salinity (PPTh) 12.72 ☑ Sp Conductance (umho/cm) 0.03
				NPDES Number FL0042919
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments Tox ~~EFF~~ 1800 Sunday	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Bunnell WWTF EFD-1	☐ Comp ☑ Grab Date 7/12/10 Time 0000 Central	Date Time Eastern Central	A
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc) EFF	Temp (C)	pH	Sample Depth ☐ m ☐ ft
				Salinity (PPTh) ☐ Sp Conductance (umho/cm)
				NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments Tox ~~EFF~~ 0000 Monday	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Bunnell WWTF EFD-1	☐ Comp ☑ Grab Date 7/11/10 Time 0600 Central	Date Time Eastern Central	A
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L) 7.11	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc) EFF	Temp (C) ~~28.0~~	pH 7.56	Sample Depth ☑ m 0.26 ☐ ft
				Salinity (PPTh) 0.05 ☑ Sp Conductance (umho/cm) 13.20
				NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments Tox ~~EFF~~ 0600 monday	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Bunnell WWTF - EFD-1	☐ Comp ☑ Grab Date 7/11/10 Time 1205 Central	Date Time Eastern Central	A
	Field ID	Tot Res Chlorine (mg/L) 3.9	Diss Oxygen (mg/L) 8.04	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc) EFF	Temp (C) 28.59	pH 7.91	Sample Depth ☑ m 0.22 ☐ ft
				Salinity (PPTh) 0.02 ☑ Sp Conductance (umho/cm) 12.57
				NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments Tox 1200 monday Going to Reuse no discharge	

Relinquished By	Date/Time	Shipping Method	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
[illegible]	7/12/10	Fed EX	[illegible]	7-13-10				

* Shaded Areas for Lab use only

** Please see reverse side for Bottle Group information

last revised October 1, 2003

09:10V 8 Bronny Reed in Tox by J.D.
10.15 7.13.10
Toxicity

07-12-35

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Request Number: RQ-2010-~~03-01-32~~
Starke WWTP

Event ID *

Requester: ~~Michael Tanski~~ Cari Butler

Field Report Prepared By: S. Piltz

Customer: NE-DIST

Collected By: Matthew Caffi / Sharon Piltz

Send Final Report To: Tom Kallemeyn

Project ID: FYI~~5~~3

Sampling Agency: DEP

PMAS: 1143

Lab ID *	Location	Comp / Grab	Collection (begin) Date Time ~~Eastern~~ Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
	Sunnd WWTF EFF-1	☐ Comp ☑ Grab	Date 1205 Time 7/12/10		A
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
		3.9	8.04		
	Matrix (Include type e.g. Salt, Fresh, etc) EFF / Temp (C) 28.59 / pH 7.91	Sample Depth 0.22 ☑ m ☐ ft	0.62 / 1252	☐ Salinity (PPTh) ☑ Sp Conductance (umho/cm)	NPDES Number FL0020907
	Latitude o ' "	Longitude o ' "	Comments: Going to Reuse no Dechlor.		

Lab ID *	Location	Comp / Grab	Collection (begin) Date Time ~~Eastern~~ Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
	Blank	☐ Comp ☑ Grab	Date 1220 Time 7/12/10		B
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (Include type e.g. Salt, Fresh, etc) DI / Temp (C)	pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number
	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)**
	Blank	☐ Comp ☐ Grab	Date Time		
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (Include type e.g. Salt, Fresh, etc) / Temp (C)	pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number
	Latitude o ' "	Longitude o ' "	Comments		

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

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
	7/12/10	FedEx		7-13-10 09:10				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

FDEP Biology Laboratory - Acute Screen 4/24 Bioassay Bench Sheets

Facility: Bunnell WWTF

Address: Tollman Street @ Dean Road

City: Bunnell County: Flagler 32010

Contact/District: Sharon Pilz / Northeast

NPDES Permit #: FL 00 20907

LIMS Job # TLH-2010-07-13-18 LIMS Sample #: 128 4998

Lims Data Entry: 7-22-10 MF Data Entry Verification: BA 7.22.10

Sample Collection: Date: 7-11-10 Time: 1815

Hold Time Start: Date: 7-12-10 Time: 1205 ME

Sample: 1 of 4

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.

Light Intensity : 50 - 100 ft. candles.

Photoperiod : 16 hours light 8 hours dark.

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: ____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 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:

Incubator # 2 min 24.6 max 26.8 mean X

Incubator # ____ min ____ max ____ mean ____

Room B246 min 24.9 max 25.6 mean X

BATCH - 7/13/10

Investigators' Signatures

Jaime Daniel

Brad Alexander

Marshall Faircloth

Amelia Rankin

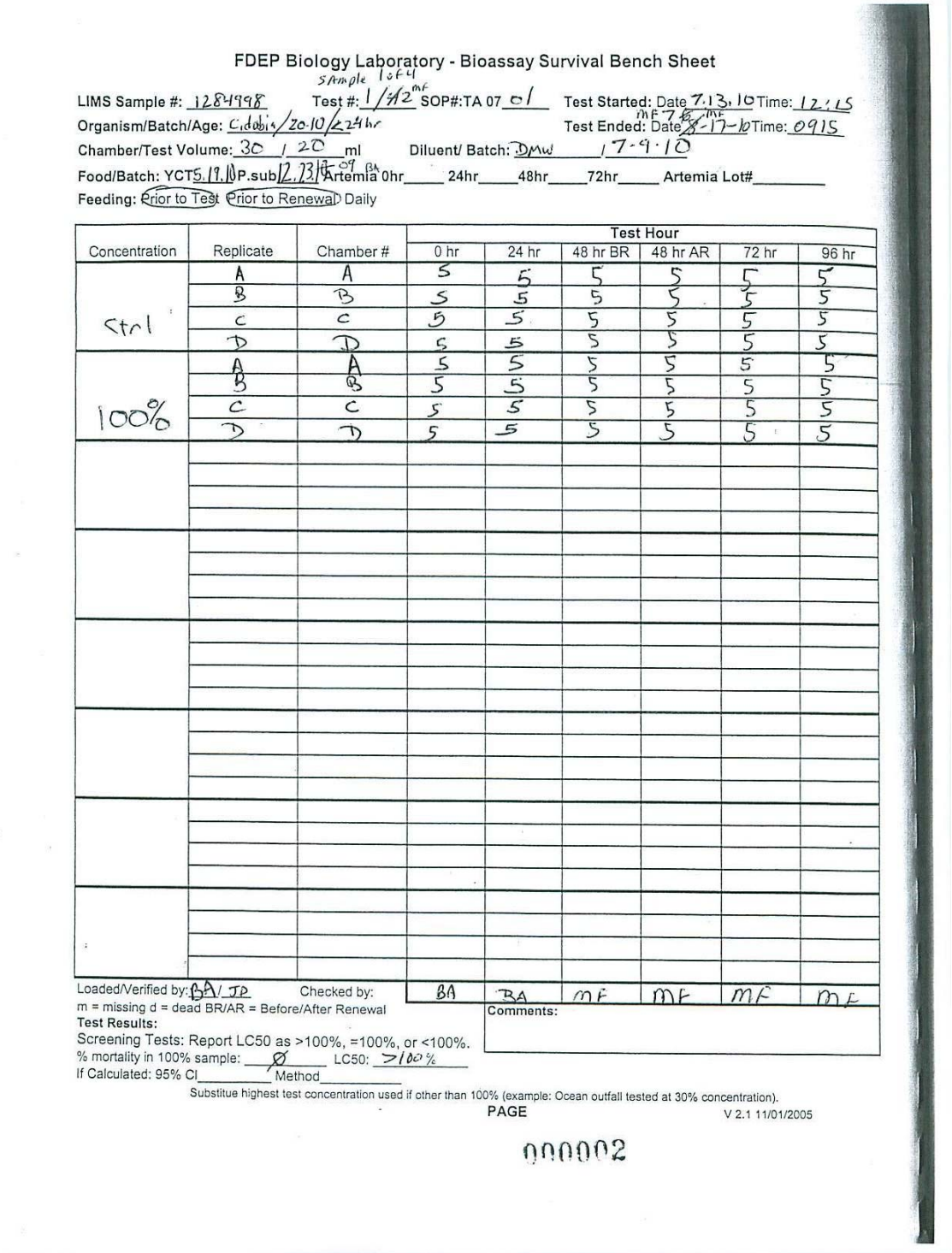
Liz Miller

REVIEWER

Water Quality Parameters	20% DMW 7-9-10 BATCH	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	N/A	NOT	measured		MF
Lab Total Residual Cl_2 (mg/L):	<0.03	<0.03				<0.03	HACH	AGR/3D	BA
Alkalinity (mg/L as $CaCO_3$):	87	152				287	HACH	BA	MF
Hardness (mg/L as $CaCO_3$):	101	151				349	HACH	BA	MF
Total Ammonia (mg/L as N):	<0.017	<0.017				<0.017	DENVER	MF	BA
Salinity (ppth):	–	–				–	YSI / Mettler	–	–

V 2.0 4/12/05

Appendix B. (continued)



FDEP Biology Laboratory - Bioassay Survival Bench Sheet

Sample 1 of 4

LIMS Sample #: 1284998 Test #: 1/112 mf SOP#:TA 07 01 Test Started: Date 7.13.10 Time: 12:15

Organism/Batch/Age: C.dubia/20-10/<24hr Test Ended: Date mf 7.16 mf 7-17-10 Time: 0915

Chamber/Test Volume: 30 / 20 ml Diluent/ Batch: DMW / 7-9-10

Food/Batch: YCT 5.19.10 P.sub 12.23.09 BA 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	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
			BA	BA	MF	MF	MF	MF

Loaded/Verified by: BA / JP Checked by:

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

Test Results:

Screening Tests: Report LC50 as >100%, =100%, or <100%.

% mortality in 100% sample: 0 LC50: >100%

If Calculated: 95% CI_____ Method_____

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

Comments:

PAGE

V 2.1 11/01/2005

000002

Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

Sample 1/4 samples MF

LIMS Sample #: 1284998 Test #: 2/2 SOP#:TA 07 02 Test Started: Date 7.13.10 Time: 1300

Organism/Batch/Age: C.leedsi/7/3/10 Test Ended: Date 7-17-10 Time: 0915

Chamber/Test Volume: 400 / 1000 ml Diluent/ Batch: Well 7-13-10

Food/Batch: YCT____ P.sub____ Artemia 0hr 105.10 24hr____ 48hr 106.10 72hr____ Artemia Lot# 23613

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	F1	5	5	5	5	5	5
	B	F2	5	5	5	5	5	5
	C	F3	5	5	5	5	5	5
	D	F4	5	5	4 ID	4	4	4
100%	A	F5	5	5	5	5	5	5
	B	F6	5	5	5	5	5	5
	C	F7	5	5	5	5	5	5
	D	F8	5	5	5	5	5	5
Loaded/Verified by: JB / BA		Checked by:	JB	JB	BA	BA	MF	MF

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

Comments:

Test Results:

Screening Tests: Report LC50 as >100%, =100%, or <100%.

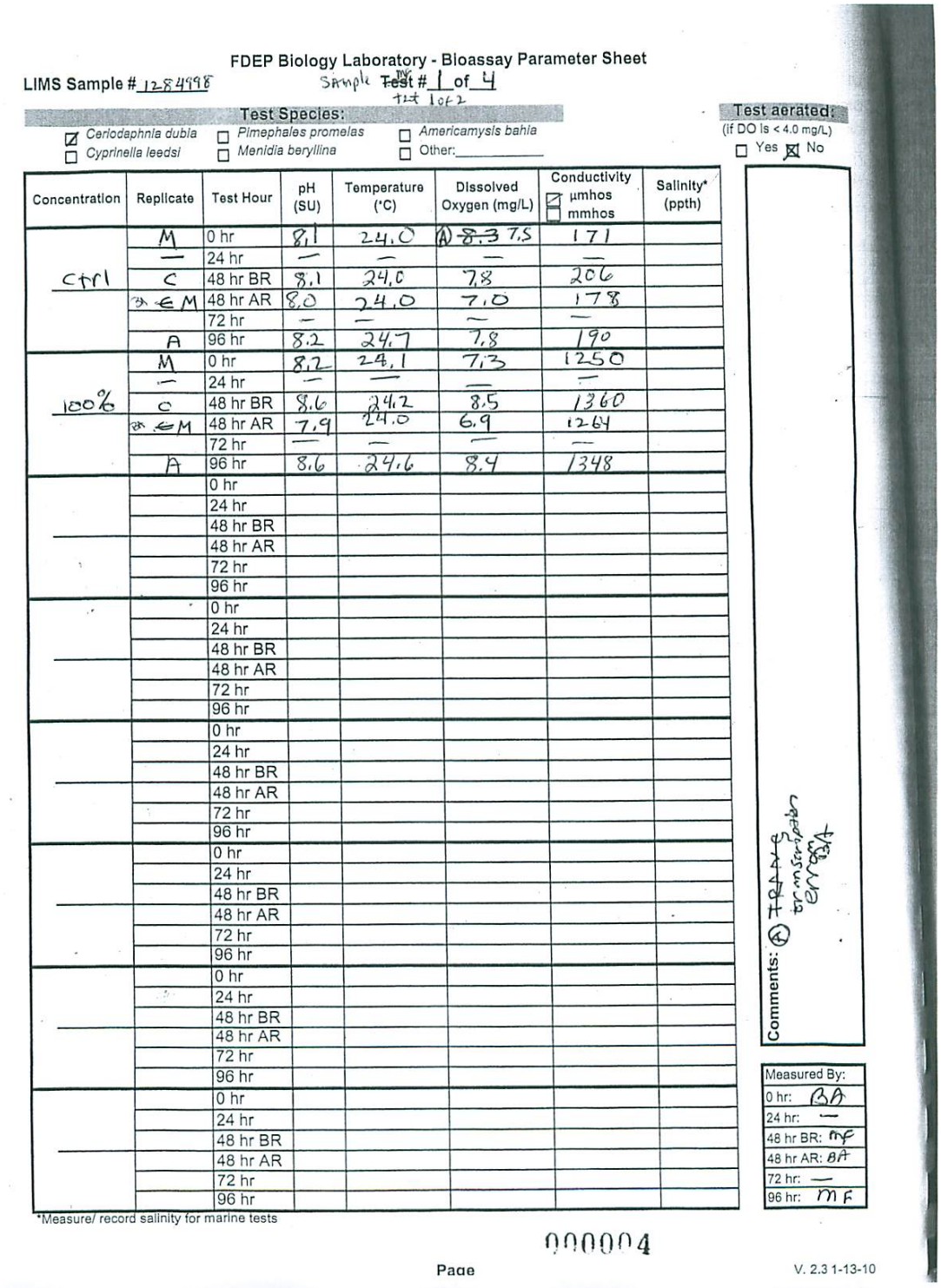
% mortality in 100% sample: 0 LC50: >100%

If Calculated: 95% CI_____ Method_____

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 # 1284998 Sample ~~Test~~ # 1 of 4 1st 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)
	M	0 hr	8.1	24.0	Ⓐ ~~8.3~~ 7.5	171	
	—	24 hr	—	—	—	—	
Ctrl	C	48 hr BR	8.1	24.0	7.8	206	
	⁂ ∈ M	48 hr AR	8.0	24.0	7.0	178	
		72 hr	—	—	—	—	
	A	96 hr	8.2	24.7	7.8	190	
	M	0 hr	8.2	24.1	7.3	1250	
	—	24 hr	—	—	—	—	
100%	C	48 hr BR	8.6	24.2	8.5	1360	
	⁂ ∈ M	48 hr AR	7.9	24.0	6.9	1264	
		72 hr	—	—	—	—	
	A	96 hr	8.6	24.6	8.4	1348	
		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					
		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					
		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: Ⓐ TRAN Stabilized

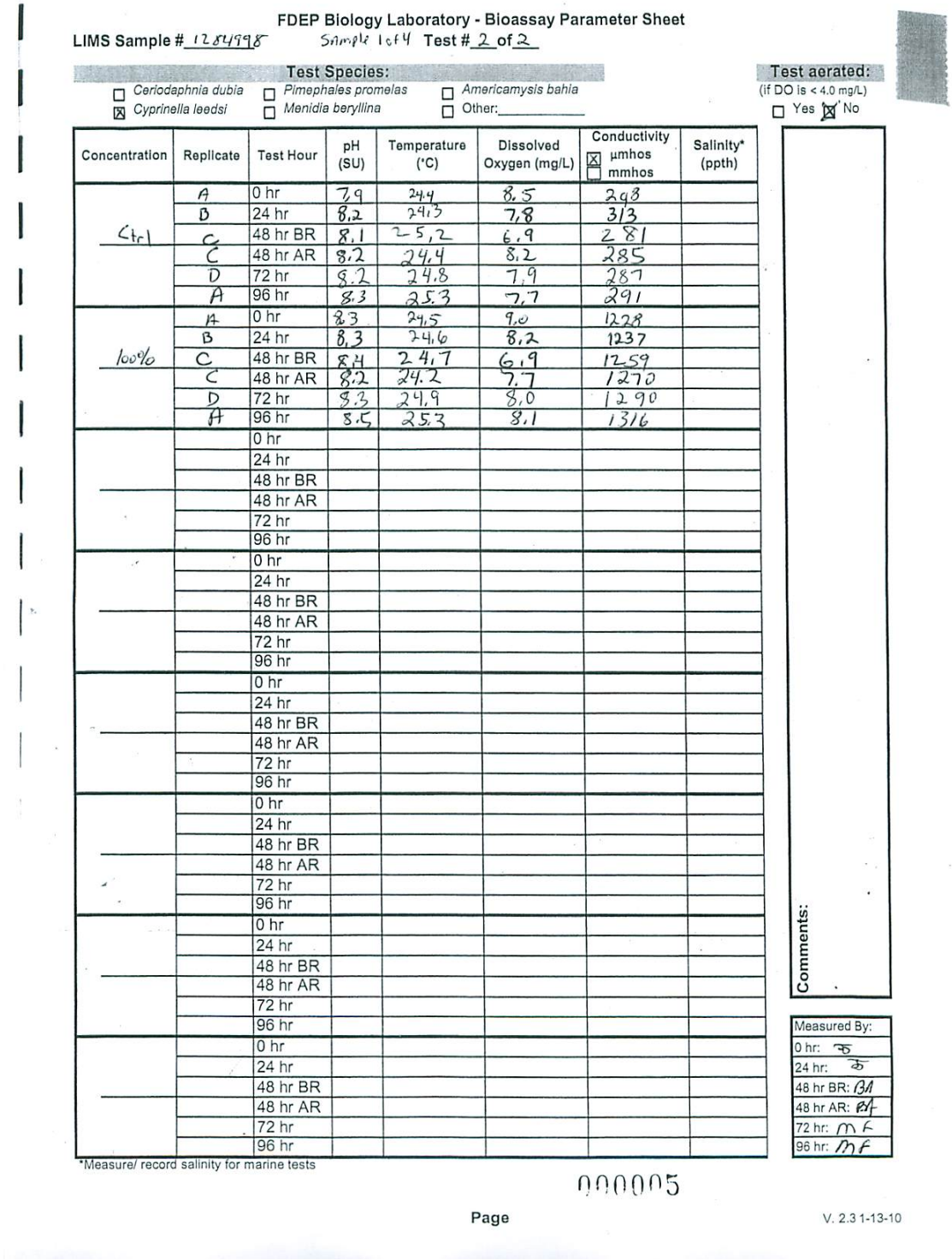
Measured By:
0 hr: BA
24 hr: —
48 hr BR: MF
48 hr AR: BA
72 hr: —
96 hr: MF

000004

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V. 2.3 1-13-10

Appendix B. (continued)



FDEP Biology Laboratory - Bioassay Parameter Sheet

LIMS Sample # 1284998 Sample 1 of 4 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	24.4	8.5	298	
	D	24 hr	8.2	24.3	7.8	313	
	C	48 hr BR	8.1	25.2	6.9	281	
	C	48 hr AR	8.2	24.4	8.2	285	
	D	72 hr	8.2	24.8	7.9	287	
	A	96 hr	8.3	25.3	7.7	291	
100%	A	0 hr	8.3	24.5	9.0	1228	
	B	24 hr	8.3	24.6	8.2	1237	
	C	48 hr BR	8.4	24.7	6.9	1259	
	C	48 hr AR	8.2	24.2	7.7	1270	
	D	72 hr	8.3	24.9	8.0	1290	
	A	96 hr	8.5	25.3	8.1	1316	
		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					
		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					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					

*Measure/ record salinity for marine tests

Comments:

Measured By:
0 hr: [illegible]
24 hr: [illegible]
48 hr BR: BA
48 hr AR: BA
72 hr: MF
96 hr: MF

000005

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V. 2.3 1-13-10

FDEP Biology Laboratory - Acute Screen 4/24 Bioassay Bench Sheets

Facility: Bunnell WWTF

Address: Tollman Street @ Dean Road

City: Bunnell County: Flagler 32010

Contact/District: Sharon Pilz / Northeast

NPDES Permit #: FL 0020907

LIMS Job #: TLH-2010-07-13-18 LIMS Sample #: 1287999

Lims Data Entry: 7-22-10 MF Data Entry Verification: BA 7-22-10

Sample Collection: Date: 7-12-10 Time: 0000

Hold Time Start: Date: 7-12-10 Time: 1205

Sample: 2 of 4

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.

Light Intensity : 50 - 100 ft. candles.

Photoperiod : 16 hours light 8 hours dark.

Test 1 validation: **Test 1:** SOP TA 07_ C1

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: 9.6 mg/L Final DO: 8.4 mg/L Duration: 15 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:

Incubator # 2 min. 24.6 max. 26.8 mean X

Incubator # ____ min. ____ max. ____ mean ____

Room B246 min. 24.9 max. 25.6 mean X

Investigators' Signatures

James Daniels

Bree Alexander

Marshall Fairbett

Amelia Parker

Liz Miller

REVIEWER

Water Quality Parameters	20% DMW Batch 7-9-10	Moderately Hard Water/ (Well Water) Batch 7-12-10A	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	N/A	Not measured			MF
Lab Total Residual Cl_2 (mg/L):	<0.03	<0.07				0.04	HACH	AGR/SD	BA
Alkalinity (mg/L as $CaCO_3$):	87	152				294	HACH	BA	MF
Hardness (mg/L as $CaCO_3$):	101	151				339	HACH	BA	MF
Total Ammonia (mg/L as N):	<0.07	<0.07				<0.07	DENVER	MF	BA
Salinity (ppth):	—	—				—	YSI / Mettler	—	—

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Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1284999 Test #: 2/4-1/2 (Sample 2 of 4) SOP#:TA 07 01 Test Started: Date 7.13.10 Time: 12:25

Organism/Batch/Age: Cdubia/70.10/<24hr mF Test Ended: Date 7-17-10 Time: 0845

Chamber/Test Volume: 30 / 20 ml Diluent/ Batch: DMW / 7.9.10

Food/Batch: YCT 5.19.10 P.sub 12.23.09 BA 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	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	3 2d	3
	D	D	5	5	5	5	5	5
Loaded/Verified by: BA / JD		Checked by:	BA	BA	mF	mF	mP	mF

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: 10 LC50: >100

If Calculated: 95% CI________ Method________

Substitue 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 #: 1284999 — Sample 2 of 4 — Test #: 2/2 — SOP#:TA 07 02 — Test Started: Date 7/13/10 Time: 1305

Organism/Batch/Age: C. leedsi / 71310 — Test Ended: Date 7-14-10 MF Time: 0845

Chamber/Test Volume: 400 / 1000 ml — Diluent/ Batch: Well / 7-13-10

Food/Batch: YCT____ P.sub____ Artemia 0hr 105-10 24hr____ 48hr 106.10 72hr____ Artemia Lot# 23613

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	F9	5	5	5	5	5	5
	B	F10	5	5	5	5	4 1D	4
	C	F11	5	5	5	5	5	5
	D	F12	5	5	5	5	5	5
100%	A	F13	5	5	5	5	5	5
	B	F14	5	5	5	5	5	5
	C	F15	5	5	5	5	5	5
	D	F16	5	5	5	5	5	5
Loaded/Verified by: [illegible] / BA		Checked by:	[illegible]	SD	BA	BA	MF	MF

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

Comments:

Test Results:

Screening Tests: Report LC50 as >100%, =100%, or <100%.

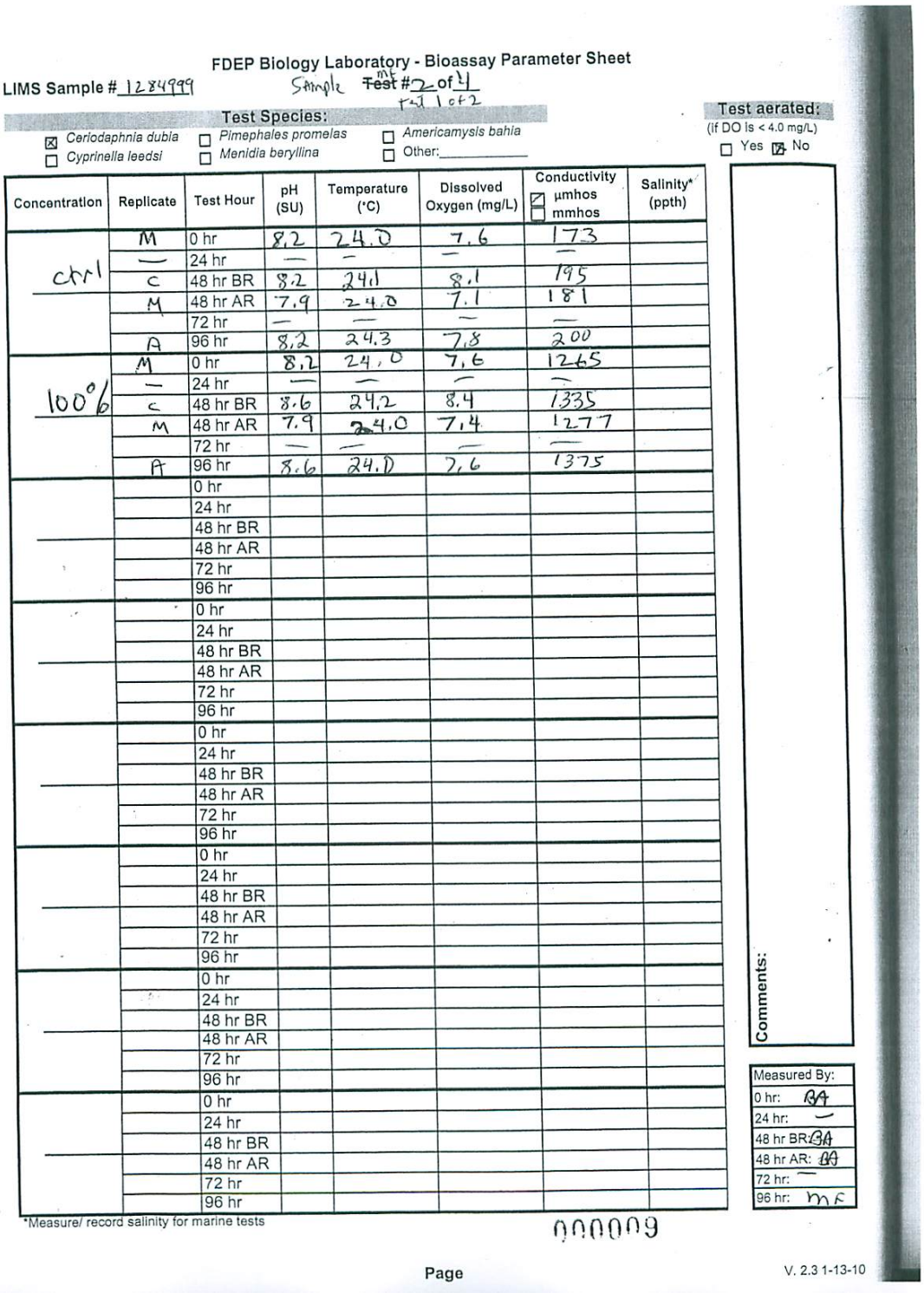
% mortality in 100% sample: Ø LC50: >100

If Calculated: 95% CI______ Method______

Substitue 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 # 1284999 Sample ~~Test~~ mt #2 of 4 rpt 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	8.2	24.0	7.6	173	
	—	24 hr	—	—	—	—	
	C	48 hr BR	8.2	24.1	8.1	195	
	M	48 hr AR	7.9	24.0	7.1	181	
		72 hr	—	—	—	—	
	A	96 hr	8.2	24.3	7.8	200	
100%	M	0 hr	8.2	24.0	7.6	1265	
	—	24 hr	—	—	—	—	
	C	48 hr BR	8.6	24.2	8.4	1335	
	M	48 hr AR	7.9	24.0	7.4	1277	
		72 hr	—	—	—	—	
	A	96 hr	8.6	24.0	7.6	1375	
		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					
		48 hr BR					
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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: BA
24 hr: —
48 hr BR: BA
48 hr AR: BA
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 # 1284999 Sample 2 of 4 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)
	A	0 hr	7.9	24.2	8.3	300	
	B	24 hr	8.2	24.6	8.0	277	
Ctrl	C	48 hr BR	8.2	25.3	7.0	280	
	C	48 hr AR	7.8	24.4	7.8	284	
	D	72 hr	8.1	25.0	7.8	285	
	A	96 hr	8.3	24.9	7.7	297	
	A	0 hr	8.2	24.3	8.4	1240	
	B	24 hr	8.4	24.9	8.2	1251	
100%	C	48 hr BR	8.4	25.1	6.9	1244	
	C	48 hr AR	7.9	24.2	7.4	1303	
	D	72 hr	8.3	24.9	8.0	1289	
	A	96 hr	8.5	25.2	8.1	1297	
		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					
		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					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					

*Measure/ record salinity for marine tests

Comments:

Measured By:
0 hr: JD
24 hr: JS
48 hr BR: BA
48 hr AR: AE MF
72 hr: MF
96 hr: MF

000010

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V. 2.3 1-13-10

FDEP Biology Laboratory - Acute Screen 4/24 Bioassay Bench Sheets

Facility: Bunnell WWTF

Address: TOLLMAN Street @ Dear Road

City: BUNNELL County: Flagler 32010

Contact/District: Sharon PiLTz / Northeast

NPDES Permit #: FL 0020907

LIMS Job # FLH-2010-07-13-18 LIMS Sample #: 1285060

Lims Data Entry: 7-22-10 MF Data Entry Verification: BA 7.22.10

Sample Collection: Date: 7-12-10 Time: 0600

Hold Time Start: Date: 7-12-10 Time: 1205

Sample: 3 of 4

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.

Light Intensity : 50 - 100 ft. candles.

Photoperiod : 16 hours light 8 hours dark.

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: 4.1 (BA) NaOH N HCl N ____ Drops mL Final pH: ____

Aeration : (yes) no Initial DO: 9.1 mg/L Final DO: 8.2 mg/L Duration: 15 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:

Incubator # 2 min. 24.6 max 26.8 mean X

Incubator # ____ min. ____ max. ____ mean ____

Room B246 min. 24.9 max 25.6 mean X

Investigators' Signatures

James Daniels

Brook Alexander

Marshall Faircloth

Amelia Rankin

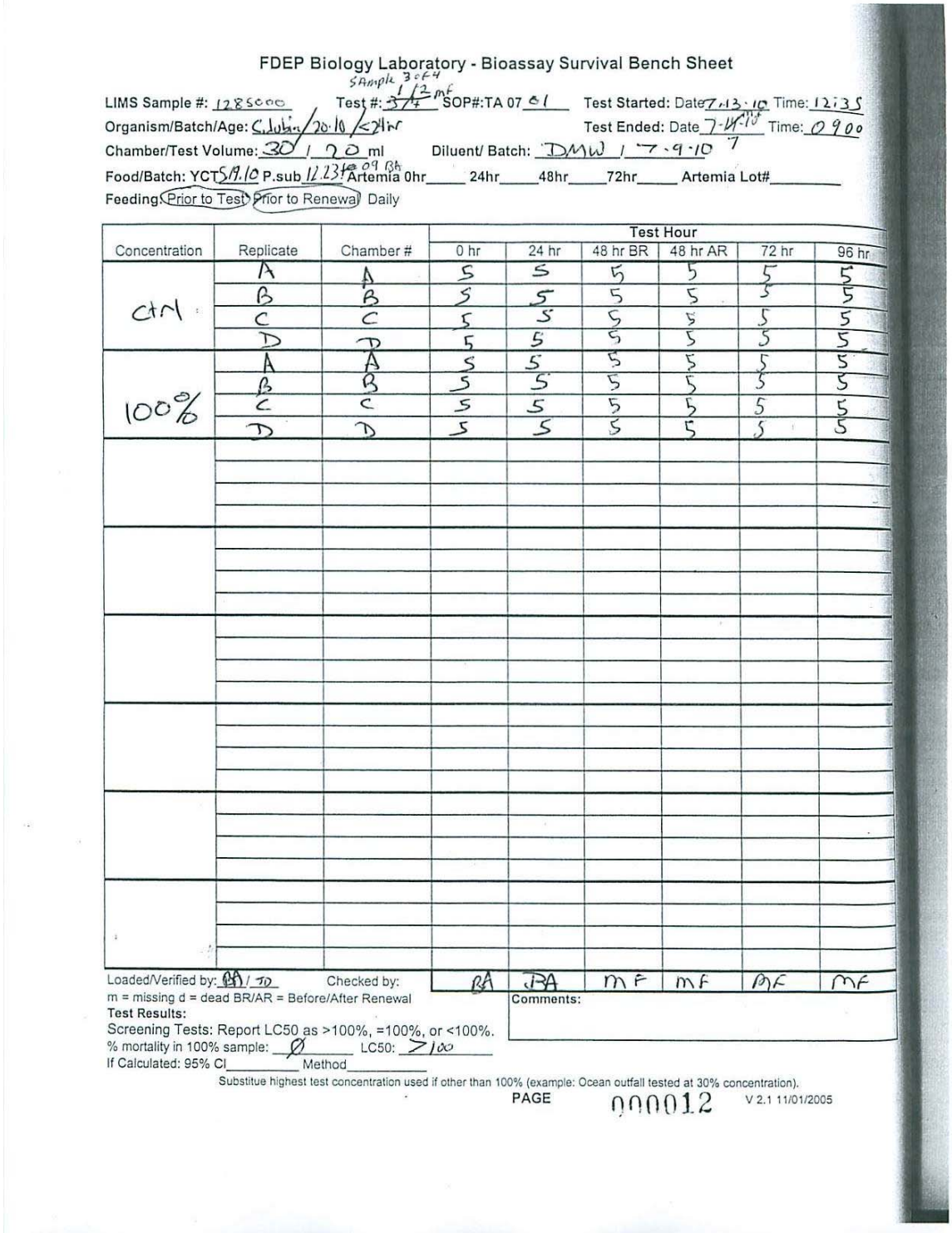
Liz Miller

REVIEWER

Water Quality Parameters	20% DMW Batch 7-9-10	Moderately Hard Water/ (Well Water) Batch 7-13-10	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	N/A	Not measured			MF
Lab Total Residual Cl_2 (mg/L):	<0.03	<0.03				<0.03	HACH	JS / AGR	BA
Alkalinity (mg/L as $CaCO_3$):	87	152				282	HACH	BA	MF
Hardness (mg/L as $CaCO_3$):	101	151				358	HACH	BA	MF
Total Ammonia (mg/L as N):	<0.017	<0.017				<0.017	DENVER	MF	BA
Salinity (ppth):	–	–				–	YSI / Mettler	–	–

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Appendix B. (continued)



FDEP Biology Laboratory - Bioassay Survival Bench Sheet

Sample 3 of 4

LIMS Sample #: 1285000 Test #: 374 1/2 mf SOP#:TA 07 01 Test Started: Date 7.13.10 Time: 1235

Organism/Batch/Age: C.dubia / 20.10 / <24hr Test Ended: Date 7-14-10 Time: 0900

Chamber/Test Volume: 30 / 20 ml Diluent/ Batch: DMW / 7-9-10

Food/Batch: YCT 5A.10 P.sub 12.23.09 BA 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	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
Loaded/Verified by: BA / TD	Checked by:		BA	BA	MF	MF	MF	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

If Calculated: 95% CI_____ Method_____

Comments:

Substitue 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

Sample 3 of 4

LIMS Sample #: 1285000 Test #: 2/2 SOP#:TA 07 02 Test Started: Date 7/13/10 Time: 13:10

Organism/Batch/Age: Cladoc/ 7/13/10 Test Ended: Date 7-17-10 Time: 0900

Chamber/Test Volume: 40 / 1000 ml Diluent/ Batch: Vell / 7.13.10

Food/Batch: YCT____ P.sub____ Artemia 0hr 105.10 24hr____ 48hr 106.10 72hr____ Artemia Lot# 23613

Feeding: (Prior to Test) (Prior to Renewal) Daily

Concentration	Replicate	Chamber #	0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Ctrl	A	F 17	5	5	5	5	5	5
	B	F 18	5	5	5	5	5	5
	C	F 19	5	5	5	5	5	5
	D	F 20	5	5	5	5	5	5
100%	A	F 21	5	5	5	5	5	5
	B	F 22	5	5	5	5	5	5
	C	F 23	5	5	5	5	5	5
	D	F 24	5	5	5	5	5	5
Loaded/Verified by: JS / BA		Checked by:	JS	JS	BA	BA	MF	MF

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

Comments:

Test Results:

Screening Tests: Report LC50 as >100%, =100%, or <100%.

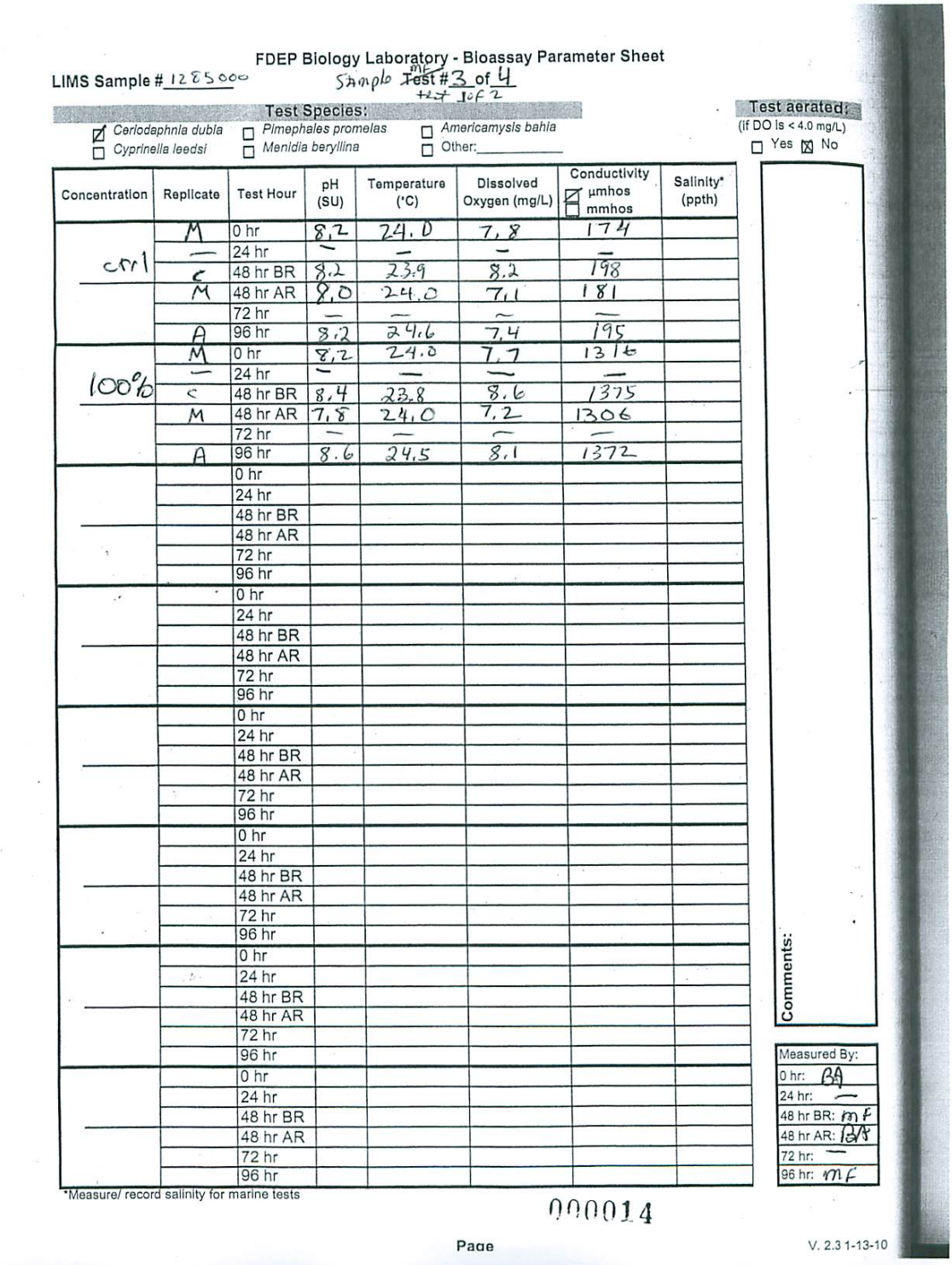
% mortality in 100% sample: Ø LC50: >100

If Calculated: 95% CI______ Method______

Substitue 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 # 1285000 Sample ~~Test~~ # 3 of 4 +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	M	0 hr	8.2	24.0	7.8	174	
	—	24 hr	—	—	—	—	
	C	48 hr BR	8.2	23.9	8.2	198	
	M	48 hr AR	8.0	24.0	7.1	181	
		72 hr	—	—	—	—	
	A	96 hr	8.2	24.6	7.4	195	
100%	M	0 hr	8.2	24.0	7.7	1316	
	—	24 hr	—	—	—	—	
	C	48 hr BR	8.4	23.8	8.6	1375	
	M	48 hr AR	7.8	24.0	7.2	1306	
		72 hr	—	—	—	—	
	A	96 hr	8.6	24.5	8.1	1372	
		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					
		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					
		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: BA
24 hr: —
48 hr BR: MF
48 hr AR: BA
72 hr: —
96 hr: MF

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Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Parameter Sheet

LIMS Sample #1285000 Test # 2 of 2 Sample 3 of 4

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	8.0	24.1	8.0	290	
	B	24 hr	8.2	24.5	8.2	293	
	C	48 hr BR	8.2	25.2	6.8	284	
	C	48 hr AR	8.2	24.2	8.0	282	
	D	72 hr	8.2	24.8	7.8	288	
	A	96 hr	8.3	25.2	7.7	291	
100%	A	0 hr	8.3	24.2	8.2	1280	
	B	24 hr	8.3	25.0	8.0	1287	
	C	48 hr BR	8.4	25.6	6.8	1289	
	C	48 hr AR	8.1	24.1	7.6	1331	
	D	72 hr	8.3	24.7	8.3	1305	
	A	96 hr	8.4	25.3	8.2	1370	
		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					
		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					
		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: JD
24 hr: JD
48 hr BR: BA
48 hr AR: MF
72 hr: MF
96 hr: MF

*Measure/ record salinity for marine tests

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V. 2.3 1-13-10

FDEP Biology Laboratory - Acute Screen 4/24 Bioassay Bench Sheets

Facility: Bunnell WWTF
Address: Tollman Street @ Dean Road
City: Bunnell County: FLAGLER 32010
Contact/District: Sharon Pilz / Northeast
NPDES Permit #: FL 0020907
LIMS Job #: TLH-2010-07-13-18 LIMS Sample #: 1285001
Lims Data Entry: 7-22-10 MF Data Entry Verification: BA 7-22-10

Collection Time 1205 MF

Sample Collection: Date: 7-12-10 Time: 1205
Hold Time Start: Date: 7-12-10 Time: 1205 MF
Sample: 4 of 4

Comments:
100% percent mortality in 100% sample at 24 hours. 5% mortality in the C. dubia dechlorinated sample and 10% mortality in the C. leedsi dechlorinated sample @ 96 hours. MF 7-22-10

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.
Light Intensity : 50 - 100 ft. candles.
Photoperiod : 16 hours light 8 hours dark.

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: 9.5 mg/L Final DO: 8.3 mg/L Duration: 15 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 1.2 mL of 0.025N Sodium Thiosulfate per liter of sample. Final TRC: <0.03

Light Intensity : 50 - 100 ft. candles
Photoperiod : 16 light 8 dark
Temperature Range °C:
Incubator # 2 min 24.6 max 26.3 mean X
Incubator # ____ min. ____ max. ____ mean ____
Room B246 min 24.9 max 25.6 mean X

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)

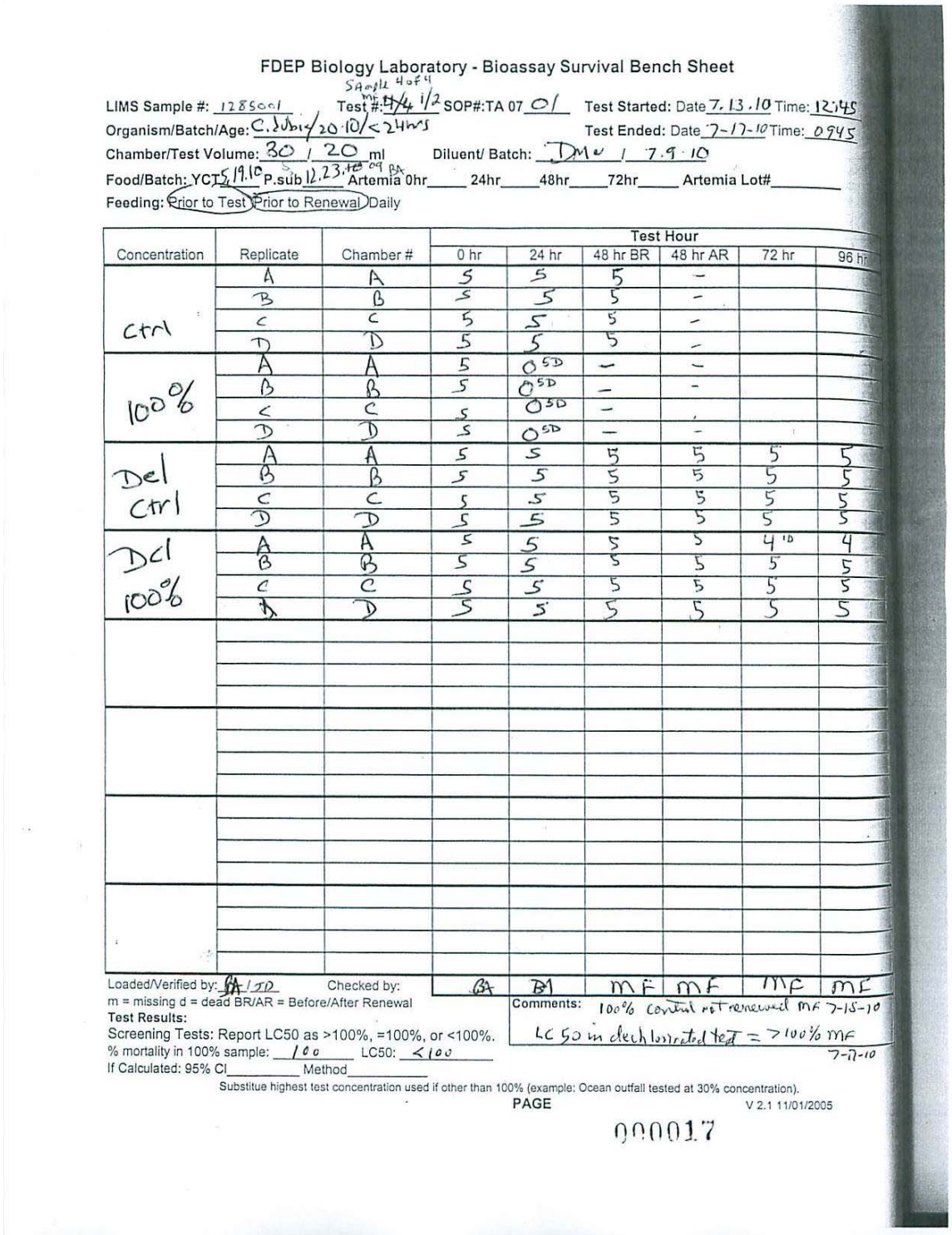
Investigators' Signatures
Bruce Hillsinger
Marshall Faircloth
James Daneh
Amelia Rankin

Liz Miller
REVIEWER

Water Quality Parameters	20% DMW 7-9-10 batch	Moderately Hard Water/ (Well Water) 7-12-10 batch A	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	N/A	3.9	MF facility meter	—	MF
Lab Total Residual Cl_2 (mg/L):	<0.03	<0.03				1.12	HACH	AGR/SD	BA
Alkalinity (mg/L as $CaCO_3$):	87	152				279	HACH	BA	MF
Hardness (mg/L as $CaCO_3$):	101	151				349	HACH	BA	MF
Total Ammonia (mg/L as N):	<0.017	<0.017				<0.017	DENVER	MF	BA
Salinity (ppth):	—	—				—	YSI / Mettler	—	—

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Appendix B. (continued)



FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1285001 Test #: Sample 4 of 4 mf 1/4 1/2 SOP#:TA 07 01 Test Started: Date 7.13.10 Time: 1245

Organism/Batch/Age: C. dubia / 20.10 / <24hrs Test Ended: Date 7-17-10 Time: 0945

Chamber/Test Volume: 30 / 20 ml Diluent/ Batch: DMW / 7.9.10

Food/Batch: YCT 5/19.10 P.sub 12.23, feb 09 BA 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	0 SD	–	–		
	B	B	5	0 SD	–	–		
	C	C	5	0 SD	–	–		
	D	D	5	0 SD	–	–		
Del 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
Del 100%	A	A	5	5	5	5	4 1D	4
	B	B	5	5	5	5	5	5
	C	C	5	5	5	5	5	5
	D	D	5	5	5	5	5	5
			BA	BA	MF	MF	MF	MF

Loaded/Verified by: BA / SD Checked by:

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

Test Results:

Screening Tests: Report LC50 as >100%, =100%, or <100%.

% mortality in 100% sample: 100 LC50: <100

If Calculated: 95% CI_____ Method_____

Comments: 100% control not renewed MF 7-15-10

LC 50 in dechlorinated test = >100% MF 7-17-10

Substitue 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

SAMPLE 4 OF 4

LIMS Sample #: 1285001 Test #: 2/2 SOP#:TA 07 02 Test Started: Date 7/13/10 Time: ~~7:45~~ 13:15

Organism/Batch/Age: C.dubia/7/13/10 Test Ended: Date 7-14-10 Time: 09:45

Chamber/Test Volume: 900 / 1000 ml Diluent/ Batch: Well / 7.13-10 Chlorinated 7-17-10 1300 inf MF

Food/Batch: YCT P.sub Artemia 0hr 105.10 24hr 48hr 106.10 72hr Artemia Lot#23610

Feeding: Prior to Test Prior to Renewal Daily Dechlorinated Test

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Ctrl	A	g1	10	10	10	BA ~~10~~		
	B	g2	10	10	10	–		
100%	A	g5 DD	10	0 10D	–	–		
	B	g6	10	0 10D	–	–		
dechlor Ctrl	A	g3 DD	10	10	10	10	10	10
	B	g4	10	10	10	10	10	10
dechlor 100%	A	g7	10	9 10	8 10	8	MF B	8
	B	g8	10	10	10	10	10	10

Loaded/Verified by: BA Checked by: ~~5~~ ~~5~~ BA BA MF MF

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

Comments: 100% Control not renewed MF 7-28-10

LC 50 in Dechlorinated Test = >100% MF 7-17-10

Test Results:

Screening Tests: Report LC50 as >100%, =100%, or <100%.

% mortality in 100% sample: 100 LC50: <100

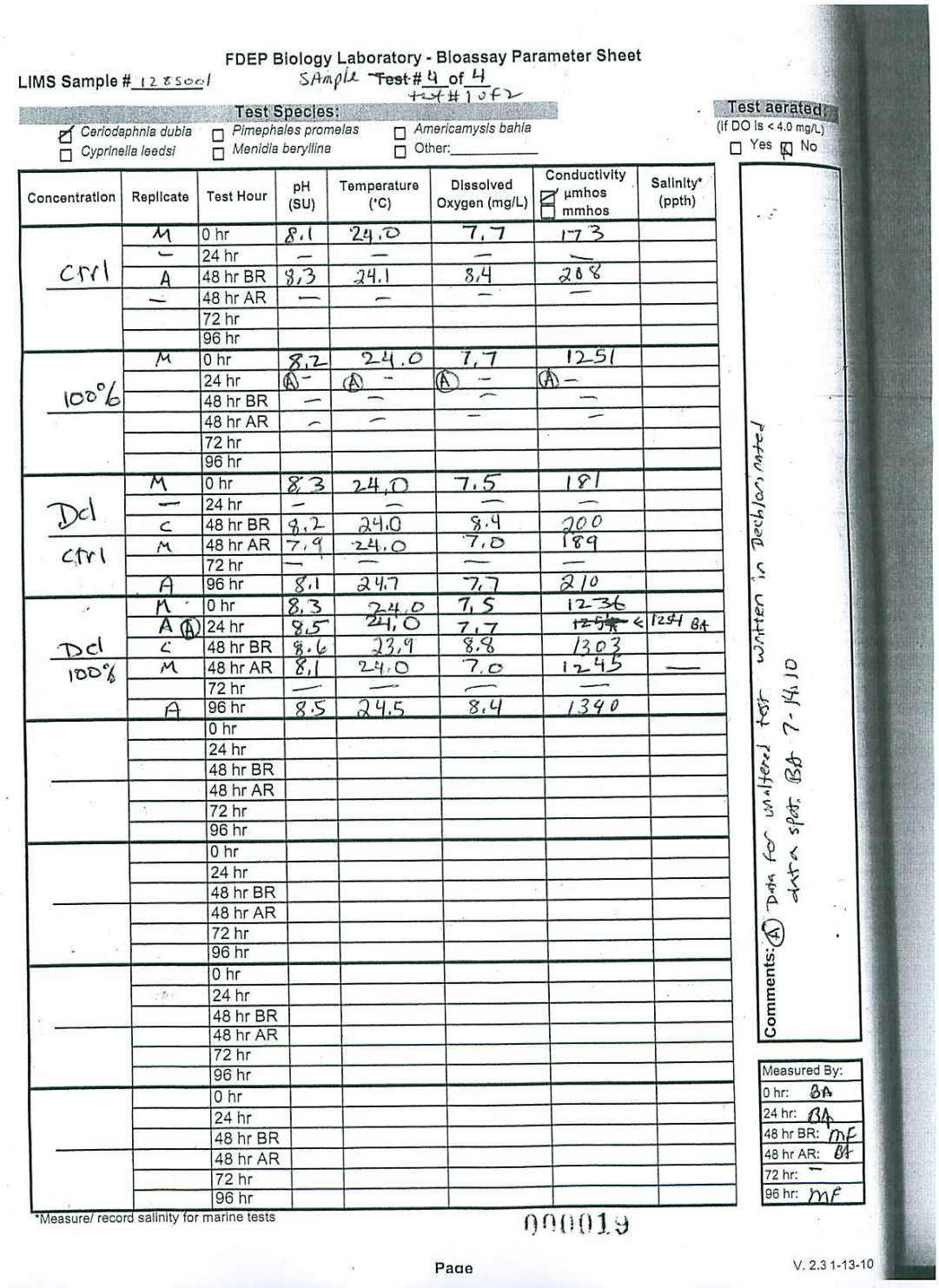
If Calculated: 95% CI Method

Substitue 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 # 128500I Sample ~~Test #~~ 4 of 4 Test # 1 of 2

Test Species:
- ☑ Ceriodaphnia dubia
- ☐ Cyprinella leedsi
- ☐ Pimephales promelas
- ☐ Menidia beryllina
- ☐ Americamysis bahia
- ☐ 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	8.1	24.0	7.7	173	
	—	24 hr	—	—	—	—	
	A	48 hr BR	8.3	24.1	8.4	208	
	—	48 hr AR	—	—	—	—	
		72 hr					
		96 hr					
100%	M	0 hr	8.2	24.0	7.7	1251	
		24 hr	(A) -	(A) -	(A) -	(A) -	
		48 hr BR	—	—	—	—	
		48 hr AR	—	—	—	—	
		72 hr					
		96 hr					
Dcl	M	0 hr	8.3	24.0	7.5	181	
	—	24 hr	—	—	—	—	
	C	48 hr BR	8.2	24.0	8.4	200	
Ctrl	M	48 hr AR	7.9	24.0	7.0	189	
		72 hr	—	—	—	—	
	A	96 hr	8.1	24.7	7.7	210	
Dcl	M	0 hr	8.3	24.0	7.5	1236	
	A (A)	24 hr	8.5	~~24.0~~ 24.0	7.7	~~1254~~ < 1254 BA	
	C	48 hr BR	8.6	23.9	8.8	1303	
100%	M	48 hr AR	8.1	24.0	7.0	1245	—
		72 hr	—	—	—	—	
	A	96 hr	8.5	24.5	8.4	1340	
		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					
		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: (A) Data for unaltered test written in Dechlorinated data sheet BA 7-14-10

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

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Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Parameter Sheet

LIMS Sample # 128501 Sample # 4 of 4 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)
	A	0 hr	8.0	24.0	8.2	305	
	B	24 hr	7.9	25.4	8.4	301	
Ctrl	A	48 hr BR	8.2	25.8	6.9	288	
		48 hr AR					
		72 hr					
		96 hr					
	A	0 hr	8.3	24.1	8.3	1207	
	B	24 hr	8.1	25.4	8.1	1224	
100%		48 hr BR	-	-	-	-	
		48 hr AR					
		72 hr					
		96 hr					
	A	0 hr	8.2	24.0	8.3	328	
	B	24 hr	8.0	25.3	7.3	325	
dechlor Ctrl	C	48 hr BR	8.2	25.7	6.7	294	
	C	48 hr AR	8.2	24.2	7.8	291	
	D	72 hr	8.1	25.6	7.9	297	
	A	96 hr	8.3	25.3	7.7	302	
	A	0 hr	8.3	24.1	8.2	1218	
	B	24 hr	8.3	25.1	7.3	1206	
dechlor 100%	C	48 hr BR	8.4	25.9	6.7	1261	
	C	48 hr AR	8.2	24.1	7.3	1274	
	D	72 hr	8.3	25.7	8.0	1297	
	A	96 hr	8.4	25.3	7.9	1295	
		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					
		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: [illegible]
24 hr: [illegible]
48 hr BR: BA
48 hr AR: ML
72 hr: ML
96 hr: ML

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Appendix B. (continued)

Bioassay Instrument ID

Test ID: Bundell WWTF LIMS# 12849985 Dates: 7-13-10 – 7-17-10

METER / DEVICE	ID	SOP	Parameter	Method	v 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)

entered by SA 7-19-10

V 1.1 6/12/08 MF

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Appendix C. SRT Bench Sheets and Statistical Analysis

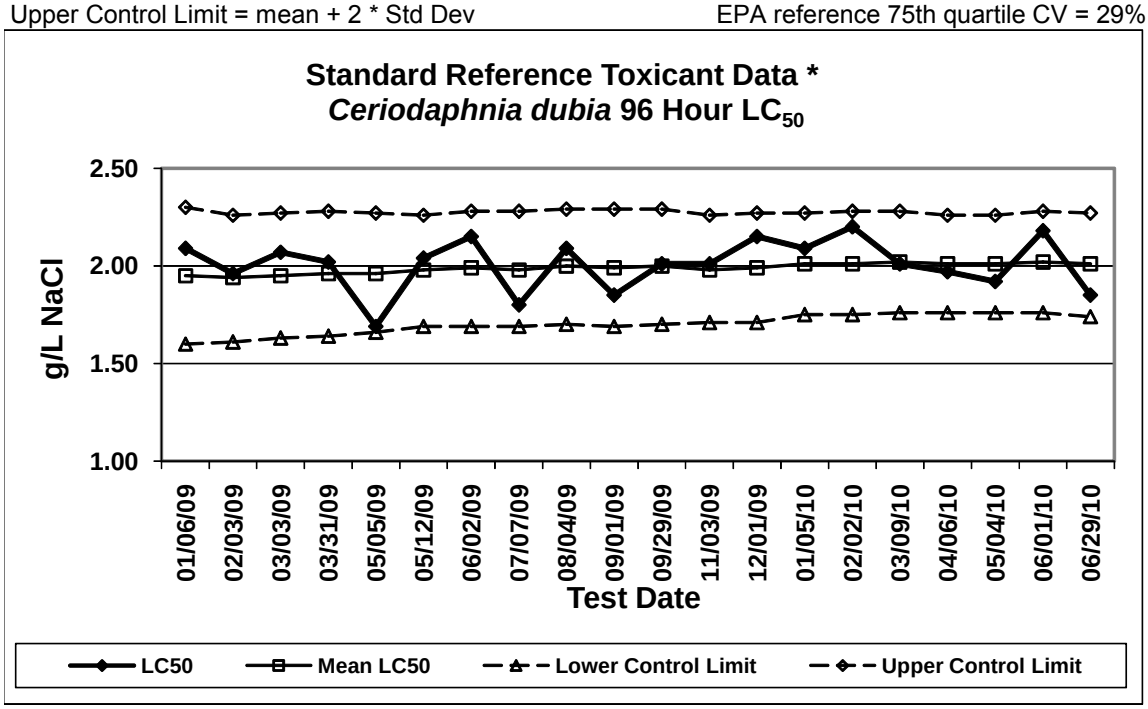
Florida Department of Environmental Protection
Bureau of Laboratories

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
01/06/09	2.09	1.95	0.17	1.60	2.30
02/03/09	1.96	1.94	0.16	1.61	2.26
03/03/09	2.07	1.95	0.16	1.63	2.27
03/31/09	2.02	1.96	0.16	1.64	2.28
05/05/09	1.69	1.96	0.15	1.66	2.27
05/12/09	2.04	1.98	0.14	1.69	2.26
06/02/09	2.15	1.99	0.15	1.69	2.28
07/07/09	1.80	1.98	0.15	1.69	2.28
08/04/09	2.09	2.00	0.15	1.70	2.29
09/01/09	1.85	1.99	0.15	1.69	2.29
09/29/09	2.01	2.00	0.15	1.70	2.29
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

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

CV = 6.64
EPA reference 75th quartile CV = 29%



Appendix C. (continued)

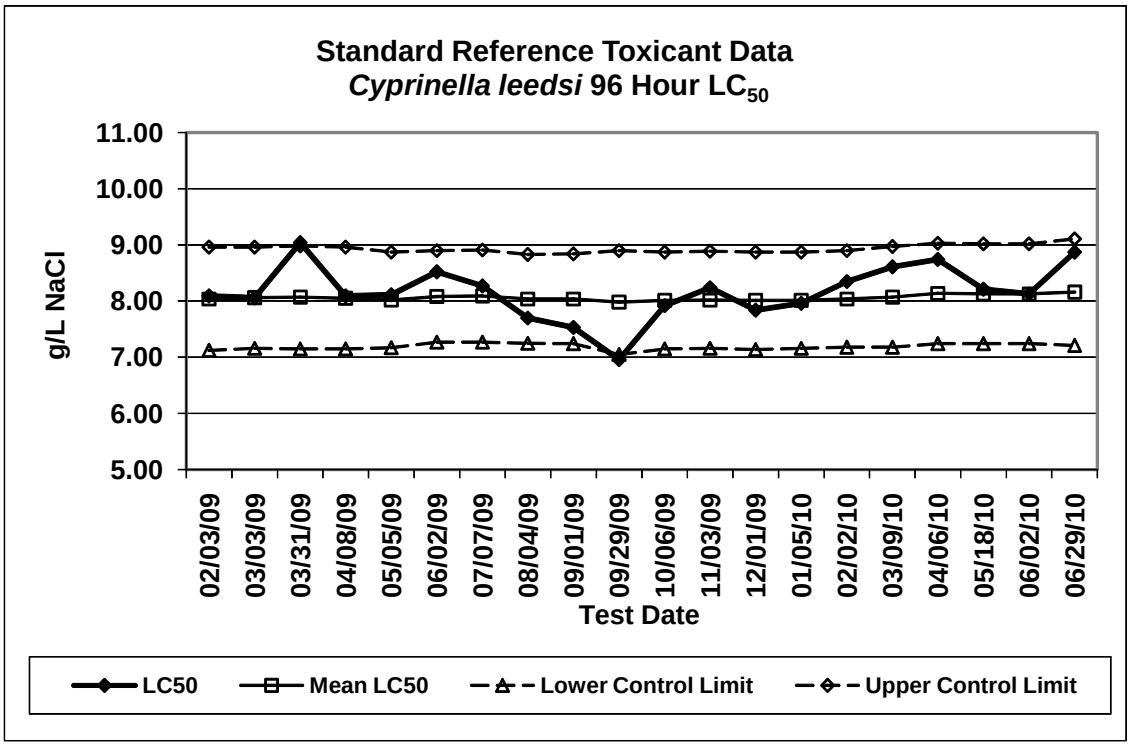
Florida Department of Environmental Protection
Bureau of Laboratories

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

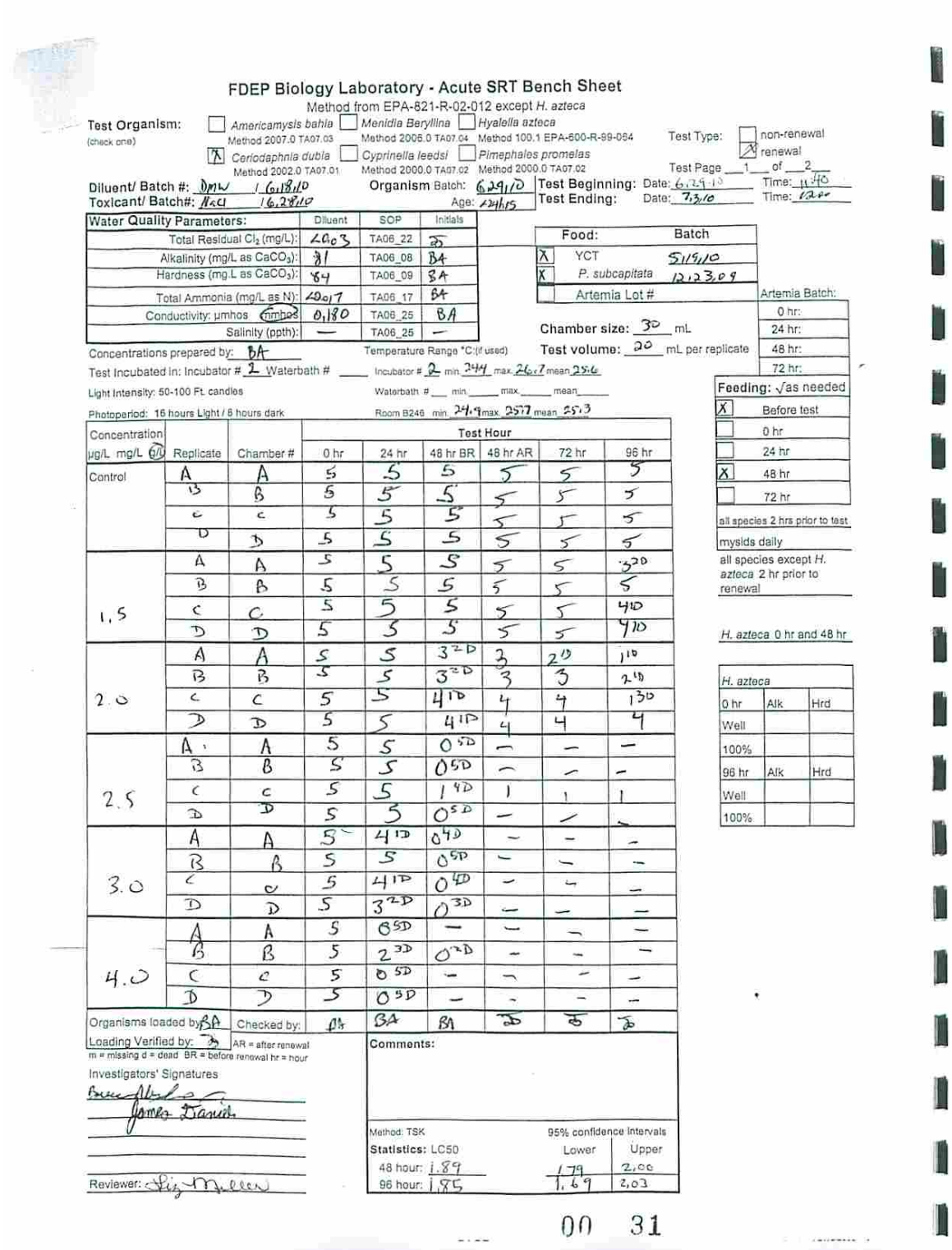
Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
02/03/09	8.09	8.04	0.46	7.12	8.96
03/03/09	8.06	8.06	0.45	7.16	8.96
03/31/09	9.04	8.07	0.46	7.15	8.98
04/08/09	8.09	8.05	0.45	7.15	8.96
05/05/09	8.11	8.02	0.43	7.17	8.87
06/02/09	8.52	8.08	0.41	7.27	8.90
07/07/09	8.27	8.09	0.41	7.27	8.91
08/04/09	7.70	8.04	0.40	7.25	8.83
09/01/09	7.53	8.04	0.40	7.24	8.84
09/29/09	6.96	7.98	0.46	7.05	8.90
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

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

CV = 5.81
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 / 6.18.10
Toxicant/ Batch#: NaCl / 6.28.10
Organism Batch: 6.29.10
Age: 24hrs
Test Beginning: Date: 6.29.10 Time: 1340
Test Ending: Date: 7.3.10 Time: 1200

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	2003	TA06_22	BA
Alkalinity (mg/L as $CaCO_3$):	81	TA06_08	BA
Hardness (mg/L as $CaCO_3$):	84	TA06_09	BA
Total Ammonia (mg/L as N):	2017	TA06_17	BA
Conductivity: µmhos (mmhos)	0.180	TA06_25	BA
Salinity (ppth):	—	TA06_25	—

Food:	Batch
☒ YCT	5/19/10
☒ *P. subcapitata*	12.23.09
☐ 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. 24.4 max. 26.7 mean 25.6
Light Intensity: 50-100 Ft. candles Waterbath # ___ min. ____ max. ____ mean ____
Photoperiod: 16 hours Light / 8 hours dark Room B246 min. 24.9 max. 25.7 mean 25.3

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

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

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

Comments:

Investigators' Signatures
Brian Flanders
James Daniel

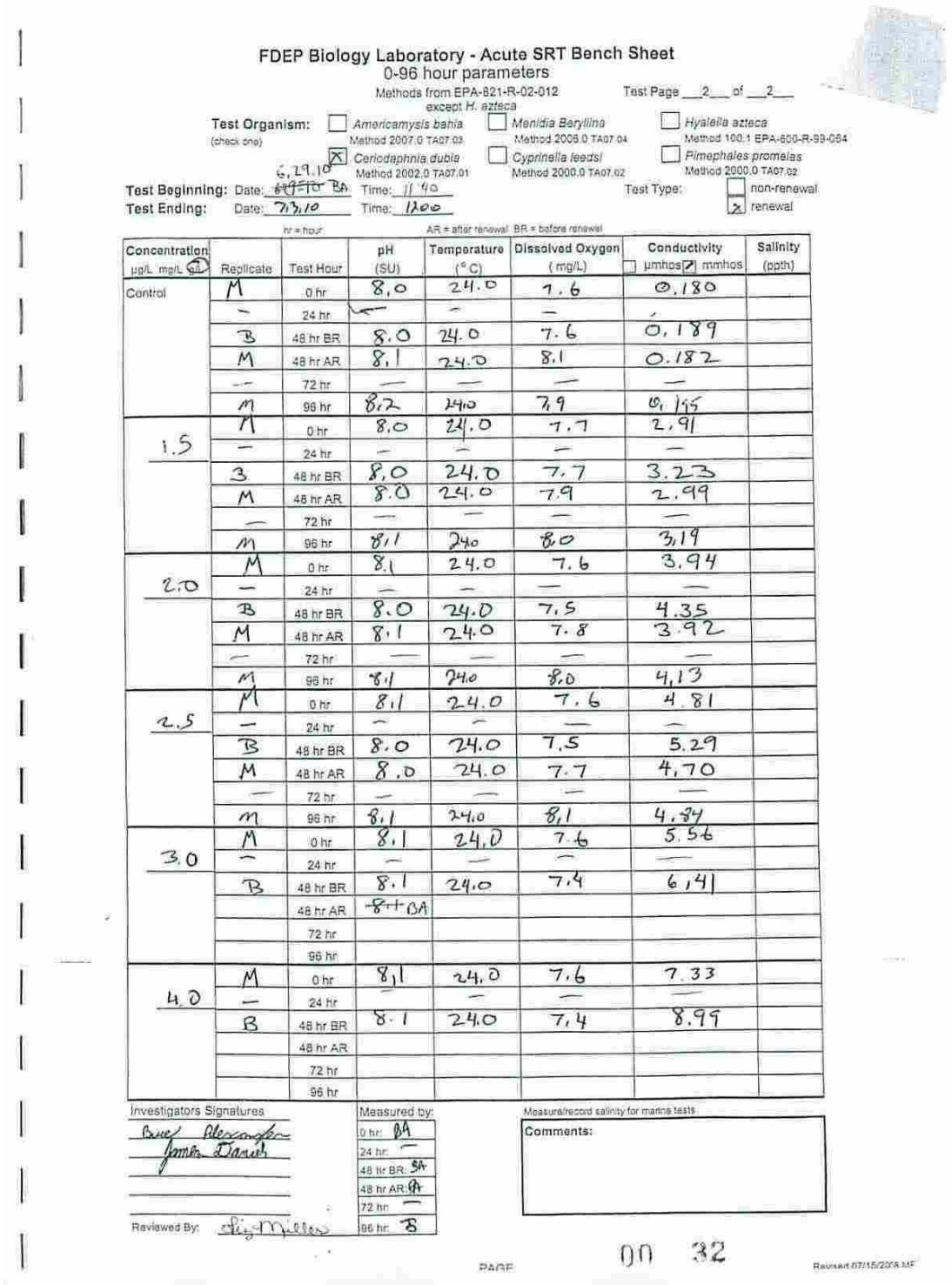
Reviewer: Liz Mullen

Method: TSK

Statistics: LC50	95% confidence Intervals Lower	Upper
48 hour: 1.89	1.79	2.00
96 hour: 1.85	1.69	2.03

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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
- [x] *Ceriodaphnia dubia* Method 2002.0 TA07.01
- [ ] *Cyprinella leedsi* Method 2000.0 TA07.02
- [ ] *Pimephales promelas* Method 2000.0 TA07.02

Test Beginning: Date: 6/29/10 BA Time: 1140
Test Ending: Date: 7/3/10 Time: 1200
Test Type: [ ] non-renewal [x] 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 [x] mmhos	Salinity (ppth)
Control	M	0 hr	8.0	24.0	7.6	0.180	
	—	24 hr	—	—	—	—	
	B	48 hr BR	8.0	24.0	7.6	0.189	
	M	48 hr AR	8.1	24.0	8.1	0.182	
	—	72 hr	—	—	—	—	
	M	96 hr	8.2	24.0	7.9	0.195	
1.5	M	0 hr	8.0	24.0	7.7	2.91	
	—	24 hr	—	—	—	—	
	B	48 hr BR	8.0	24.0	7.7	3.23	
	M	48 hr AR	8.0	24.0	7.9	2.99	
	—	72 hr	—	—	—	—	
	M	96 hr	8.1	24.0	8.0	3.19	
2.0	M	0 hr	8.1	24.0	7.6	3.94	
	—	24 hr	—	—	—	—	
	B	48 hr BR	8.0	24.0	7.5	4.35	
	M	48 hr AR	8.1	24.0	7.8	3.92	
	—	72 hr	—	—	—	—	
	M	96 hr	8.1	24.0	8.0	4.13	
2.5	M	0 hr	8.1	24.0	7.6	4.81	
	—	24 hr	—	—	—	—	
	B	48 hr BR	8.0	24.0	7.5	5.29	
	M	48 hr AR	8.0	24.0	7.7	4.70	
	—	72 hr	—	—	—	—	
	M	96 hr	8.1	24.0	8.1	4.84	
3.0	M	0 hr	8.1	24.0	7.6	5.56	
	—	24 hr	—	—	—	—	
	B	48 hr BR	8.1	24.0	7.4	6.41	
		48 hr AR	~~8.1~~ BA				
		72 hr					
		96 hr					
4.0	M	0 hr	8.1	24.0	7.6	7.33	
	—	24 hr	—	—	—	—	
	B	48 hr BR	8.1	24.0	7.4	8.99	
		48 hr AR					
		72 hr					
		96 hr					

Investigators Signatures: Bruce Alexander, James Daniel

Reviewed By: Liz Miller

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

Measure/record salinity for marine tests

Comments:

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Revised 07/15/2008 MF

Appendix C. (continued)

FDEP Biology Laboratory - Acute SRT Bench Sheet

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

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

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

Diluent/ Batch #: Well / 6.29.10
Toxicant/ Batch#: NaCl / 6.28.10
Organism Batch: 6.29.10 Age: 11 days
Test Beginning: Date: 6.29.10 Time: 1340
Test Ending: Date: 7.3.10 Time: 1150

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	<0.03	TA06_22	JD
Alkalinity (mg/L as $CaCO_3$):	161	TA06_08	BA
Hardness (mg.L as $CaCO_3$):	160	TA06_09	BA
Total Ammonia (mg/L as N):	<0.017	TA06_17	BA
Conductivity (µmhos) mmhos	279	TA06_25	JD
Salinity (ppth):	—	TA06_25	—

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

Artemia Batch:
0 hr: 10-10
24 hr:
48 hr: 10-10
72 hr:

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

Concentrations prepared by: JD
Temperature Range °C:(if used)
Test Incubated in: Incubator # 2 Waterbath # ____ Incubator # min 24.4 max 26.7 mean 25.6
Light Intensity: 50-100 Ft. candles Waterbath # ___ min. ____ max. ____ mean ____
Photoperiod: 16 hours Light / 8 hours dark Room B246 min 24.9 max 25.7 mean 25.3

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	F1	10	10	10	10	10	10
	B	F2	10	10	10	10	10	10
6	A	F3	10	10	10	10	10	10
	B	F4	10	10	10	10	10	10
7	A	F5	10	10	10	10	10	10
	B	F6	10	10	10	10	10	10
8	A	F7	10	9D	9	9	9	9
	B	F8	10	10	10	10	10	10
9	A	F9	10	6D	6	6	6	6
	B	F8	10	3D	3	3	3	3
10	A	F9	10	0D	—	—	—	—
	B	F10	10	1D	0	—	—	—
Organisms loaded by: KMS		Checked by:	JD	JD	JD	JD	JD	JD
Loading Verified by: JD			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 David
Bruce Reardon
Erin M Spencer

Reviewer: Liz Miller

Comments: (A) Statistics for 48 & 96 hours switched places BA 7-20-10

Method: TSK

Statistics: LC50	95% confidence intervals Lower	Upper
~~96 hour~~ 8.87 (A)	96 hour 8.62	9.12
~~48 hour~~ 8.92	48 hour 8.66	9.18

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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: 6.29.10 Time: 1340
Test Ending: Date: 7.3.10 Time: 1150
Test Type: ☐ non-renewal ☒ renewal

hr = hour AR = after renewal BR = before renewal

Concentration µg/L mg/L (circle)	Replicate	Test Hour	pH (SU)	Temperature (° C)	Dissolved Oxygen (mg/L)	Conductivity ☐ µmhos ☒ mmhos	Salinity (ppth)
Control	A	0 hr	8.0	24.0	7.8	0.279	
	B	24 hr	8.2	25.3	7.9	0283	
	A	48 hr BR	8.1	24.9	7.8	0.287	
	A	48 hr AR	8.1	24.0	7.4	0.289	
	B	72 hr	7.8	25.1	7.3	0.368	
	A	96 hr	8.2	25.2	8.1	~~0.285~~ (A)	
6	A	0 hr	8.1	24.1	7.7	11.4	
	B	24 hr	8.1	25.1	7.5	11.2	
	A	48 hr BR	8.1	24.9	7.4	11.1	
	A	48 hr AR	8.1	24.0	7.0	11.1	
	B	72 hr	7.9	25.0	6.7	11.3	
	A	96 hr	8.0	25.0	8.0	11.0	
7	A	0 hr	8.0	24.0	7.7	13.2	
	B	24 hr	8.1	25.1	7.5	13.0	
	A	48 hr BR	8.0	24.5	7.3	13.0	
	A	48 hr AR	8.1	24.0	7.1	13.1	
	B	72 hr	8.0	24.6	6.6	13.2	
	A	96 hr	8.1	24.6	7.9	13.4	
8	A	0 hr	8.1	24.0	7.7	14.4	
	B	24 hr	8.1	25.1	7.2	14.1	
	A	48 hr BR	8.1	24.5	7.2	14.0	
	A	48 hr AR	8.1	24.0	7.3	14.4	
	B	72 hr	8.0	24.8	6.7	14.5	
	A	96 hr	8.1	24.5	7.6	14.7	
9	A	0 hr	8.1	24.0	7.8	16.9	
	B	24 hr	8.0	24.9	7.2	16.0	
	A	48 hr BR	8.0	24.7	7.3	16.0	
	A	48 hr AR	8.1	24.0	7.2	16.5	
	B	72 hr	8.0	24.4	6.7	16.6	
	A	96 hr	8.2	24.0	7.5	16.7	
10	A	0 hr	8.0	24.0	7.8	18.4	
	B	24 hr	7.9	25.1	7.1	17.8	
	B	48 hr BR	7.7	24.8	7.2	17.5	
		48 hr AR					
		72 hr					
		96 hr					

Investigators Signatures
Jones Daniels
Bruce Alexander
KimMSpencer

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

Reviewed By: Phil Mallen

Measure/record salinity for marine tests

Comments:
(A) Ctrl A conductivity 96hr 0.296-JD

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Revised 07/15/2008 MF

Appendix C. (continued)

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

DATE: 6-29-10 DURATION: 96 hr TOXICANT: NaCl
SPECIES: ***Ceriodaphnia dubia***

RAW DATA: Concentration (g/L)	Number Exposed	Mortalities
.00	20	0
1.50	20	4
2.00	20	12
2.50	20	20
3.00	20	20
4.00	20	20

SPEARMAN-KARBER TRIM: 20.00%

SPEARMAN-KARBER ESTIMATES: LC50: **1.85**
95% LOWER CONFIDENCE: 1.69
95% UPPER CONFIDENCE: 2.03

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

DATE: 6-29-10 DURATION: 96 hr TOXICANT: NaCl
SPECIES: ***Cyprinella leedsi***

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

SPEARMAN-KARBER TRIM: 0.00%

SPEARMAN-KARBER ESTIMATES: LC50: **8.87**
95% LOWER CONFIDENCE: 8.62
95% UPPER CONFIDENCE: 9.12

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: 6/28/10

Ship to: FDEP

P.O. No:

Species	Quantity	Age	Brood/Lot Number	Temp. (°C)	pH (S.U.)	Salinity (‰)
Mysidopsis bahia	150	4 days	MS100624	25	8.0	20
Menidia beryllina	150	12 days	SS100616	25	8.0	20
						Hardness mg/L
Cyprinella leedsi	150	10 days	CL100618	25	7.8	80
Pimephales promelas	150	8 days	FM100620	25	7.8	80
Ceriodaphnia dubia						
Daphnia magna						
YCT						
P. subcapitata						

Packed by: PM

Shipped Via: FedEx

Notes: All acute age.

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: 7/12/10

Ship to: FDEP

P.O. No: _____

Species	Quantity	Age	Brood/Lot Number	Temp. (°C)	pH (S.U.)	Salinity (‰)
Mysidopsis bahia						
Menidia beryllina						
						Hardness mg/L
Cyprinella leedsi	~~250~~ 250	11 days	CL 100701	25 ↓	7.8 ↓	80 ↓
Pimephales promelas						
Ceriodaphnia dubia						
Daphnia magna						
YCT						
P. subcapitata						

Packed by: PM

Shipped Via: Fed Ex

Notes: Acute age.

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 Bunnell Wastewater Treatment Facility Outfall D-001, sampled on July 12, 2010.

Date Sampled	Sample ID	Analysis Group	Components	Results	Remark	Units	MDL	PQL
7/12/2010 12:05	Effluent	AGP/LN	Algal Growth Potential	91.3		mg DryWt/L	0.3	0.9
7/12/2010 12:05	Effluent	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	0.62	U	ug/L	0.62	1.9
7/12/2010 12:05	Effluent	Chlorophyll/Grain Size/BOD	BOD-5 Day,N-Inhib	0.86	I	mg/L	0.2	2
7/12/2010 12:05	Effluent	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.45	U	ug/L	0.45	1.3
7/12/2010 12:05	Effluent	Overflow	Fecal Coliforms-Membrane Filter	2	U	#/100 mL		
7/12/2010 12:05	Effluent	Metals	Copper	2.73		ug/L	0.5	1
7/12/2010 12:05	Effluent	Metals	Lead	0.2	U	ug/L	0.2	0.8
7/12/2010 12:05	Effluent	Metals	Chromium	0.32	I	ug/L	0.3	1.2
7/12/2010 12:05	Effluent	Metals	Arsenic	0.82	I	ug/L	0.25	1
7/12/2010 12:05	Effluent	Metals	Aluminum	110	I	ug/L	60	240
7/12/2010 12:05	Effluent	Metals	Selenium	0.2	U	ug/L	0.2	0.8
7/12/2010 12:05	Effluent	Metals	Zinc	24		ug/L	5	20
7/12/2010 12:05	Effluent	Metals	Magnesium	13.5		mg/L	0.04	0.16
7/12/2010 12:05	Effluent	Metals	Iron	40	I	ug/L	30	120
7/12/2010 12:05	Effluent	Metals	Sodium	124		mg/L	0.5	2
7/12/2010 12:05	Effluent	Metals	Silver	0.025	U	ug/L	0.025	0.1
7/12/2010 12:05	Effluent	Metals	Nickel	0.98	I	ug/L	0.25	1
7/12/2010 12:05	Effluent	Metals	Calcium	109		mg/L	0.075	0.3
7/12/2010 12:05	Effluent	Metals	Cadmium	0.03	U	ug/L	0.03	0.12
7/12/2010 12:05	Effluent	Nutrients	Total-P	0.91	A	mg P/L	0.005	0.05
7/12/2010 12:05	Effluent	Nutrients	Chloride	190	A	mg Cl/L	2	5
7/12/2010 12:05	Effluent	Nutrients	Fluoride	0.61		mg F/L	0.035	0.1
7/12/2010 12:05	Effluent	Nutrients	Sulfate	28	A	mg SO4/L	2	5
7/12/2010 12:05	Effluent	Nutrients	O-Phosphate-P	0.81		mg P/L	0.08	0.2
7/12/2010 12:05	Effluent	Nutrients	Color (true)	5	U	PCU	5	5
7/12/2010 12:05	Effluent	Nutrients	Alkalinity	261		mg CaCO3/L	0.65	2.5
7/12/2010 12:05	Effluent	Nutrients	Organic Carbon	12		mg C/L	1	5
7/12/2010 12:05	Effluent	Nutrients	NO2NO3-N	6.2		mg N/L	0.08	0.2
7/12/2010 12:05	Effluent	Nutrients	Ammonia-N	0.023		mg N/L	0.01	0.02
7/12/2010 12:05	Effluent	Nutrients	Kjeldahl Nitrogen	1	J	mg N/L	0.16	0.4
7/12/2010 12:05	Effluent	Nutrients	TSS	4	U	mg/L	4	16
7/12/2010 12:05	Effluent	Overflow	1,3-Dichlorobenzene	0.43	U	ug/L	0.43	9.5
7/12/2010 12:05	Effluent	Overflow	1,4-Dichlorobenzene	0.51	U	ug/L	0.51	9.5
7/12/2010 12:05	Effluent	Overflow	Acenaphthene	0.57	U	ug/L	0.57	9.5
7/12/2010 12:05	Effluent	Overflow	Bis(2-chloroethoxy)methane	0.51	U	ug/L	0.51	9.5
7/12/2010 12:05	Effluent	Overflow	Fluorene	0.27	U	ug/L	0.27	9.5

Appendix E. (continued)

Date Sampled	Sample ID	Analysis Group	Components	Results	Remark	Units	MDL	PQL
7/12/2010 12:05	Effluent	Overflow	DDD-p,p'	0.025	U	ug/L	0.025	0.1
7/12/2010 12:05	Effluent	Overflow	PCB-1254	0.26	U	ug/L	0.26	1
7/12/2010 12:05	Effluent	Overflow	Atrazine	0.18	U	ug/L	0.18	1.9
7/12/2010 12:05	Effluent	Overflow	Simazine	0.21	U	ug/L	0.21	1.9
7/12/2010 12:05	Effluent	Overflow	2-Methylphenol	0.84	U	ug/L	0.84	9.5
7/12/2010 12:05	Effluent	Overflow	4-Nitrophenol	2.4	U	ug/L	2.4	48
7/12/2010 12:05	Effluent	Overflow	Benzo(g,h,i)perylene	0.45	U	ug/L	0.45	9.5
7/12/2010 12:05	Effluent	Overflow	Bis(2-chloroisopropyl)ether	0.75	U	ug/L	0.75	9.5
7/12/2010 12:05	Effluent	Overflow	Hexachloroethane	0.92	UJ	ug/L	0.92	9.5
7/12/2010 12:05	Effluent	Overflow	Disulfoton	2	U	ug/L	2	2
7/12/2010 12:05	Effluent	Overflow	Parathion	1	U	ug/L	1	1
7/12/2010 12:05	Effluent	Overflow	PCB-1242	0.16	U	ug/L	0.16	1
7/12/2010 12:05	Effluent	Overflow	PCB-1268	0.078	U	ug/L		
7/12/2010 12:05	Effluent	Overflow	Propazine	0.24	U	ug/L		
7/12/2010 12:05	Effluent	Overflow	1,2,4-Trichlorobenzene	0.48	UJ	ug/L	0.48	9.5
7/12/2010 12:05	Effluent	Overflow	2,4-Dimethylphenol	0.63	U	ug/L	0.63	9.5
7/12/2010 12:05	Effluent	Overflow	2-Methyl-4,6-dinitrophenol	1	U	ug/L	1	48
7/12/2010 12:05	Effluent	Overflow	Benzo(a)anthracene	0.4	U	ug/L	0.4	9.5
7/12/2010 12:05	Effluent	Overflow	Hexachlorobenzene	0.79	U	ug/L	0.79	9.5
7/12/2010 12:05	Effluent	Overflow	Nitrobenzene	0.78	U	ug/L	0.78	9.5
7/12/2010 12:05	Effluent	Overflow	Malathion	1	U	ug/L	1	1
7/12/2010 12:05	Effluent	Overflow	Beta-BHC	0.0067	U	ug/L	0.0067	0.05
7/12/2010 12:05	Effluent	Overflow	DDE-p,p'	0.025	U	ug/L	0.025	0.1
7/12/2010 12:05	Effluent	Overflow	Heptachlor	0.007	UJ	ug/L	0.007	0.05
7/12/2010 12:05	Effluent	Overflow	PCB-1221	0.28	U	ug/L	0.28	2
7/12/2010 12:05	Effluent	Overflow	Terbuthylazine	0.21	U	ug/L		
7/12/2010 12:05	Effluent	Overflow	2,4,5-Trichlorophenol	1.4	U	ug/L	1.4	9.5
7/12/2010 12:05	Effluent	Overflow	2-Nitrophenol	0.77	U	ug/L	0.77	9.5
7/12/2010 12:05	Effluent	Overflow	Acenaphthylene	0.65	U	ug/L	0.65	9.5
7/12/2010 12:05	Effluent	Overflow	Bis(2-ethylhexyl)phthalate	1.7	U	ug/L	1.7	9.5
7/12/2010 12:05	Effluent	Overflow	Chrysene	0.66	U	ug/L	0.66	9.5
7/12/2010 12:05	Effluent	Overflow	Di-n-octyl phthalate	0.5	U	ug/L	0.5	9.5
7/12/2010 12:05	Effluent	Overflow	Hexachlorocyclopentadiene	0.65	U	ug/L	0.65	9.5
7/12/2010 12:05	Effluent	Overflow	Phenanthrene	0.56	U	ug/L	0.56	9.5
7/12/2010 12:05	Effluent	Overflow	Phenol	0.77	U	ug/L	0.77	9.5
7/12/2010 12:05	Effluent	Overflow	Pyrene	0.37	U	ug/L	0.37	9.5
7/12/2010 12:05	Effluent	Overflow	Endosulfan I	0.013	UJ	ug/L	0.013	0.05

Appendix E. (continued)

Date Sampled	Sample ID	Analysis Group	Components	Results	Remark	Units	MDL	PQL
7/12/2010 12:05	Effluent	Overflow	Endosulfan II	0.0098	U	ug/L	0.0098	0.1
7/12/2010 12:05	Effluent	Overflow	Gamma-BHC	0.0059	U	ug/L	0.0059	0.05
7/12/2010 12:05	Effluent	Overflow	PCB-1232	0.094	U	ug/L	0.094	1
7/12/2010 12:05	Effluent	Overflow	Prometon	0.19	U	ug/L		
7/12/2010 12:05	Effluent	Overflow	Simetryn	0.26	U	ug/L		
7/12/2010 12:05	Effluent	Overflow	1,2-Dichlorobenzene	0.3	UJ	ug/L	0.3	9.5
7/12/2010 12:05	Effluent	Overflow	3,3'-Dichlorobenzidine	0.51	U	ug/L	0.51	19
7/12/2010 12:05	Effluent	Overflow	4-Chloro-3-methylphenol	0.7	U	ug/L	0.7	9.5
7/12/2010 12:05	Effluent	Overflow	4-Chlorophenyl phenyl ether	0.54	U	ug/L	0.54	9.5
7/12/2010 12:05	Effluent	Overflow	Diethyl phthalate	0.3	U	ug/L	0.3	9.5
7/12/2010 12:05	Effluent	Overflow	N-Nitrosodimethylamine	2.9	U	ug/L	2.9	9.5
7/12/2010 12:05	Effluent	Overflow	Pentachlorophenol	1	U	ug/L	1	48
7/12/2010 12:05	Effluent	Overflow	Demeton-O	2.5	U	ug/L		
7/12/2010 12:05	Effluent	Overflow	Dieldrin	0.0091	U	ug/L	0.0091	0.1
7/12/2010 12:05	Effluent	Overflow	PCB-1260	0.2	U	ug/L	0.2	1
7/12/2010 12:05	Effluent	Overflow	Ametryn	0.16	U	ug/L		
7/12/2010 12:05	Effluent	Overflow	Prometryn	0.21	U	ug/L		
7/12/2010 12:05	Effluent	Overflow	Terbutryn	0.17	U	ug/L		
7/12/2010 12:05	Effluent	Overflow	1,2-Diphenylhydrazine	0.67	U	ug/L	0.67	9.5
7/12/2010 12:05	Effluent	Overflow	2,6-Dinitrotoluene	0.46	U	ug/L	0.46	9.5
7/12/2010 12:05	Effluent	Overflow	2-Chloronaphthalene	0.95	UJ	ug/L	0.95	9.5
7/12/2010 12:05	Effluent	Overflow	3 & 4 Methylphenol	0.7	U	ug/L	0.7	9.5
7/12/2010 12:05	Effluent	Overflow	Benzo(a)pyrene	0.52	U	ug/L	0.52	9.5
7/12/2010 12:05	Effluent	Overflow	Bis(2-chloroethyl)ether	0.69	U	ug/L	0.69	9.5
7/12/2010 12:05	Effluent	Overflow	Butyl benzyl phthalate	0.61	U	ug/L	0.61	9.5
7/12/2010 12:05	Effluent	Overflow	Di-n-butyl phthalate	0.42	U	ug/L	0.42	9.5
7/12/2010 12:05	Effluent	Overflow	Dibenzo(a,h)anthracene	0.74	U	ug/L	0.74	9.5
7/12/2010 12:05	Effluent	Overflow	Dimethyl phthalate	0.3	U	ug/L	0.3	9.5
7/12/2010 12:05	Effluent	Overflow	Indeno(1,2,3-cd)pyrene	0.63	U	ug/L	0.63	9.5
7/12/2010 12:05	Effluent	Overflow	Isophorone	0.44	U	ug/L	0.44	9.5
7/12/2010 12:05	Effluent	Overflow	N-Nitrosodi-n-propylamine	0.74	U	ug/L	0.74	9.5
7/12/2010 12:05	Effluent	Overflow	Demeton-S	2.5	U	ug/L		
7/12/2010 12:05	Effluent	Overflow	Methyl parathion	0.5	U	ug/L	0.5	0.5
7/12/2010 12:05	Effluent	Overflow	Alpha-BHC	0.0057	U	ug/L	0.0057	0.05
7/12/2010 12:05	Effluent	Overflow	Endrin Aldehyde	0.016	U	ug/L	0.016	0.1
7/12/2010 12:05	Effluent	Overflow	Heptachlor Epoxide	0.006	U	ug/L	0.006	0.05

Appendix E. (continued)

Date Sampled	Sample ID	Analysis Group	Components	Results	Remark	Units	MDL	PQL
7/12/2010 12:05	Effluent	Overflow	Toxaphene	1.3	U	ug/L	1.3	5
7/12/2010 12:05	Effluent	Overflow	2,4-Dichlorophenol	0.73	U	ug/L	0.73	9.5
7/12/2010 12:05	Effluent	Overflow	2-Chlorophenol	0.86	U	ug/L	0.86	9.5
7/12/2010 12:05	Effluent	Overflow	4-Bromophenyl phenyl ether	0.71	U	ug/L	0.71	9.5
7/12/2010 12:05	Effluent	Overflow	Anthracene	0.34	U	ug/L	0.34	9.5
7/12/2010 12:05	Effluent	Overflow	Benzidine	2.9	U	ug/L	2.9	76
7/12/2010 12:05	Effluent	Overflow	Benzo(b)fluoranthene	0.49	U	ug/L	0.49	9.5
7/12/2010 12:05	Effluent	Overflow	Fluoranthene	0.34	U	ug/L	0.34	9.5
7/12/2010 12:05	Effluent	Overflow	Naphthalene	0.48	U	ug/L	0.48	9.5
7/12/2010 12:05	Effluent	Overflow	Aldrin	0.007	U	ug/L	0.007	0.05
7/12/2010 12:05	Effluent	Overflow	PCB-1262	0.067	U	ug/L		
7/12/2010 12:05	Effluent	Overflow	Secbumeton	0.25	U	ug/L		
7/12/2010 12:05	Effluent	Overflow	2,4,6-Trichlorophenol	0.95	U	ug/L	0.95	9.5
7/12/2010 12:05	Effluent	Overflow	2,4-Dinitrophenol	0.89	U	ug/L	0.89	48
7/12/2010 12:05	Effluent	Overflow	2,4-Dinitrotoluene	0.56	U	ug/L	0.56	9.5
7/12/2010 12:05	Effluent	Overflow	Benzo(k)fluoranthene	0.55	U	ug/L	0.55	9.5
7/12/2010 12:05	Effluent	Overflow	Hexachlorobutadiene	0.55	UJ	ug/L	0.55	9.5
7/12/2010 12:05	Effluent	Overflow	N-Nitrosodiphenylamine	0.9	U	ug/L	0.9	9.5
7/12/2010 12:05	Effluent	Overflow	Azinphos Methyl	1	U	ug/L	1	1
7/12/2010 12:05	Effluent	Overflow	Chlorpyrifos	1	U	ug/L		
7/12/2010 12:05	Effluent	Overflow	Diazinon	1	U	ug/L	1	1
7/12/2010 12:05	Effluent	Overflow	Chlordane- Technical	0.06	U	ug/L	0.06	0.5
7/12/2010 12:05	Effluent	Overflow	DDT-p,p'	0.0097	U	ug/L	0.0097	0.1
7/12/2010 12:05	Effluent	Overflow	Delta-BHC	0.0048	UJ	ug/L	0.0048	0.05
7/12/2010 12:05	Effluent	Overflow	Endosulfan Sulfate	0.025	U	ug/L	0.025	0.1
7/12/2010 12:05	Effluent	Overflow	Endrin	0.0097	U	ug/L	0.0097	0.1
7/12/2010 12:05	Effluent	Overflow	Methoxychlor	0.013	U	ug/L	0.013	0.1
7/12/2010 12:05	Effluent	Overflow	PCB-1016	0.069	U	ug/L	0.069	1
7/12/2010 12:05	Effluent	Overflow	PCB-1248	0.33	U	ug/L	0.33	1
7/12/2010 12:05	Effluent	Overflow	Atraton	0.25	U	ug/L		
7/12/2010 12:05	Effluent	Field Parameter	Total Residual Chlorine	3.9		mg/L		
7/12/2010 12:05	Effluent	Field Parameter	Dissolved Oxygen	8.04		mg/L		
7/12/2010 12:05	Effluent	Field Parameter	Sample Depth	0.22		m		
7/12/2010 12:05	Effluent	Field Parameter	Temperature	28.59		C		
7/12/2010 12:05	Effluent	Field Parameter	pH	7.91				
7/12/2010 12:05	Effluent	Field Parameter	Specific Conductance	1252		umhos/cm		

Appendix E. (continued)

Date Sampled	Sample ID	Analysis Group	Components	Results	Remark	Units	MDL	PQL
7/12/2010 12:20	Blank	Metals	Silver	0.025	U	ug/L	0.025	0.1
7/12/2010 12:20	Blank	Metals	Arsenic	0.25	U	ug/L	0.25	1
7/12/2010 12:20	Blank	Metals	Magnesium	0.04	U	mg/L	0.04	0.16
7/12/2010 12:20	Blank	Metals	Copper	0.5	U	ug/L	0.5	1
7/12/2010 12:20	Blank	Metals	Cadmium	0.03	U	ug/L	0.03	0.12
7/12/2010 12:20	Blank	Metals	Zinc	5	U	ug/L	5	20
7/12/2010 12:20	Blank	Metals	Calcium	0.075	U	mg/L	0.075	0.3
7/12/2010 12:20	Blank	Metals	Iron	30	U	ug/L	30	120
7/12/2010 12:20	Blank	Metals	Aluminum	60	U	ug/L	60	240
7/12/2010 12:20	Blank	Metals	Lead	0.2	U	ug/L	0.2	0.8
7/12/2010 12:20	Blank	Metals	Nickel	0.25	U	ug/L	0.25	1
7/12/2010 12:20	Blank	Metals	Chromium	0.3	U	ug/L	0.3	1.2
7/12/2010 12:20	Blank	Metals	Selenium	0.2	U	ug/L	0.2	0.8
7/12/2010 12:20	Blank	Metals	Sodium	0.5	U	mg/L	0.5	2
7/12/2010 12:20	Blank	Nutrients	Alkalinity	0.65	U	mg CaCO3/L	0.65	2.5
7/12/2010 12:20	Blank	Nutrients	Organic Carbon	1	U	mg C/L	1	5
7/12/2010 12:20	Blank	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
7/12/2010 12:20	Blank	Nutrients	Kjeldahl Nitrogen	0.08	U	mg N/L	0.08	0.2
7/12/2010 12:20	Blank	Nutrients	Total-P	0.004	U	mg P/L	0.004	0.01
7/12/2010 12:20	Blank	Nutrients	Fluoride	0.035	U	mg F/L	0.035	0.1
7/12/2010 12:20	Blank	Nutrients	Sulfate	0.2	U	mg SO4/L	0.2	0.5
7/12/2010 12:20	Blank	Nutrients	Chloride	0.2	U	mg Cl/L	0.2	0.5
7/12/2010 12:20	Blank	Nutrients	O-Phosphate-P	0.004	U	mg P/L	0.004	0.01
7/12/2010 12:20	Blank	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
7/12/2010 12:20	Blank	Nutrients	Color (true)	5	U	PCU	5	5
7/12/2010 12:20	Blank	Overflow	2,4-Dichlorophenol	0.74	U	ug/L	0.74	9.6
7/12/2010 12:20	Blank	Overflow	2,4-Dinitrotoluene	0.57	U	ug/L	0.57	9.6
7/12/2010 12:20	Blank	Overflow	2,6-Dinitrotoluene	0.46	U	ug/L	0.46	9.6
7/12/2010 12:20	Blank	Overflow	2-Methylphenol	0.85	U	ug/L	0.85	9.6
7/12/2010 12:20	Blank	Overflow	Anthracene	0.35	U	ug/L	0.35	9.6
7/12/2010 12:20	Blank	Overflow	Bis(2-chloroethyl)ether	0.69	U	ug/L	0.69	9.6
7/12/2010 12:20	Blank	Overflow	Di-n-octyl phthalate	0.51	U	ug/L	0.51	9.6
7/12/2010 12:20	Blank	Overflow	Dibenzo(a,h)anthracene	0.75	U	ug/L	0.75	9.6
7/12/2010 12:20	Blank	Overflow	Hexachlorobutadiene	0.56	U	ug/L	0.56	9.6
7/12/2010 12:20	Blank	Overflow	Naphthalene	0.48	U	ug/L	0.48	9.6
7/12/2010 12:20	Blank	Overflow	Phenol	0.78	U	ug/L	0.78	9.6

Appendix E. (continued)

Date Sampled	Sample ID	Analysis Group	Components	Results	Remark	Units	MDL	PQL
7/12/2010 12:20	Blank	Overflow	Demeton-S	2.4	U	ug/L		
7/12/2010 12:20	Blank	Overflow	Chlordane- Technical	0.058	U	ug/L	0.058	0.49
7/12/2010 12:20	Blank	Overflow	Delta-BHC	0.0047	U	ug/L	0.0047	0.049
7/12/2010 12:20	Blank	Overflow	Endosulfan Sulfate	0.024	U	ug/L	0.024	0.097
7/12/2010 12:20	Blank	Overflow	Heptachlor	0.0068	U	ug/L	0.0068	0.049
7/12/2010 12:20	Blank	Overflow	PCB-1016	0.067	U	ug/L	0.067	0.97
7/12/2010 12:20	Blank	Overflow	PCB-1221	0.27	U	ug/L	0.27	1.9
7/12/2010 12:20	Blank	Overflow	Toxaphene	1.3	U	ug/L	1.3	4.9
7/12/2010 12:20	Blank	Overflow	Terbuthylazine	0.21	U	ug/L		
7/12/2010 12:20	Blank	Overflow	1,2,4-Trichlorobenzene	0.48	UJ	ug/L	0.48	9.6
7/12/2010 12:20	Blank	Overflow	1,3-Dichlorobenzene	0.43	U	ug/L	0.43	9.6
7/12/2010 12:20	Blank	Overflow	2,4-Dinitrophenol	0.89	U	ug/L	0.89	48
7/12/2010 12:20	Blank	Overflow	4-Chlorophenyl phenyl ether	0.55	U	ug/L	0.55	9.6
7/12/2010 12:20	Blank	Overflow	Acenaphthene	0.58	U	ug/L	0.58	9.6
7/12/2010 12:20	Blank	Overflow	Dimethyl phthalate	0.31	U	ug/L	0.31	9.6
7/12/2010 12:20	Blank	Overflow	Beta-BHC	0.0065	U	ug/L	0.0065	0.049
7/12/2010 12:20	Blank	Overflow	Gamma-BHC	0.0057	U	ug/L	0.0057	0.049
7/12/2010 12:20	Blank	Overflow	PCB-1260	0.19	U	ug/L	0.19	0.97
7/12/2010 12:20	Blank	Overflow	Atraton	0.25	U	ug/L		
7/12/2010 12:20	Blank	Overflow	Terbutryn	0.17	U	ug/L		
7/12/2010 12:20	Blank	Overflow	1,2-Dichlorobenzene	0.31	U	ug/L	0.31	9.6
7/12/2010 12:20	Blank	Overflow	1,4-Dichlorobenzene	0.52	U	ug/L	0.52	9.6
7/12/2010 12:20	Blank	Overflow	Acenaphthylene	0.65	U	ug/L	0.65	9.6
7/12/2010 12:20	Blank	Overflow	Benzo(a)pyrene	0.53	U	ug/L	0.53	9.6
7/12/2010 12:20	Blank	Overflow	Benzo(k)fluoranthene	0.56	U	ug/L	0.56	9.6
7/12/2010 12:20	Blank	Overflow	Bis(2-chloroethoxy)methane	0.52	U	ug/L	0.52	9.6
7/12/2010 12:20	Blank	Overflow	Butyl benzyl phthalate	0.62	U	ug/L	0.62	9.6
7/12/2010 12:20	Blank	Overflow	N-Nitrosodi-n-propylamine	0.75	U	ug/L	0.75	9.6
7/12/2010 12:20	Blank	Overflow	Endrin	0.0094	U	ug/L	0.0094	0.097
7/12/2010 12:20	Blank	Overflow	Heptachlor Epoxide	0.0058	U	ug/L	0.0058	0.049
7/12/2010 12:20	Blank	Overflow	PCB-1242	0.16	U	ug/L	0.16	0.97
7/12/2010 12:20	Blank	Overflow	PCB-1268	0.076	U	ug/L		
7/12/2010 12:20	Blank	Overflow	Prometon	0.19	U	ug/L		
7/12/2010 12:20	Blank	Overflow	Simazine	0.21	U	ug/L	0.21	1.9
7/12/2010 12:20	Blank	Overflow	Simetryn	0.26	U	ug/L		
7/12/2010 12:20	Blank	Overflow	1,2-Diphenylhydrazine	0.67	U	ug/L	0.67	9.6

Appendix E. (continued)

Date Sampled	Sample ID	Analysis Group	Components	Results	Remark	Units	MDL	PQL
7/12/2010 12:20	Blank	Overflow	2,4,5-Trichlorophenol	1.4	U	ug/L	1.4	9.6
7/12/2010 12:20	Blank	Overflow	2-Nitrophenol	0.78	U	ug/L	0.78	9.6
7/12/2010 12:20	Blank	Overflow	3 & 4 Methylphenol	0.71	U	ug/L	0.71	9.6
7/12/2010 12:20	Blank	Overflow	Benzo(a)anthracene	0.4	U	ug/L	0.4	9.6
7/12/2010 12:20	Blank	Overflow	Bis(2-ethylhexyl)phthalate	1.7	U	ug/L	1.7	9.6
7/12/2010 12:20	Blank	Overflow	Hexachlorocyclopentadiene	0.65	U	ug/L	0.65	9.6
7/12/2010 12:20	Blank	Overflow	N-Nitrosodimethylamine	2.9	U	ug/L	2.9	9.6
7/12/2010 12:20	Blank	Overflow	Azinphos Methyl	0.97	U	ug/L	0.97	0.97
7/12/2010 12:20	Blank	Overflow	Demeton-O	2.4	U	ug/L		
7/12/2010 12:20	Blank	Overflow	PCB-1254	0.25	U	ug/L	0.25	0.97
7/12/2010 12:20	Blank	Overflow	PCB-1262	0.065	U	ug/L		
7/12/2010 12:20	Blank	Overflow	2,4,6-Trichlorophenol	0.96	U	ug/L	0.96	9.6
7/12/2010 12:20	Blank	Overflow	2,4-Dimethylphenol	0.63	U	ug/L	0.63	9.6
7/12/2010 12:20	Blank	Overflow	2-Methyl-4,6-dinitrophenol	1.1	U	ug/L	1.1	48
7/12/2010 12:20	Blank	Overflow	Benzidine	2.9	U	ug/L	2.9	77
7/12/2010 12:20	Blank	Overflow	Diethyl phthalate	0.31	U	ug/L	0.31	9.6
7/12/2010 12:20	Blank	Overflow	Fluorene	0.27	U	ug/L	0.27	9.6
7/12/2010 12:20	Blank	Overflow	Indeno(1,2,3-cd)pyrene	0.63	U	ug/L	0.63	9.6
7/12/2010 12:20	Blank	Overflow	Phenanthrene	0.57	U	ug/L	0.57	9.6
7/12/2010 12:20	Blank	Overflow	Parathion	0.97	U	ug/L	0.97	0.97
7/12/2010 12:20	Blank	Overflow	Alpha-BHC	0.0055	U	ug/L	0.0055	0.049
7/12/2010 12:20	Blank	Overflow	Endosulfan I	0.013	U	ug/L	0.013	0.049
7/12/2010 12:20	Blank	Overflow	Methoxychlor	0.013	U	ug/L	0.013	0.097
7/12/2010 12:20	Blank	Overflow	Ametryn	0.16	U	ug/L		
7/12/2010 12:20	Blank	Overflow	Prometryn	0.21	U	ug/L		
7/12/2010 12:20	Blank	Overflow	4-Chloro-3-methylphenol	0.7	U	ug/L	0.7	9.6
7/12/2010 12:20	Blank	Overflow	Benzo(g,h,i)perylene	0.45	U	ug/L	0.45	9.6
7/12/2010 12:20	Blank	Overflow	Bis(2-chloroisopropyl)ether	0.76	U	ug/L	0.76	9.6
7/12/2010 12:20	Blank	Overflow	Hexachloroethane	0.93	UJ	ug/L	0.93	9.6
7/12/2010 12:20	Blank	Overflow	N-Nitrosodiphenylamine	0.9	U	ug/L	0.9	9.6
7/12/2010 12:20	Blank	Overflow	Disulfoton	1.9	U	ug/L	1.9	1.9
7/12/2010 12:20	Blank	Overflow	Aldrin	0.0068	U	ug/L	0.0068	0.049
7/12/2010 12:20	Blank	Overflow	DDD-p,p'	0.024	U	ug/L	0.024	0.097
7/12/2010 12:20	Blank	Overflow	Dieldrin	0.0088	U	ug/L	0.0088	0.097
7/12/2010 12:20	Blank	Overflow	Endosulfan II	0.0095	U	ug/L	0.0095	0.097
7/12/2010 12:20	Blank	Overflow	Endrin Aldehyde	0.016	U	ug/L	0.016	0.097
7/12/2010 12:20	Blank	Overflow	PCB-1248	0.32	U	ug/L	0.32	0.97

Appendix E. (continued)

Date Sampled	Sample ID	Analysis Group	Components	Results	Remark	Units	MDL	PQL
7/12/2010 12:20	Blank	Overflow	Propazine	0.24	U	ug/L		
7/12/2010 12:20	Blank	Overflow	Secbumeton	0.25	U	ug/L		
7/12/2010 12:20	Blank	Overflow	2-Chloronaphthalene	0.96	UJ	ug/L	0.96	9.6
7/12/2010 12:20	Blank	Overflow	2-Chlorophenol	0.87	U	ug/L	0.87	9.6
7/12/2010 12:20	Blank	Overflow	4-Nitrophenol	2.4	U	ug/L	2.4	48
7/12/2010 12:20	Blank	Overflow	Benzo(b)fluoranthene	0.49	U	ug/L	0.49	9.6
7/12/2010 12:20	Blank	Overflow	Fluoranthene	0.35	U	ug/L	0.35	9.6
7/12/2010 12:20	Blank	Overflow	Hexachlorobenzene	0.8	U	ug/L	0.8	9.6
7/12/2010 12:20	Blank	Overflow	Isophorone	0.44	U	ug/L	0.44	9.6
7/12/2010 12:20	Blank	Overflow	Pyrene	0.38	U	ug/L	0.38	9.6
7/12/2010 12:20	Blank	Overflow	Chlorpyrifos	0.97	U	ug/L		
7/12/2010 12:20	Blank	Overflow	DDT-p,p'	0.0094	U	ug/L	0.0094	0.097
7/12/2010 12:20	Blank	Overflow	PCB-1232	0.091	U	ug/L	0.091	0.97
7/12/2010 12:20	Blank	Overflow	Atrazine	0.18	U	ug/L	0.18	1.9
7/12/2010 12:20	Blank	Overflow	3,3'-Dichlorobenzidine	0.52	U	ug/L	0.52	19
7/12/2010 12:20	Blank	Overflow	4-Bromophenyl phenyl ether	0.72	U	ug/L	0.72	9.6
7/12/2010 12:20	Blank	Overflow	Chrysene	0.66	U	ug/L	0.66	9.6
7/12/2010 12:20	Blank	Overflow	Di-n-butyl phthalate	0.42	U	ug/L	0.42	9.6
7/12/2010 12:20	Blank	Overflow	Nitrobenzene	0.79	U	ug/L	0.79	9.6
7/12/2010 12:20	Blank	Overflow	Pentachlorophenol	1.1	U	ug/L	1.1	48
7/12/2010 12:20	Blank	Overflow	Diazinon	0.97	U	ug/L	0.97	0.97
7/12/2010 12:20	Blank	Overflow	Malathion	0.97	U	ug/L	0.97	0.97
7/12/2010 12:20	Blank	Overflow	Methyl parathion	0.49	U	ug/L	0.49	0.49
7/12/2010 12:20	Blank	Overflow	DDE-p,p'	0.024	U	ug/L	0.024	0.097

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

Bunnell WWTP – FL0020907 – July-2010

State of Florida
Department of Environmental Protection
Facility Introduction & Summary

PART I: Information gathered prior to sampling event	
Prepared By: Max Schwartz	**Contact Number:** 904-807-3336
Facility Name (as it appears on permit): Bunell Wastewater Treatment Facility	**Current Name:** same
NPDES Permit Number: FL0020907	**Permit Expiration Date:** June 27, 2011
Physical Address: Tolman Street Bunnell, FL 32110	
District: Northeast	**County:** Flagler
Function of Facility: Facility treats domestic wastewater.	
Facility Type: Domestic Wastewater	**Permitted Capacity (MGD):** 0.6

Mean Flow for previous 12 months for all EXTERNAL outfalls listed in permit (list date range including months):

EFD-1 Flow to surface	
Month	AADF (MGD)
Jun-09	0.171
Jul-09	0.160
Aug-09	0.170
Sep-09	0.175
Oct-09	0.176
Nov-09	0.167
Dec-09	.168
Jan-10	.172
Feb-10	.181
Mar-10	.205
Apr-10	0.213
May-10	0.186

EFA-2 Flow to Reuse	
Month	AADF (MGD)
Jun-09	0.135
Jul-09	0.157
Aug-09	0.139
Sep-09	0.131
Oct-09	0.13
Nov-09	0.133
Dec-09	0.122
Jan-10	0.117
Feb-10	0.104
Mar-10	0.095
Apr-10	0.032
May-10	0.086

Appendix F. (continued)

Bunnell WWTP – FL0020907 – July-2010

If applicable, Mean Flow for previous 12 months for REUSE outfall(s) (list date range including months):

EFA-2 Flow to Reuse	
Month	AADF (MGD)
Jun-09	0.135
Jul-09	0.157
Aug-09	0.139
Sep-09	0.131
Oct-09	0.13
Nov-09	0.133
Dec-09	0.122
Jan-10	0.117
Feb-10	0.104
Mar-10	0.095
Apr-10	0.032
May-10	0.086

Description of type of Discharge:

☒ **Continuous** ☐ **Intermittent** ☐ **Seasonal** ☐ **Rainfall Dependent** ☐ **Other, please specify**

Appendix F. (continued)

Bunnell WWTP – FL0020907 – July-2010

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

EFA-1 – Sample point immediately after disinfection and prior to dechlorination.
EFD-1 – Sample point after dechlorination and prior discharge to Black Branch of Haw Creek (Outfall D-001)
EFA-2 - Sample point immediately after disinfection and prior to the reuse system (Outfall R-001)
EFB-1 - Sample point after filtration and prior to disinfection at reuse facility.
CAL-1- Calculated Values
CAL-2 –Calculated mass loading on nutrients (TN/TP) (lb/mo)
CAL-3 - Calculated yearly mass loading of nutrients (TN/TP) (lb/yr)
CAL-4 - Calculated unionized ammonia
SWB-1 – 200 yards upstream of the outfall to determine background (Outfall D-001)
SWD-3 –200 yards downstream from the outfall (Outfall D-001)
SWD-4 – Below bend in the canal where canal turns to run along S.R 11
SWD-5 – Canal just before it enters black branch

Description of Permitted Outfall(s): (excerpted from current permit)

Surface Water Discharge:

An existing 0.30 MGD AADF permitted discharge to a drainage canal that flows to Black Branch of Haw Creek (Class III fresh waters) at Discharge Location (D-001), ultimately drains to Lower St. Johns River. The diameter of the discharge pipe is 15 inches and discharges above the water surface. The point of discharge D-001 is located approximately at latitude 29° 27' 51" N, longitude 81° 15' 50" W.

REUSE:

Land Application: Construct and operate a new 0.60 MGD annual average daily flow (AADF) design capacity slow-rate public access irrigation reuse system R-001. The slow-rate public access system consists of the following:

User Name	User Type	Area (acres)	Rate (inches/we	Capacity (mgd)
Grand Reserve Golf Club and Residential Development	Golf Course and Residential Landscaping	608.0	0.24	0.50
Austin Outdoors Nursery	Commercial Nursery	50.0	0.24	0.10
	Total	658.0	-	0.60

The permitted capacity of the slow-rate public access irrigation reuse system R-001 will be limited to 0.499 MGD AADF per applicant request for an interim period while influent flows are low.

Appendix F. (continued)

Bunnell WWTP – FL0020907 – July-2010

TREATMENT FACILITIES:

To operate an existing 0.60 MGD annual average daily flow (AADF) design capacity extended aeration wastewater treatment facility (WWTF) consisting of following units:

- Two surge pumps (with a minimum capacity of 833 GPM each and two manual bar screens (One is located before the equalization basin, and one is located before the splitter box);
- One flow equalization basin (120,000 gallons) and one splitter box;
- One Carrousel oxidation ditch (0.345 million gallon (MG), 13.4 feet water depth) and two 0.155 MG ring steel biological treatment units (BTU) each of which is divided into a 18,080-gal re-aeration zone, a 77,500-gal aeration zone, a 19,375-gal swing zone, a 18,080-gal 1st post anoxic zone, and a 21,960-gal 2nd post anoxic zone;
- Two clarifiers (95,000 gallons each);
- One aerobic digester (123,000 gallons) and one sludge holding tank (34,500 gallons);
- One tertiary filter (capacity of 0.6 MGD AADF);
- One chlorine contact chamber (18,850 gallons);
- One post aeration & dechlorination basin (9,000 gallons);
- One reuse water storage tank (0.90 MG),

The permitted capacity of the WWTF before and after completion and placing into service the public access reuse system is **0.300 MGD and 0.499 MGD AADF,** respectively, per applicant request for an interim period while influent flows are low.

The wastewater residuals are hauled to Shelley's Environmental Services RMF, or a DEP-permitted RMF, or a DEP-permitted WWTF for final treatment and disposal.

Upon completion and placing into service the public access reuse system, the primary method of disposal of the effluent is reuse of reclaimed water via spray irrigation to public access reuse sites. Surface water discharge will become an alternative (backup) disposal method.

Appendix F. (continued)

Bunnell WWTP – FL0020907 – July-2010

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

1. During the period beginning on the issuance date and lasting through the expiration date of this permit, the permittee is authorized to discharge effluent from Outfall D-001 to Alligator Creek. Such discharge shall be limited and monitored by the permittee as specified below:

1. During the period beginning on the issuance date and lasting through the completion and placing into service of the Reuse System R-001 (Condition V1.1), the permittee is authorized to discharge effluent from Outfall D-001 to a drainage canal that flows to Black Branch of Haw Creek. Such effluent shall be limited and monitored by the permittee as specified below and reported in accordance with condition I.C.7.

Parameter	Effluent Limitations							Monitoring Requirements			Notes
	Units	Max/Min	Annual Total Mass	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	
Flow, Surface water discharge at the Outfall D-001	MGD	Maximum	-	0.30	Report	-	-	Daily 5 Days/Week	Recording flow meters and totalizers	EFD-1	See Cond.I.A 4 & 6
BOD, Carbonaceous 5 day, 20C	mg/L	Maximum	-	8.0	8.0	-	16.0	Every 2 Weeks	8-hour flow proportioned composite	EFD-1	See Cond.I.A 4
Solids, Total Suspended	mg/L	Maximum	-	20.0	30.0	-	60.0	Every 2 Weeks	8-hour flow proportioned composite	EFD-1	See Cond.I.A 4
Coliform, Fecal	See Permit Condition I.A.4 & 7							Every 2 Weeks	Grab	EFA-1	
pH	s.u.	Range	-	-	-	-	6.0 to 8.5	Daily 5 Days/Week	Grab	EFD-1	See Cond.I.A 4

Appendix F. (continued)

Bunnell WWTP – FL0020907 – July-2010

Parameter	Effluent Limitations						Monitoring Requirements			Notes
	Units	Max/Min	Annual Total Mass	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	
Total Residual Chlorine (For Disinfection)	mg/L	Minimum	-	-	-	-	0.5	Daily 5 Days/Week	Grab	EFA-1	See Cond.I.A 4 & 8
Total Residual Chlorine (For Dechlorination)	mg/L	Maximum	-	-	-	-	0.01	Weekly	Grab	EFD-1	See Cond.I.A 4
Dissolved Oxygen	mg/L	Minimum	-	-	-	-	6.0	Daily 5 Days/Week	Meter	EFD-1	See Cond.I.A 4 & 9
Nitrogen, Kjeldahl Total (as N)	mg/L	Maximum	-	2.50	2.50	3.75	5.00	Every 2 Weeks	8-hour flow proportioned composite	EFD-1	See Cond.I.A 4
Nitrogen, Total (as N)	mg/L	Maximum	-	Report	Report	-	Report	Every 2 Weeks	8-hour flow proportioned composite	EFD-1	See Cond.I.A 4 & 11
Nitrogen, Total (as N)	Lbs/Mon	Maximum	-	-	Report	-	-	Every 2 Weeks	Calculated	CAL-2	See Cond.I.A 4 & 11
Nitrogen, Total (as N) (Accumulated load)	Lbs/ yr	Maximum	13,371.0	-	-	-	-	Every 2 Weeks	Calculated	CAL-3	See Cond.I.A 4 & 11
Nitrate plus Nitrate, as N	mg/L	Minimum	-	-	-	-	Report	Quarterly	Grab	EFD-1	See Cond.I.A 4
Organic Nitrogen, as N	mg/L	Minimum	-	-	-	-	Report	Quarterly	Grab	EFD-1	See Cond.I.A 4

Appendix F. (continued)

Bunnell WWTP – FL0020907 – July-2010

Parameter	Units	Effluent Limitations						Monitoring Requirements			Notes
		Max/Min	Annual Total Mass	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	
Total Ammonia, as N	mg/L	Maximum	-	-	-	-	Report	Quarterly	Grab	EFD-1	See Cond.I.A 4 & 12
Water Temperature	Deg. C	Maximum	-	-	-	-	Report	Quarterly	Meter or Instrument	EFD-1	See Cond.I.A 4 & 12
Un-ionized Ammonia as N	mg/L	Maximum	-	-	-	-	0.02	Quarterly	Calculated	CAL-4	See Cond.I.A 4 & 12
Total Phosphorous, as P	mg/L	Maximum	-	Report	-	-	Report	Quarterly	Grab	EFD-2	See Cond.I.A 4 & 11
Total Phosphorous, as P	Lbs/Mon	Maximum	-		-	-	Report	Quarterly	Calculated	CAL-3	See Cond.I.A 4 & 11
Total Phosphorous, as P (Accumulated load)	Lbs/yr	Maximum	1268.0		-	-	-	Quarterly	Calculated	CAL-1	See Cond.I.A 4 & 11
Ortho-Phosphorous, as P	mg/L	Maximum	-	-	-	-	Report	Quarterly	Grab and Filtered	EFD-1	See Cond.I.A 4
Silver, Total Recoverable	µg/L	Maximum	-	-	-	-	0.07	Quarterly	Grab	EFD-1	See Cond.I.A 4
Stream Monitoring	See Permit Condition I.A.4 & 13									SWB-1 SWD-3 SWD-4 SWD-5	

Appendix F. (continued)

Bunnell WWTP – FL0020907 – July-2010

Parameter	Units	Effluent Limitations							Monitoring Requirements			Notes
		Max/Min	Annual Total Mass	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number		
Acute, Whole Effluent Toxicity	See Permit Condition I.A.4 & 14									EFD-1		

Appendix F. (continued)

Bunnell WWTP – FL0020907 – July-2010

2. During the period beginning on placing the reuse system R-001 into service and lasting through the expiration date of this permit, the permittee is authorized to discharge effluent from Outfall D-001 to a drainage canal that flows to Black Branch of Haw Creek. The surface water discharge is used as a backup discharge to the reuse system R-001.

a. When the surface water discharge occurs, the permittee shall monitor for the parameters specified below:

Parameter	Units	Effluent Limitations						Monitoring Requirements			Notes
		Max/Min	Annual Total Mass	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	
Flow to the surface water at the Outfall D-001	MGD	Maximum	-	0.30	Report	-	-	Daily 5 Days/Week (During discharge period)	Recording flow meters and totalizers	EFD-1	See Cond.I. A.5 & 6
BOD, Carbonaceous 5 day, 20C	mg/L	Maximum	-	8.0	8.0	-	16.0	Every 2 Weeks (During discharge period)	8-hour flow proportioned composite	EFD-1	See Cond.I. A.5
Solids, Total Suspended	mg/L	Maximum	-	20.0	30.0	-	60.0	Every 2 Weeks (During discharge period)	8-hour flow proportioned composite	EFD-1	See Cond.I. A.5
Coliform, Fecal		See Permit Condition I.A.5 & 7						Every 2 Weeks (During discharge period)	Grab	EFA-1	
pH	s.u.	Range	-	-	-	-	6.0 to 8.5	Daily 5 Days/Week (During discharge period)	Grab	EFD-1	See Cond.I. A.5
Total Residual Chlorine (For Disinfection)	mg/L	Minimum	-	-	-	-	0.5	Daily 5 Days/Week (During discharge period)	Grab	EFA-1	See Cond.I. A.5 & 8
Total Residual Chlorine (For Dechlorination)	mg/L	Maximum	-	-	-	-	0.01	Weekly (During discharge period)	Grab	EFD-1	See Cond.I. A.5

Appendix F. (continued)

Bunnell WWTP – FL0020907 – July-2010

Parameter	Units	Effluent Limitations						Monitoring Requirements			
		Max/Min	Annual Total Mass	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	Notes
Dissolved Oxygen	mg/L	Minimum	-	-	-	-	6.0	Daily 5 Days/Week (During discharge period)	Meter	EFD-1	See Cond.I. A.5 & 9
Nitrogen, Kjeldahl Total (as N)	mg/L	Maximum	-	2.50	2.50	-	5.00	Every 2 Weeks (During discharge period)	8-hour flow proportioned composite	EFD-1	See Cond.I. A.5
Nitrogen, Total (as N)	mg/L	Maximum	-	Report	Report	-	Report	Every 2 Weeks (During discharge period)	8-hour flow proportioned composite	EFD-1	See Cond.I. A.5 & 11
Nitrogen, Total (as N)	Lbs/Mon	Maximum		-	Report	-	-	Every 2 Weeks (During discharge period)	Calculate	CAL-2	See Cond.I. A.5 & 11
Nitrogen, Total (as N) (Accumulated load)	Lbs/ yr	Maximum	2740.0	-	-	-	-	Every 2 Weeks (During discharge period)	Calculate	CAL-3	See Cond.I. A.5 & 11
Phosphorus, Total (as P)	mg/L	Maximum	-	-	Report	-	Report	Every 2 Weeks (During discharge period)	8-hour flow proportioned composite	EFD-1	See Cond.I. A.5 & 11
Phosphorus, Total (as P)	Lbs/Mon	Maximum	-	-	Report	-	-	Every 2 Weeks (During discharge period)	Calculate	CAL-2	See Cond.I. A.5 & 11

Appendix F. (continued)

Bunnell WWTP – FL0020907 – July-2010

Parameter	Units	Effluent Limitations						Monitoring Requirements			Notes
		Max/Min	Annual Total Mass	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	
Phosphorus, Total (as P) (Accumulated load)	Lbs/yr	Maximum	913.0	-	-	-	Report	Every 2 Weeks (During discharge period)	Calculate	CAL-3	See Cond.I. A.5 & 11

b. When the surface water discharge exceeds 0.10 MGD monthly average daily flow (MADF)[8], additional to the limitations and monitoring requirements specified in Condition I.A.2 above, the permittee shall monitor for the parameters specified below:

Parameter	Units	Effluent Limitations						Monitoring Requirements			Notes
		Max/Min	Annual Average	Monthly Average	Weekly Average	Single Sample		Monitoring Frequency	Sample Type	Monitoring Location Site Number	
Nitrate plus Nitrate, as N	mg/L	Minimum	-	-	-	Report		Quarterly (During discharge period)	Grab	EFD-1	See Cond.I.A. 5
Organic Nitrogen, as N	mg/L	Minimum	-	-	-	Report		Quarterly (During discharge period)	Grab	EFD-1	See Cond.I.A. 5
Total Ammonia, as N	mg/L	Maximum	-	-	-	Report		Quarterly (During discharge period)	Grab	EFD-1	See Cond.I.A. 5 & 12
Water Temperature	Deg. C	Maximum	-	-	-	Report		Quarterly (During discharge period)	Meter or Instrument	EFD-1	See Cond.I.A. 5 & 12

Appendix F. (continued)

Bunnell WWTP – FL0020907 – July-2010

Parameter	Units	Max/Min	Effluent Limitations				Monitoring Requirements			Notes
			Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	
Un-ionized Ammonia as N	mg/L	Maximum	-	-	-	0.02	Quarterly (During discharge period)	Calculated	CAL-4	See Cond.I.A. 5 & 12
Ortho-Phosphorous, as P	mg/L	Maximum	-	-	-	Report	Quarterly (During discharge period)	Grab and Filtered	EFD-1	See Cond.I.A. 5
Silver, Total Recoverable	µg/L	Maximum	-	-	-	0.07	Quarterly (During discharge period)	Grab	EFD-1	See Cond.I.A. 5
Stream Monitoring	See Permit Condition I.A.5 & 13								SWB-1 SWD-3 SWD-4 SWD-5	
Acute, Whole Effluent Toxicity	See Permit Condition I.A.5 & 14								EFD-1	

Appendix F. (continued)

Bunnell WWTP – FL0020907 – July-2010

3. Effluent samples shall be taken at the monitoring site locations listed in Permit Condition I. A. 1. and as described below:

Monitoring Location Site Number	Description of Monitoring Location
EFA-1	Effluent sample point immediately after disinfection and prior to dechlorination.
EFD-1	Effluent sample point immediately after dechlorination and prior discharge to the Outfall D-001.
CAL-1	Calculated value
CAL-2	Calculated mass loading of nutrients (TN/TP) (lbs/Mo)
CAL-3	Calculated yearly mass loading of nutrients (TN/TP) (lbs/yr)
CAL-4	Calculated unionized ammonia

4. Monitoring requirements under Condition I.A.1 are effective on the first day of the second month following permit issuance and lasting through the completion and placing into service of the reuse system R-001 (See Condition VI.1). Until such time, the permittee shall continue to monitor and report in accordance with previously effective permit requirements, if any.

5. Upon placing the public access reuse system into service, the surface water discharge from the Outfall D-001 will become a backup discharge. When the backup discharge occurs, the permittee shall monitor for the parameters under Condition I.A.2.a. When the backup discharge occurs and amount of effluent discharge exceeds 0.10 MGD monthly average daily flow (MADF)®, the permittee shall monitor for the parameters under Conditions I.A.2.a and I.A.2.b. When no discharge occurs from D-001, this fact shall be reported on the discharge monitoring report (DMR) and submitted to the Department. See specific Condition number I.C.7.

   Monthly average daily flow (MADF) means total volume of effluent or reclaimed water flowing from the Outfall D-001 during a calendar month, divided by the number of days in that month and expressed in MGD)

6. Recording flow meters and totalizers shall be utilized to measure flow and calibrated at least annually. *[62-601.200(17) and .500(6)]*

7. The arithmetic mean of the monthly fecal coliform values collected during an annual period shall not exceed 200 per 100 mL of effluent sample. The geometric mean of the fecal coliform values for a minimum of 10 samples of effluent each collected on a separate day during a period of 30 consecutive days (monthly), shall not exceed 200 per 100 mL of sample. No more than 10 percent of the samples collected (the 90th percentile value) during a period of 30 consecutive days shall exceed 400 fecal coliform values per 100 mL of sample. Any one sample shall not exceed 800 fecal coliform values per 100 mL of sample. Note: To report the 90th percentile value, list the fecal coliform values obtained during the month in ascending order. Report the value of the sample that corresponds to the 90th percentile (multiply the number of samples by 0.9). For example, for 30 samples, report the corresponding fecal coliform number for the 27th value of ascending order. *[62-600.440(4)(c)]*

8. A minimum of 0.5 mg/L total residual chlorine must be maintained for a minimum contact time of 15 minutes based on peak hourly flow. *[62-600.440(4)(b)]*

Appendix F. (continued)

Bunnell WWTP – FL0020907 – July-2010

9. The average of DO level shall not be less than 6.0 mg/L in a 24-hour period and shall never be less than 5.0 mg/L. Normal daily and seasonal fluctuations above these levels shall be maintained. *[62-302.530(31)] and [62-650.400(2)]*

10. Florida water quality criteria and standards shall not be violated as a result of the discharge. *[62-620.320(9), and 62-302.500(1) and (2)]*

11. The average monthly flow is used to calculate the average pounds per month loading. Average monthly flow is calculated by dividing the total months discharge in millions of gallons by the total number of days in the month. Then the pounds per month are calculated. Yearly mass loading shall be calculated as the sum of the 12 monthly average mass loads (lbs/mo) during any consecutive 12-month period (rolling 12 month period). In the interim period (before placing the reuse system into service), the total maximum annual loads of total nitrogen (TN) and total phosphorus (TP) are 13,371 lb per year (6062 kilograms per year) and 1268 lb per year (575 kilograms per year), respectively. In the final period (after placing the reuse system into service), total maximum annual loads of total nitrogen (TN) and total phosphorus (TP) are 2740 lb per year (1242 kilograms per year) and 913 lb per year (414 kilograms per year), respectively. *[62-4.240, 62-302.300(13), 62-650.400(1)]*

12. The pH and temperature of the effluent shall be taken at the time of total ammonia sample collection. The un-ionized ammonia fraction shall be calculated based on the total ammonia, pH, and temperature.

13. The Permittee shall continue monitoring of the segment of the canal, Black Branch, Haw Creek near D-001, and effluent for maintaining data on the impact of the discharge to the water quality of the surface water body. Monitoring shall be on a quarterly basis, and sampling is only required when a discharge exceeds 0.10 MGD monthly average daily flow for one or more months of the quarter. The monitoring sites are described as follows:

Monitoring Site No.	Station Number	LOCATION
SWB-1	Station #1	200 yards above the outfall to determine background
SWD-3	Station #3	200 yards below the outfall.
SWD-4	Station #4	Below bend in canal where canal turns to run along S.R. 11
SWD-5	Station #5	Canal just before it enters Black Branch

The permittee shall coordinate the specific site locations with the DEP Northeast District Office. The parameters to be measured shall include the following:

PARAMETER	SAMPLE TYPE @ Station # 1, 3, 4, 5	REPORT MIN/MAX
Dissolved Oxygen	Grab	Minimum
pH	Grab	Maximum
Temperature	Grab	Maximum
Specific Conductivity	Grab	Maximum
CBOD5	Grab	Maximum
Total Nitrogen	Calculated	Maximum
Total Ammonia	Grab	Maximum
Organic Nitrogen	Calculated	Maximum
Nitrite+Nitrate	Grab	Maximum

Appendix F. (continued)

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PARAMETER	SAMPLE TYPE @ Station # 1, 3, 4, 5	REPORT MIN/MAX
Total Phosphorous	Grab	Maximum
Ortho-phosphorous	Grab and Filtered	Maximum
TKN	Grab	Maximum
Total Coliform (General)	Grab	Maximum
Fecal Coliform (General)	Grab	Maximum
Chlorophyll a	Grab	Maximum

Samples shall be taken at mid-depth at the specified locations. Ortho-phosphorous samples shall be filtered immediately after collection. The samples shall be taken on the same day as a nutrients effluent sampling event, as defined in Condition I.A.1. or Condition I.A.2.b. When no discharge occurs from D-001, this fact shall be reported on the discharge monitoring report (DMR) and submitted to the Department. See specific Condition number I.C.7.
[62-4.240(3)(c)]

14. The permittee shall comply with the following requirements to evaluate acute whole effluent toxicity of the discharge from outfall D-001.

    a. Effluent Limitation

        (1) Whole effluent acute toxicity shall not result in an LC50 of less than 100% effluent in any routine or additional follow-up test. [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 once every six months, and sampling is only required when a discharge exceeds 0.10 million gallons per day monthly average daily flow. When no discharge occurs during any monthly reporting period, this fact shall be reported on the toxicity page of the DMR.
        (2) Upon completion of six consecutive, valid routine tests that demonstrate compliance with the effluent limitation in 12.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 sent 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%, 75%, 50%, 25%, and 12.5% effluent.
        (2) Additional Follow-up Tests, if required:
            (a) If a routine test does not meet the acute toxicity limitation in 14.a.(1) above, the permittee shall conduct two additional tests on each species that failed the test.

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(b) The first and second additional tests shall be conducted using a control (0% effluent) and a minimum of five dilutions: 100%, 75%, 50%, 25%, and 12.5% 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 tests shall be conducted weekly thereafter until a total of two valid additional 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) Routine tests shall be conducted on four separate grab samples collected at evenly-spaced (6-hr) intervals over a 24-hr period and used in four separate tests in order to catch any peaks of toxicity and to account for daily variations in effluent quality. If the duration of the discharge is less than 24-hours, the duration of discharge shall be documented on the chain of custody.

(2) For additional follow-up tests, the first test shall be conducted on four separate grab samples collected at evenly-spaced (6-hr) intervals over a 24-hour period. Each sample shall be run as a separate test. The second additional test shall be run on a single grab sample collected on the day and time when the greatest toxicity was identified in the first additional test. Results for each additional test shall include the determination of LC50 values with 95% confidence limits.

e. Quality Assurance Requirements

(1) A standard reference toxicant (SRT) quality assurance (QA) acute toxicity test shall be conducted with each species used in the required toxicity tests either concurrently or started no more than 30 days before the date of each routine or additional follow-up test conducted. The SRT-QA data shall be included in the reports for each companion routine or additional test required.

(2) If the mortality in the control (0% effluent) exceeds 10% for either species in any test, the test for that species (including the control) shall be invalidated and the test repeated.

(3) If, during any routine separate grab sample test, 100% mortality occurs prior to the end of the test and control mortality is less than 10% at that time, that test (including the control) shall be terminated with the conclusion that the test fails and constitutes non-compliance.

(4) Additional tests shall be evaluated for acceptability based on the concentration-response relationship, as required by EPA-821-R-02-012, Section 12.2.6.2., and included with the bioassay reports.

f. Reporting Requirements

(1) Results from all required tests shall be reported on the Discharge Monitoring Report (DMR) as follows:

(a) Routine Test Results: If an LC50 >100% effluent occurs in all four separate grab

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sample tests for the test species, ">100%" should be entered on the DMR for that test species. If in any of the four separate grab sample tests for the test an LC50 <100% effluent occurs, the lowest calculated LC50 effluent concentration shall be entered on the DMR for that test species.

(b) Additional Follow-up Test Results: Report the calculated LC50 value for that test species and the 95% confidence limits.

(2) A bioassay laboratory report for the routine test shall be prepared according to EPA-821-R-02-012, Section 12, Report Preparation and Test Review, and mailed to the Department at the address below within 30 days of the completion of the test.

(3) For additional follow-up tests, a single bioassay laboratory report shall be prepared according to EPA-821-R-02-012, Section 12, and mailed within 45 days of completion of the second valid additional test. If any additional test or two consecutive routine tests do not meet the effluent limitation specified in 14.a.(1) above, the permittee shall contact the Department within 30 days of the laboratory report submittal to discuss the corrective actions necessary to remedy the observed acute toxicity.

(4) All bioassay reports shall be sent to:

Florida Department of Environmental Protection
Northeast District Office
Attn: Wastewater Section
7825 Baymeadows Way, Suite B200
Jacksonville, Florida 32256-7590

15. The Department may develop a Total Maximum Daily Load (TMDL) for the receiving water body (Black Branch of Haw Creek) during the life of the permit. Once a TMDL for this receiving water body has been established and adopted by rule, the Department shall revise this permit to incorporate the final findings of the TMDL, pursuant to Rule 62-620.325, FAC.

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B. Reuse and Land Application Systems

1. During the period beginning on the completion and placing into service the public access reuse system and lasting through the expiration date of this permit, the permittee is authorized to direct reclaimed water to Reuse System R-001. Such reclaimed water shall be limited and monitored by the permittee as specified below:

			Reclaimed Water Limitations				Monitoring Requirements			
Parameter	Units	Max/Min	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	Notes
Flow to the Reuse system R-001	MGD	Maximum	0.499	Report	-	-	Continuous	Recording flow meters and totalizers	EFA-2	See Cond.I.B. 3
BOD, Carbonaceous 5 day, 20C	mg/L	Maximum	20.0	30.0	-	60.0	Weekly	8-hour flow proportioned composite	EFA-2	
Solids, Total Suspended	mg/L	Maximum	-	-	-	5.0	Daily 5 Days/Week	Grab	EFB-1	
pH	SU	Range	-	-	-	6.0 to 8.5	Daily 5 Days/Week	Meter	EFA-2	
Coliform, Fecal, % less than detection	PERCENT	Minimum	See Permit Condition I.B.4.				Monthly	Calculated	CAL-1	
Coliform, Fecal	#/100ML	Maximum	See Permit Condition I.B.4.				Daily 5 days/week	Grab	EFA-2	
Total Residual Chlorine (For Disinfection)	mg/L	Minimum	-	-	-	1.0	Continuous	Meter	EFA-2	See Cond.I.B. 5 & 7
Turbidity	NTU	Maximum	See Permit Condition I.B.6, 7, & 8				Continuous	Meter	EFB-1	
Nitrate plus Nitrite, as N	mg/L	Maximum	-	-	-	Report	Monthly	Grab	EFA-2	
Primary Drinking water Standards	MG/L		See Permit Condition I.C.8				Annually	8-hour flow proportioned composite	EFA-2	

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Parameter	Units	Max/Min	Reclaimed Water Limitations				Monitoring Requirements			Notes
			Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	
Secondary Drinking Water Standards	MG/L	See Permit Condition I.C.8					Annually	8-hour flow proportioned composite	EFA-2	
Giardia	CYSTS/ 100 L	Maximum	See Permit Condition I.B.9				Once every five years	Filtered	EFA-2	
Cryptosporidium	OOCYSTS/ 100 L	Range	See Permit Condition I.B.9				Once every five years	Filtered	EFA-2	

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2. Reclaimed water samples shall be taken at the monitoring site locations listed in Permit Condition I. B. 1. and as described below:

Monitoring Location Site Number	Description of Monitoring Location
EFA-2	Sample point immediately after disinfection (high-level disinfection) prior to discharge to the reuse system.
EFB-1	Sample point after filtration and prior to disinfection (high-level disinfection) at the reuse facility.
CAL-1	Calculated values

3. Recording flow meters and totalizers shall be utilized to measure flow and calibrated at least annually. *[62-601.200(17) and .500(6)]*

4. Over a 30-day period, at least 75 percent of the fecal coliform values shall be below the detection limits. No sample shall exceed 25 fecal coliforms per 100 mL. No sample shall exceed 5.0 mg/L of total suspended solids (TSS) at a point before the application of the disinfectant. Note: To report the "% less than detection," count the number of fecal coliform observations that were less than detection, divide by the total number of fecal coliform observations in the month, and multiply by 100% (round to the nearest integer). *[62-600.440(5)(f)]*

5. The minimum total chlorine residual shall be limited as described in the approved operating protocol, such that the permit limitation for fecal coliform bacteria will be achieved. In no case shall the total chlorine residual be less than 1.0 mg/L. *[62-600.440(5)(b); 62-610.460(2); and 62-610.463(2)]*

6. The maximum turbidity shall be limited as described in the approved operating protocol, such that the permit limitations for total suspended solids and fecal coliforms will be achieved. *[62-610.463(2)]*

7. Instruments for continuous on-line monitoring of total residual chlorine and turbidity shall be equipped with an automated data logging or recording device. Continuous on-line monitoring instruments shall be calibrated according to the requirements of Chapter 62-160 and 601, F.A.C. Continuous on-line monitoring instrument shall be maintained according to the manufacture's operation and maintenance instructions. *[62-610.463(2) & .865(8)(d)]*

8. The treatment facilities shall be operated in accordance with the approved operating protocols. Only reclaimed water that meets the criteria established in the approved operating protocol(s) may be released to system storage or to the reuse system. Reclaimed water that fails to meet the criteria in the approved operating protocol(s) (The effluent does not meet reuse quality requirements) but meets the surface water discharge requirements specified in Condition I.A.2 shall be directed to the surface water at the Outfall D-001. The operating protocol(s) shall be reviewed and updated periodically to ensure continuous compliance with the minimum treatment and disinfection requirements. Updated operating protocols shall be submitted to the Department for review and approval at least annually, upon revision of the operating protocol(s), and with each permit application. *[62-610.320(6) and 62-610.463(2)]*

9. No later than 24 months from the date placing the reuse system R-001 into service, the permittee shall monitor for Giardia and Cryptosporidium. Intervals between sampling for Giardia and Cryptosporidium shall not exceed five years. Sampling results shall be reported on DEP Form 62-

Appendix F. (continued)

610.300(4)(a) 4 which is attached to this permit. This form shall be submitted to the Department and to DEP's Reuse Coordinator in Tallahassee. *[62-610.463(4)]*

Appendix F. (continued)

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PART I: Continued	
Receiving Waters: **Black Branch of Haw Creek**	**Classification (indicate whether fresh or marine):** **Class III Fresh water**
Toxicity Test Requirements (routine and/or additional test language, test species, salinity adjustment, etc.): **See Item 14 on page 15-17.**	
Administrative or Consent Orders (date executed, specific requirements, interim limit dates-if applicable, etc.): **N/A – old CO closed August 5, 2009**	
Facility Mixing Zone Details (if applicable): NA	
List Permit Violations (DMR data) and plant upsets that occurred at the plant within the last year: **For June 1, 2009- May 31, 2010 (from PCS)**	

Date	Parameter and Units	Limit	Result
January 2010	Nitrogen, Kjeldahl, Total (As N) mg/L	Max. 5.0 Mo. Avg. 2.5	Max. 16 Mo. Avg. 10
February 2010	Nitrogen, Kjeldahl, Total (As N) mg/L	Max. 5.0 Mo. Avg. 2.5	Max. 14 Mo. Avg. 10.3
March 2010	Nitrogen, Kjeldahl, Total (As N) mg/L	Max. 5.0 Mo. Avg. 2.5 Ann. Avg. 2.5	Max. 17 Mo. Avg. 9.5 Ann. Avg. 3.0
April 2010	Nitrogen, Kjeldahl, Total (As N) mg/L	Ann. Avg. 2.5	Ann. Avg. 3.0

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(continued)

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Describe previous FYI and WQBEL study: Summary of the Fifth Year Inspection:

A Fifth Year Inspection conducted at the facility on January 10, 2005, found that the effluent was not acutely toxic to the water flea, Ceriodaphnia dubia, or the fish, Cyprinella leedsi, in 48-hour tests. Cadmium, arsenic, selenium, silver, chromium, lead, and nickel were not detected in the effluent. Copper (3.8 µg/L), aluminum, iron, and Zinc were detected in the effluent at levels that complied with Class III predominantly fresh water standards. There was presumptive evidence of atrazine (0.66 µg/L) in the effluent-sample.

Effluent nutrients appeared to cause increases in nitrate plus nitrite, TKN, total phosphorus, and ortho-phosphate at the test site.

Parameter	Control Site (mg/L)	Effluent (mg/L)	Test Site (mg/L)
Ammonia as N	0.18	0.036	0.11
Nitrate + Nitrite as N	0.042	16.00	7.60
TKN	1.40	1.30	1.70
Total Phosphorus as P	0.12	2.50	1.10
Ortho-Phosphates - P	0.012	2.00	0.92

Algal growth potential (AGP) corresponded to the increased nutrients at the test site (368mg Dry/Wt/L) and greatly exceeded the 5 mg Dry/Wt/L "problem threshold."

Water Quality Based Effluent Limitation (WQBEL)

The facility does not have a independent WQBEL

Receiving Water Characteristic:

Waterbody Identification Number

The Black Branch (WBID 2610) and Haw Creek (WBID 2622D and 2622 B) are not in the impaired water Group 2 303(d) Lists.

A segment of the St. Johns River (WBID 2622D) which includes the Haw Creek juncture falls under the impaired water Group 2 303(d) Lists. Iron, dissolved oxygen, and nutrient (chlorophyll) are listed as impaired parameters.

Surface Water Discharge – Final Stage

α. The surface water discharge is a backup discharge for the public access reuse system.

β. The permitted capacity of the surface water discharge is still 0.30 MGD AADF, but the effluent will have higher limitations.

χ. Modeling (Streeter-Phelps Model) was performed with assumptions of worst-case scenarios (maximum amount of effluent discharge, highest water temperature in summer, low flow events (7Q10)) resulting in the recommended limits for CBOD5, nutrients, and dissolved oxygen (DO). (See Appendix F)

- The Minimum concentration of DO in the final effluent is to remain at 6.0 mg/L.
- Concentrations of both CBOD5 and TSS in the effluent are limited to 5.0 mg/L AADF.
- New and lower nutrient limitations to restrict TN and TP to maximum concentrations of 3.0 mg/L and 1.0 mg/L AADF, respectively, are expected. However, mass loading limits for the nutrients are proposed instead of concentration limits.
  - TN mass loading = (0.30 MGD)(3.0 mg/L)(8.34 lbm/MGD.mg/L) = 7.51 lb/day
    = 3.40 kg/day AADF or 1240.0 kg/yr or 2740.0 lb/yr total
  - TP mass Loading = (0.30 MGD)(1.0 mg/L)(8.34 lbm/MGD.mg/L) = 2.50 lb/day
    = 1.13 kg/day AADF or 414.0 kg/yr or 913.2lb/day total
  - TN and TP loads will be reduced significantly when the surface water discharge becomes a backup discharge.

Since the surface water discharge will become a backup discharge (Flow from the Outfall D-001 is intermittent), surface water monitorir required only when the discharge occurs.

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Describe previous or current Enforcement Actions (including WLs): SNC TKN violation WL issued (#WL-10-065-DW)
Describe any violations or problems noted in previous inspection: **No comments**
Discuss whether DMR trends within previous five years are improving or declining: **No comments**
Additional Comments (this should include a trend of the Effluent, i.e. if the facility is now Reuse): **No comments**

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PART II: Sampling Event Information	
Date(s) sample collected: 7/12/2010	**Sampler(s):** Malton Prifti & Sharon Piltz
Temperature (Deg C): 28.59 C	**pH (SU):** 7.91 SU
Dissolved Oxygen (mg/L): 8.04 mg/L	**Conductivity (umhos/cm):** 1252 umhos/cm
Total Residual Chlorine (mg/L): 3.9 mg/L	**Total Residual Chlorine - after Disinfection (mg/L):** 3.9 mg/L
Method of Chlorination: Chlorine Gas	**Method of De-chlorination:** Sulfur Dioxide (Sulfur Dioxide was not used during sampling; facility was discharging to R-001)

Flow During Sample Collection for each outfall(MGD):
The flow going through the facility on 7/12/2010 at 12:05pm was 275 GPM = .396 MGD.

The facility did not have the flow for each outfall during the sampling collection period because the flow meters were not working for the outfalls.

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):

EFD-1 Flow to surface D-001	
Month	AADF (MGD)
Jun-09	0.171
Jul-09	0.160
Aug-09	0.170
Sep-09	0.175
Oct-09	0.176
Nov-09	0.167
Dec-09	.168
Jan-10	.172
Feb-10	.181
Mar-10	.205
Apr-10	0.213
May-10	0.186
June-10	.076

EFA-2 Flow to Reuse R-001	
Month	AADF (MGD)
Jun-09	0.135
Jul-09	0.157
Aug-09	0.139
Sep-09	0.131
Oct-09	0.13
Nov-09	0.133
Dec-09	0.122
Jan-10	0.117
Feb-10	0.104
Mar-10	0.095
Apr-10	0.032
May-10	0.086
June-10	.219

Describe Discharge during Sampling Event:
☒ **Continuous** ☐ **Intermittent** ☐ **Seasonal** ☐ **Rainfall Dependent** ☐ **Other, please specify**

Describe any conditions, difficulties or abnormal events that occurred during the sample collection and any other additional comments here: The facility was discharging to R-001 on 7/12/10 at 12:05 pm during the last sampling collection period; therefore chlorine residual was 3.9 mg/L. The facility was discharging to R-001 because there was a demand for reuse.

Appendix G. EPA End Sheet

The Bioassay of Bunnell Wastewater Treatment Facility effluent sampled on July 11-12, 2010. NPDES #FL0020907.

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 2 0 9 0 7 11	12 1 0 0 7 1 2	18 B	19 S	20 1

Remarks

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The Priority Pollutants Analysis of Bunnell Wastewater Treatment Facility effluent sampled on July 12, 2010. NPDES #FL0020907.

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 2 0 9 0 7 11	12 1 0 0 7 1 2	18 X	19 S	20 1

Remarks

66

Biological Analyses of Bunnell Wastewater Treatment Facility effluent sampled on July 12, 2010. NPDES #FL0020907.

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 2 0 9 0 7 11	12 1 0 0 7 1 2	18 S	19 S	20 1

Remarks

66