

Effluent Quality Assessment

City of Tampa Howard F. Curren AWWTF

Hillsborough County

NPDES #FL0020940

Sampled March 9, 11 and 13, 2009

June 2009

Biology Section
Bureau of Laboratories
Division of Environmental Assessment and Restoration

Quality Manual No. 870346G
NELAC Certification No. E31780

City of Tampa Howard F. Curren AWWTF, 2700 Maritime Boulevard, Tampa, Hillsborough County, Florida, 33605. NPDES #FL0020940. Effluent samples for chemical, microbiology and bioassay analyses for this facility were collected on March 9, 2009. Additional samples for bioassay testing were collected on March 11 and 13, 2009.

Introduction

The City of Tampa Howard F. Curren AWWTF (advanced wastewater treatment facility) is a Type 1, two-stage, high rate (pure oxygen and fine bubble aeration) activated-sludge biological-nitrification domestic wastewater treatment plant. Effluent discharge from the facility is continuous. The facility has a design capacity of 96 million gallons per day (MGD) annual average daily flow (AADF). From March 2008 through February 2009 the AADF discharged to surface waters was 54 MGD and the AADF discharged via reuse was 1.8 MGD, 0.6 MGD and 2.58 MGD, respectively through Outfalls R-001, R-002 and R-003. The wastewater treatment system consists of:

- pre-aeration with odor control;
- mechanical screening and grit removal;
- eight (8) primary sedimentation tanks;
- six (6) pure-oxygen reactors;
- twelve (12) carbonaceous sedimentation tanks;
- four (4) nitrification reactors;
- eight (8) final sedimentation tanks;
- thirty-two (32) coarse sand, denitrification filters;
- three (3) chlorine contact chambers with post-aeration and dechlorination units;
- three (3) two-meter belt thickeners;
- three (3) floating biological solids thickeners;
- two (2) gravity sludge thickeners;
- seven (7) anaerobic digesters;
- sludge storage tanks;
- eight (8) belt filter presses;
- a sludge heat-drying facility; and,
- fifty-seven (57) sludge drying beds and other associated facilities.

Chlorine gas is used for chlorination. Sulfur dioxide is used for dechlorination. Residuals generated by this facility are heat dried to meet Class AA standards for distribution and marketing or are dewatered for land application as a Class B residual.

Effluent Disposal:

Surface Water Discharge D-001: An existing 96.0 MGD AADF permitted discharge to Hillsborough Bay (Class III marine waters) at Discharge Location (D-001) which is approximately 43 m (141 feet) in length and discharges at a depth of approximately 8.9 m (29.1 feet). The point of discharge for Outfall D-001 is located approximately at latitude 27º 54’ 41” N, longitude 82º 26’ 27” W.

Surface Water Discharge D-002: An existing intermittent discharge to Hillsborough Bay (Class III marine waters) at Discharge Location (D-002) which is approximately < 0.3 m (< 1 feet) in length and discharges at a depth of approximately 1.4 m (4.5 feet). Outfall D-002 shall only discharge as a result of flows to the treatment plant in excess of 100 MGD coupled with extreme high tide conditions. The point of discharge for Outfall D-002 is located approximately at latitude 27º 55’ 11” N, longitude 82º 26’ 31” W.

Surface Water Discharge D-003: An existing intermittent discharge to Hillsborough Bay (Class III marine waters) at Discharge Location (D-003) which is approximately < 0.3 m (< 1 feet) in length and discharges at a depth of approximately 2.1 m (6.8 feet). Outfall D-003 shall only discharge as a result of flows to the treatment plant in excess of 100 MGD coupled with extreme high tide conditions. The point of discharge for Outfall D-003 is located approximately at latitude 27º 55’ 12” N, longitude 82º 26’ 32” W.

REUSE:
Land Application R-001: An existing 50.5 MGD AADF permitted capacity slow-rate public access (R-001-City of Tampa Public Access Reuse System) consisting of the City of Tampa service area as outlined on the Potential Major Users Map generated by PBS&J, Inc. This system has the potential at ultimate build out of 50.5 MGD annual average rating, which will be spread over approximately 12,000 irrigable acres.

Land Application R-002: An existing 2.3 MGD AADF permitted capacity Part VII industrial reuse system (R-002) providing Part III quality reclaimed water for use as cooling water and minor irrigation at the City of Tampa Refuse to Energy Facility (McKay Bay Facility). R-002 is located approximately at latitude 27º 56' 56" N, longitude 82º 25' 19" W.

Land Application R-003: An existing 4.32 MGD AADF permitted capacity Part VII industrial reuse system (R-003) providing secondary treatment reclaimed water to a closed-loop system for heating purposes at C.F. Industries. R-003 is located approximately at latitude 27º 55' 02" N, longitude 82º 26' 14" W.

The facility has no Administrative Orders. The facility does have a Consent Order (FDEP OGC File № 05-0259, jointly with Environmental Protection Commission of Hillsborough County (EPC) case № 03-33366). The consent order, which addresses collection system issues, was opened in August 2005 and is still in effect. The facility has a mixing zone for pH extending 133 meters in any spatial direction of the outfall (D-001) with an effluent limitation for a minimum of pH 6.0 SU, and a dichlorobromomethane mixing zone of 12.3 m centered over the existing outfall with an effluent limitation of 35 µg/L as an annual average. A review of Discharge Monitoring Report (DMR) data for the past year (2008) did not reveal violations of permit limits. DMR data for 2007 revealed a permit violation for toxicity (06/2007 – Ceriodaphnia dubia no observed effect concentration (NOEC) 12.5% (initial test) and 6.25% (1st follow-up test); permitted value, NOEC = 100%) and a violation for Fecal Coliforms (07/2007 – result 240 colony forming units(CFU)/100 mL; limit 25 CFU/100mL). (Facility information provided by Jason Cohen and Joe Squitieri of FDEP Southwest District.)

Methods

Samples were collected from the EFD-01 NPDES sampling point (after dechlorination and prior to discharge to Hillsborough Bay) for Outfall D-001 by Pete Wenner, Jason Cohen and Chris Anastasiou (FDEP Southwest District) following DEP-SOP-001/01 FS 2400 Wastewater Sampling. All DEP SOPs are available on the web at: http://www.floridadep.org/labs/qa/sops.htm.

See Appendix A for the completed chain of custody forms.

The chronic definitive toxicity tests and algal growth potential test were performed following internal DEP SOPs TA07_05, TA07_09, 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.

Statistical Analyses of data from these tests were performed with the TOXCALC® Toxicity Data Analysis Software.

An aliquot of the AGP sample was salinity adjusted to meet the minimum salinity requirements of the marine test species. Both a freshwater and a marine AGP test were performed.

Toxicity Test Results

Tests were performed March 9 – March 17*, 2009.

Ceriodaphnia dubia chronic definitive bioassay –	No Observed Effect Concentration (NOEC) for both Reproduction and Survival = 100%
Pimephales promelas chronic definitive bioassay –	No Observed Effect Concentration (NOEC) for Survival = 100%; NOEC for Growth = 6.25%**

The bioassay samples were not chronically toxic to the *Ceriodaphnia dubia* test organisms.

*Termination criteria were met for the *Ceriodaphnia dubia* test on test day 6, March 16, 2009.

**The bioassay samples showed chronic toxic to the *Pimephales promelas* test organisms producing an NOEC for growth of 6.25% and a lowest observed effect concentration of 12.5%; however, this result was an interrupted dose response in which a significant effect was bracketed by non-significant effects. An evaluation of the data in accordance with EPA 821-B-00-004 suggests that the test result is the result of a Type 1 error. “A Type 1 error is the error of incorrectly rejecting the null hypothesis (assuming that the treatment is significantly different from the control) when in fact the null hypothesis is true (the treatment is not significantly different from the control.”

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.

***SRT chart for *P. promelas* includes data from the repeat (initiated on 3/25/09) of the *P. promelas* SRT that was concurrent with the Curren AWWTF. The SRT was repeated because the IC20 endpoint of the concurrent SRT was outside the ± 2 Standard Deviation control limits. The bench sheets for the repeated test are not included due to document size limitation.

Algal Growth Potential

The effluent AGP was 114 mg dry wt/L of the unicellular green alga, *Pseudokirchneriella subcapitata*, formerly known as *Selenastrum capricornutum*. Raschke and Schultz (1987) found that AGP values above 5.0 mg dry weight/L represent a “problem” threshold for fresh receiving waters, implying nutrient enrichment. The analytical chemistry suggests that the effluent is nitrogen-limited. The predicted AGP based on inorganic nitrogen concentrations was 47.5 (±20%) mg dry wt/L (Table 1; Miller et al. 1978).

The salinity-adjusted effluent AGP was 40.5 mg dry wt/L of the saltwater species *Dunaliella tertiolecta.* Raschke and Schultz found that AGP values above 10.0 mg dry weight/L represent a “problem” threshold for marine receiving waters, implying nutrient enrichment (personal communication, Marshall Faircloth, et. al. FDEP, with Ron Raschke USEPA Region 4 1987).

Chemistry Results

Total residual chlorine and total ammonia were not detected in the any of the three bioassay samples in the laboratory. The total ammonia concentration in the sample collected and preserved for chemical analysis was 0.049 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.

Atrazine, nickel and selenium were detected in the effluent at levels that comply with Class III marine water quality criteria (62-302.530, F.A.C.). Arsenic, iron and zinc were detected between the laboratory method detection limits (MDL) and practical quantitation limits (PQL). Copper was detected in both the effluent and the field blank.

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

Conclusion

The effluent sample collected from EFD-01 NPDES sampling point for Outfall D-001 for this facility on March 9, 11 and 13, 2009, was not chronically toxic to the *Ceriodaphnia dubia* test species during the chronic definitive bioassays. Statistical analyses detected an interrupted dose response in the *Pimephales promelas* bioassay, showing a NOEC of 6.25% and a LOEC of 12.5%. This result was thought to be a Type 1 error. The effluent AGP result and the salinity-adjusted AGP result both exceeded

the "problem" threshold for fresh and marine receiving waters. Effluent water quality samples did not exceed any applicable water quality standards or violate any permit conditions.

Literature Cited

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

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

USEPA. 2000. Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136). EPA-821-B-00-004.

Table 1a. Measured and predicted algal growth potential (AGP; mg dry weight/L) for total soluble inorganic nitrogen (TSIN), orthophosphate (OP), total nitrogen (TN) and total phosphorus (TP) limitation of the freshwater species *Pseudokirchneriella subcapitata* and ratios of nitrogen to phosphorus for samples collected from the City of Tampa Howard F. Curren AWWTF on March 9, 2009.

City of Tampa Howard F. Curren AWWTP					
Location	AGP (measured)	Predicted AGP (TSIN) ± 20%	Predicted AGP (TN) ± 20%	Inorganic N:P ratio	Total N:P ratio
Effluent Grab	114.0	47.5 ± 9.5	91.2 ± 18.2	0.5	0.8

Table 1b. Measured algal growth potential (AGP; mg dry weight/L) of the saltwater species *Dunaliella tertiolecta* and ratios of nitrogen to phosphorus for samples collected from the City of Tampa Howard F. Curren AWWTF on March 9, 2009.

City of Tampa Howard F. Curren AWWTP			
Location	AGP (measured)	Inorganic N:P ratio	Total N:P ratio
Effluent Grab*	40.5	0.5	0.8

* - sample salinity adjusted to 7ppt

Table 2. Effluent limits, Class III Criteria for predominantly marine waters and chemical and microbiological data for samples collected from the City of Tampa Howard F. Curren AWWTP on March 9, 2009.

City of Tampa Howard F. Curren AWWTP NPDES# FL0020940	Class III Criteria	Effluent Limits	Effluent Grab	Effluent Composite
Organic Constituents (µg/L)				
Atrazine	-	-	1.7	-
Dibromochloromethane	≤ 34 a	Report s	-	-
Dichlorobromomethane	≤ 22 a	Report s	-	-
Metals (µg/L unless otherwise noted)				
Aluminum	≤ 1500	-	-	60 U
Arsenic	≤ 50	-	-	0.8 I
Cadmium	≤ 8.8	-	-	0.03 U
Calcium (mg/L)	-	-	-	98.5
Chromium-III	-	-	-	0.3 U
Copper	≤ 3.7	-	-	2.69 F
Iron	≤ 300	-	-	34 I
Lead	≤ 8.5	-	-	0.2 U
Magnesium (mg/L)	-	-	-	27.6
Mercury	≤ 0.025	Report p	-	-
Nickel	≤ 8.3	≤ 8.3 s	-	2.4
Selenium	≤ 71	-	-	1.45
Silver	≤ 2.3	-	-	0.025 U
Zinc	≤ 86	-	-	14 I
Nutrients (mg/L)				
Ortho-phosphate	-	Report p	2.4	-
Total Phosphorus	-	Report p	-	3.2
Total Ammonia	-	-	-	0.049
Un-ionized Ammonia	-	-	-	< 0.02 c
Nitrate and Nitrite	-	-	-	1.2
Total Kjeldahl Nitrogen	-	-	-	1.2
Organic Nitrogen	-	-	-	1.151 c
Total Nitrogen	-	≤ 6 sp	-	2.4 c
General Physical and Chemical Parameters				
Dissolved Oxygen (mg/L)	≥ 4.0	≥ 5.0 s	9.0	-
pH (SU)	6.5 - 8.5	6.5 - 8.5 s	7.4	-
Conductivity (µmhos/cm)	-	-	1,497	-
Temperature (°C)	-	-	25.0	-
Total Residual Chlorine (mg/L)	≤ 0.01	≤ 0.01 s	< 0.01	< 0.03 UQ£
Chlorophyll *a* (µg/L) - Corrected	-	-	0.55 U	-
Phaeophytin (µg/L)	-	-	0.24 U	-
Total Suspended Solids (mg/L)	-	≤ 10 sp*	4 U	4 U
CBOD, 5 day (mg/L), N - inhibited	-	≤ 10 sp	-	1.8 I
Flow (MGD) (March 2008 - February 2009)	-	≤ 96 a	54.9 a	54.9 a
Hardness (mg $CaCO_3$)	-	-	-	359.61 c
Microbiology (Number of colony forming units/100ml)				
Fecal Coliforms	≤ 400s #	≤ 25 s	1 U	-

Value exceeds the Class III Water Quality Criteria or permit limits

a - Annual average
c - Value is calculated
p - Limit based on 24-hour flow proportioned composite sample
s - Single sample
F - Analyte was detected in both sample and field blank
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
Q - Sample held beyond normal holding time
U - Material analyzed for but not detected; value reported is the method detection limit
- If 10 or fewer samples are taken within a month, the single sample limit is 400 CFU (62-302.530(6), F.A.C.)
£ - analysis performed in bioassay laboratory
* - single grab sample limit is ≤ 5.0 mg/L after filtration and prior to disinfection

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2009-03-09-34
Howard F. Curren AWT Plant

Requester: Jennifer Paris
Field Report Prepared By:

Customer: SW-DIST
Collected By: P WENNER C ANASTASIOU J COHEN
Send Final Report To Joe Squitieri

Project ID: FYI3
Sampling Agency: FDEP SW DISTRICT

PMAS: 1143

Lab ID *	Location EFD-01  37239			☐ Comp ☑ Grab	Collection (begin) Date 3/9/09 Time 930 Eastern Central		Collection (end) Date Time Eastern Central		Bottle Group(s)** A		
	Field ID			Tot Res Chlorine (mg/L) < 0.01	Diss Oxygen (mg/L) 9.02		Storet Station Number				
	Matrix (Include type e.g. Salt, Fresh, etc) FRESH	Temp (C) 24.97	pH 7.41	Sample Depth ☐ m ☐ ft	0.75 / 1497	☑ Salinity (PPTh) ☑ Sp Conductance (umho/cm)	NPDES Number				
	Latitude o ' "	Longitude o ' "		Comments DO% 109.7							
Lab ID *	Location EFD-01  37240			☑ Comp ☐ Grab	Collection (begin) Date 3/9/09 Time 830 Eastern Central		Collection (end) Date 3/9/09 Time 830 Eastern Central		Bottle Group(s)** A		
	Field ID			Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)		Storet Station Number				
	Matrix (Include type e.g. Salt, Fresh, etc) FRESH	Temp (C)	pH	Sample Depth ☐ m ☐ ft		☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number				
	Latitude o ' "	Longitude o ' "		Comments							
Lab ID *	Location FIELD BLANK  37244			☐ Comp ☑ Grab	Collection (begin) Date 3/9/09 Time 955 Eastern Central		Collection (end) Date Time Eastern Central		Bottle Group(s)** 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)**		
	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
	3/9/09 11:00	FED Ex	Tahmoush Ghalimi	03/10/09 9:15	2 bioassay	B. Alexander	10:05	

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2009-03-09-34
Howard F. Curren AWT Plant

Requester: Jennifer Paris
Field Report Prepared By:

Customer: SW-DIST
Collected By: P WENNER J COHEN
Send Final Report To Joe Squitieri

Project ID: FYI3
Sampling Agency: FDEP SW DISTRICT

PMAS: 1143

Lab ID *	Location			☑ Comp ☐ Grab	Collection (begin) Date Time Eastern Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
	EFD-01	37242			Date 3/10/09 Time 0830	Date 3/11/09 Time 0830	A
	Field ID			Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (Include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number	
	FRESH EFFLUENT						
	Latitude o ' "	Longitude o ' "		Comments	COMPOSITE SAMPLE FOR TOX; COLLECTION TIME: 1135		

Lab ID *	Location			☐ Comp ☐ Grab	Collection (begin) Date Time Eastern Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
	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)**
	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)**
	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
			A-B	3-12-09 0915			M Faircloth	3-12-09 1018

2 BIOASSAY Trays

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Request Number: RQ-2009-03-09-34
Howard F. Curren AWT Plant

Customer: SW-DIST

Project ID: FYI3

PMAS: 1143

Event ID *

Requester: Jennifer Paris

Field Report Prepared By:

Collected By: C. ANASTASIOU

Send Final Report To Joe Squitieri

Sampling Agency: SW DIST

Lab ID *	Location: EFD-01	☑ Comp ☐ Grab	Collection (begin) Date: 3/12/09 Time: 0915 Eastern/Central	Collection (end) Date: 3/13/09 Time: 0830 Eastern/Central	Bottle Group(s)**: A		
	Field ID: 37243	Tot Res Chlorine (mg/L): —	Diss Oxygen (mg/L): —	Storet Station Number: —			
	Matrix (Include type e.g. Salt, Fresh, etc): FRESHWATER EFFLUENT	Temp (C):	pH:	Sample Depth ☐ m ☐ ft: —	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm): —	NPDES Number: —	
	Latitude o ' " : —	Longitude o ' " : —	Comments: Sample Bottles Filled @ 0915.				
Lab ID *	Location	☐ Comp ☐ Grab	Collection (begin) Date Time Eastern/Central	Collection (end) Date Time Eastern/Central	Bottle Group(s)**		
	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)**		
	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)**		
	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
	3/13/2009 1015	FEDEX	M Fairchild	3-14-09 0902				

*Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

temp 0.2°C

Appendix B. Bench Sheets

FDEP Biology Laboratory - Chronic Definitive Bench Sheet

Ceriodaphnia dubia

Facility: Howard F. Curren AWWTF
Address: 2700 Maritime Boulevard, TAMPA
County: Hillsborough 33605
NPDES Permit #: FL 0020940
Contact/District: Peter Wenner / Southwest

LIMS entry: 3-19-09 MF verified: BA 3-19-09

Diluent/ Batch: 20% DMW / 3-3-09 Test Days Used: 0-
20% DMW / 3-9-09 Test Days Used: 1-5

SOP#: TA07_05 EPA 821-R-02-013 Method 1002.0

Start Date: 3-10-09 Time: 1440
End Date: 3-16-09 Time: 1449

Organism: *Ceriodaphnia dubia*
Organism Batch #: 10-09
Organism age : <24 hours
Feeding: Prior to Test and Daily
Food: YCT *P. subcapitata*
Food Batch: 1-22-09 2-13-09
Chamber size : 30 ml
Sample volume : 20 ml

Sample Received	LAB Sample #	LIMS JOB #	LIMS SAMPLE #	Collection Date/Time	Received Date/Time
Test Day 0	1	TLH-2009-03-10-34	1171647	3-9-09 0930	3-10-09 1005
Test Day 2	2	TLH-2009-03-12-44	1172582	3-11-09 1135	3-12-09 1018
Test Day 4	3	TLH-2009-03-17-01	1173065	3-13-09 0915	3-14-09 0902

Water Quality Parameters	Field Chlorine (mg/L)			Lab Chlorine (mg/L)			Alkalinity (mg/L as $CaCO_3$)		
Lab Sample #:	1	2	3	1	2	3	1	2	3
Sample:	<0.01	Not measured	Not measured	<0.03	<0.03	<0.03	221	263	233
Diluent/Control:				<0.03	<0.03	<0.03	83	93	93
Method:	DR-100	—	—	Hach	Hach	Hach	Hach	Hach	Hach
Measured by:	Peter Wenner	—	—	JD	JD	AGR/MF	BA	BA/JS	BA/JS
Verified by:	MF	MF	MF	MF	MF	MF	MF	MF	MF
	Conductivity (circle one) (umhos-cm) (mmhos-cm)			Ammonia (mg/L)			Hardness (mg/L as $CaCO_3$)		
Lab Sample #:	1	2	3	1	2	3	1	2	3
Sample:	1593	1563	1737	<0.017	<0.017	<0.017	341	348	347
Diluent/Control:	177	176	180	<0.017	<0.017	<0.017	84	94	94
Method:	Mettler	Mettler	Mettler	Denver	Denver	Denver	Hach	Hach	Hach
Measured by:	BA	JD	MF	MF	MF	MF	BA	BA/JS	BA/JS
Verified by:	MF	MF	BA	BA	BA	BA	MF	MF	MF

Temperature Shipped ≤8° C (all samples) (yes) no
Holding Time ≤36 hours (yes) no
Light Intensity : 50 - 100 ft. candles
Photoperiod : 16 light 8 dark
Temperature Range °C:
Incubator # 2 min. 25.8 max. 26.6 mean 26.2
Room B246 min. 24.9 max. 26.1 mean 25.5

Test Replicate	Loaded from culture vial
1	A6
2	A11
3	A17
4	A18
5	A29
6	B6
7	B9
8	B10
9	B29
10	B25

BA 3/10/09 1440

Results	
Control % CV:	51.5%
Dunnetts PMSD:	41.1%
Reproduction NOEC:	100%
Reproduction LOEC:	>100%
Survival NOEC:	100%
Survival LOEC:	>100%
ICP_{20}:	93.6%
ICP_{25}:	>100%

Investigators' signatures

Marshall Faircloth
Amelia Parker
Jones Davis
REVIEWER

Comments:

Test Page 1 of 5

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Appendix B. (continued)

FDEP Biology Laboratory - Chronic Definitive Bench Sheet

Ceriodaphnia dubia Survival and Reproduction

Facility: Howard F Curren AWWTF

LIMS Sample #: 1171647 for lab sample #1

Start Date: 3-10-09 Time: 1440 @ 3%dil

End Date: 3-16-09 Time: 14:49

Organisms loaded by: JS

Day	Counted/ verified by:	Concentrations prepared by:
0	BA	MF JS
1	JS	JS
2	BA	BA
3	JS/MF	BA MF 3: 1509 weights 15.09 from SH: MF
4	MF	BA MF 3
5	MF	—
6	BA	
7		
8		

Conc.	Day	Replicate Number 1	2	3	4	5	6	7	8	9	10	Total neonates	Surviving adults	Neonates per adult
Control	0*												10	
	1	0	0	0	0	0	0	0	0	0	0	0	10	0
	2	0	0	0	0	0	0	0	1	4	5	19	10	1.9
	3	4	0	0	2	0	3	3	4	3	5	33	10	3.3
	4	12	4	4	0	5	7	4	3	4	0	45	10	4.5
	5	0	12	0	8	11	0	4	0	10	0	96	10	9.6
	6	8	14	0	13	13	11	7	0	16	11			
	7													
	8													
	Total	13	30	4	23	29	21	15	4	30	24	193	10	= 19.3

Conc.	Day	Replicate Number 1	2	3	4	5	6	7	8	9	10	Total neonates	Surviving adults	Neonates per adult
6.25%	0*												10	
	1	0	0	0	0	0	0	0	0	0	0	0	10	0
	2	0	0	0	0	0	0	0	0	0	0	0	10	0
	3	2	0	0	3	0	1	0	2	3	6	17	10	1.7
	4	8	6	4	0	7	0	6	4	0	9	44	10	4.4
	5	0	0	0	5	11	3	11	0	11	0	41	10	4.1
	6	15	11	10	7	11	16	9	12	12	12	109	10	10.9
	7													
	8													
	Total	25	17	14	15	29	14	24	18	26	27	211	10	21.1

Concentration	Mean neonates /adult	% survival
Control	19.3	100
6.25%	21.1	100
12.50%	19.1	100
25%	20.2	100
50%	24.1	100
100%	16.0	100

Test acceptability

Mean control reproduction 15/female (yes) no

3rd brood in 60% of surviving females (yes) no

Control survival ≥80%: (yes) no

*Day 0 is test initiation day

X = Dead (original organism)

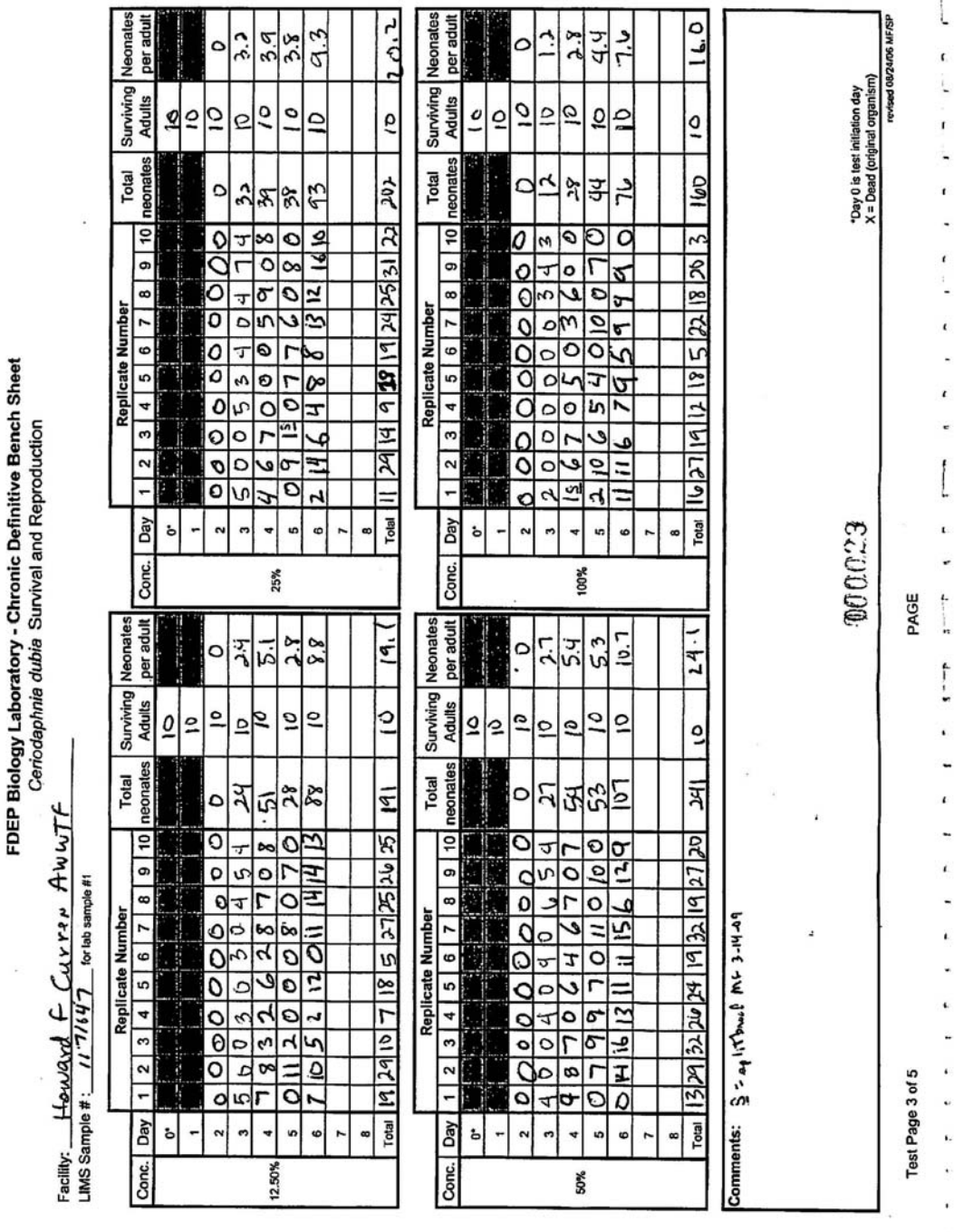
revised 08/24/05 MF/SP

Comments: Split brood MF 3-14-09 @ Result wrong end MF 3-14-09

Test Page 2 of 5

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Appendix B. (continued)



FDEP Biology Laboratory - Chronic Definitive Bench Sheet

Ceriodaphnia dubia Survival and Reproduction

Facility: Howard F Curren AWwTF

LIMS Sample #: 11-7/647 for lab sample #1

Conc.	Day	Replicate Number 1	2	3	4	5	6	7	8	9	10	Total neonates	Surviving Adults	Neonates per adult
12.50%	0*												10	
	1												10	
	2	0	0	0	0	0	0	0	0	0	0	0	10	0
	3	5	6	0	3	6	3	0	4	5	4	24	10	2.4
	4	7	8	3	2	6	2	8	7	0	8	51	10	5.1
	5	0	11	2	0	0	0	8	0	7	0	28	10	2.8
	6	7	10	5	2	12	0	11	14	14	13	88	10	8.8
	7													
	8													
	Total	19	29	10	7	18	5	37	25	26	25	191	10	19.1

Conc.	Day	Replicate Number 1	2	3	4	5	6	7	8	9	10	Total neonates	Surviving Adults	Neonates per adult
25%	0*												10	
	1												10	
	2	0	0	0	0	0	0	0	0	0	0	0	10	0
	3	5	0	0	5	3	4	0	4	7	4	32	10	3.2
	4	4	6	7	0	0	0	5	9	0	8	39	10	3.9
	5	0	9	15	0	7	7	6	0	8	0	38	10	3.8
	6	2	11	6	4	8	8	13	12	16	10	93	10	9.3
	7													
	8													
	Total	11	29	19	9	18	19	24	25	31	23	202	10	20.2

Conc.	Day	Replicate Number 1	2	3	4	5	6	7	8	9	10	Total neonates	Surviving Adults	Neonates per adult
50%	0*												10	
	1												10	
	2	0	0	0	0	0	0	0	0	0	0	0	10	0
	3	4	0	0	4	0	4	5	4	2	7	27	10	2.7
	4	9	8	7	0	2	4	6	7	0	7	54	10	5.4
	5	0	7	9	9	7	0	11	0	10	0	53	10	5.3
	6	0	14	16	13	11	11	15	6	12	9	107	10	10.7
	7													
	8													
	Total	13	29	32	26	24	19	32	19	27	20	241	10	24.1

Conc.	Day	Replicate Number 1	2	3	4	5	6	7	8	9	10	Total neonates	Surviving Adults	Neonates per adult
100%	0*												10	
	1												10	
	2	0	0	0	0	0	0	0	0	0	0	0	10	0
	3	2	0	0	0	0	0	0	3	4	3	12	10	1.2
	4	15	6	7	0	5	0	3	6	0	0	28	10	2.8
	5	2	10	6	5	4	0	10	0	7	0	44	10	4.4
	6	11	11	6	7	9	5	9	9	9	0	76	10	7.6
	7													
	8													
	Total	16	27	19	12	18	5	22	18	26	3	160	10	16.0

Comments: Sig. Diff. from AWwTF MW 3-14-09

0000123

*Day 0 is test initiation day
X = Dead (original organism)

revised 08/24/06 MF/SP

Test Page 3 of 5

PAGE

Appendix B. (continued)

FDEP Biology Laboratory - Chronic Definitive Bench Sheet

Ceriodaphnia dubia Parameters

Facility: Howard F Curren AWWTF

LIMS Sample #: 117647 for lab sample 1

Circle µmhos-cm or mmhos-cm

Test Day ↓		Concentration	New Sample: Test Replicate	pH (su)	Temp (°C)	DO (mg/L)	Conductivity (µmhos/cm) (mmhos/cm)	Old Sample: Test Replicate	pH (su)	Temp (°C)	DO (mg/L)	Conductivity (µmhos/cm) (mmhos/cm)
Day 0	sample	Control	M	7.7	24.0	6.9	177					
	1	6.25%	M	7.8	24.3	7.2	248					
	1	12.5%	M	7.8	24.3	6.8	371					
	1	25%	M	7.8	24.2	7.2	536					
	1	50%	M	7.8	24.0	7.4	893					
	1	100%	M	7.8	24.0	7.4	1592					
	Measured by:			BA	BA	BA	BA					
	Recorded by:			BA	BA	BA	BA					
Day 1	sample:	Control	M	7.9	24.0	7.2	178	M	8.0	24.0	7.6	211
	1	6.25%	M	7.9	24.0	7.1	252	M	8.1	24.0	7.6	253
	1	12.5%	M	7.9	24.0	7.2	346	M	8.2	24.0	7.6	376
	1	25%	M	7.9	24.0	7.3	527	M	8.3	24.0	7.6	548
	1	50%	M	8.0	24.0	7.3	862	M	8.4	24.0	7.5	921
	1	100%	M	7.9	24.0	7.2	1588	M	8.5	24.0	7.5	1646
	Measured by:			BA	BA	BA	BA		gs	gs	gs	gs
	Recorded by:			BA	BA	BA	BA		gs	gs	gs	gs
Day 2	sample:	Control	M	8.0	24.0	7.4	~~3~~ + 176	M	7.7	24.0	6.2	176
	2	6.25%	M	8.0	24.0	7.3	290	M	7.8	24.0	6.6	249
	2	12.5%	M	8.0	24.0	7.3	348	M	7.8	24.0	6.8	351
	2	25%	M	8.0	24.0	7.4	537	M	7.9	24.0	6.8	539
	2	50%	M	7.9	24.0	7.4	845	M	8.1	24.0	6.9	895
	2	100%	M	7.8	24.0	7.3	1532	M	8.4	24.0	7.0	1601
	Measured by:			BA	BA	BA	BA		BA	BA	BA	BA
	Recorded by:			BA	BA	BA	BA		BA	BA	BA	BA
Day 3	sample:	Control	M	8.0	24.0	7.0	173	M	8.2	25.1	7.6	186
	2	6.25%	M	8.0	24.0	7.0	286	M	8.1	25.0	7.5	293
	2	12.5%	M	8.0	24.0	7.2	355	M	8.2	24.9	7.5	362
	2	25%	M	8.0	24.1	7.2	519	M	8.2	25.0	7.5	555
	2	50%	M	7.9	24.2	7.3	860	M	8.2	24.9	7.5	880
	2	100%	M	7.8	24.7	7.3	1555	M	8.4	24.7	7.5	1560
	Measured by:			BA	BA	BA	BA		MF	MF	MF	MF
	Recorded by:			BA	BA	BA	BA		MF	MF	MF	MF

Comments: ⓐ Transcription error BA 3-12-09

Replicate M= "Metered" vial, a surrogate vial for parameters

revised 08/24/06 MF/SP

Test Page 4 of 5

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Appendix B. (continued)

FDEP Biology Laboratory - Chronic Definitive Bench Sheet

Ceriodaphnia dubia Parameters

Facility: Howard F Curren AWWTF

LIMS Sample #: 117647 for lab sample 1

Circle µmhos-cm or mmhos-cm

Test Day ↓		Concentration	New Sample: Test Replicate	pH (su)	Temp (°C)	DO	Conductivity (µmhos/cm) (mmhos/cm)	Old Sample: Test Replicate	pH (su)	Temp (°C)	DO (mg/L)	Conductivity (µmhos/cm) (mmhos/cm)
Day 4	sample:	Control	M	7.9	24.5	7.5	180	M	8.0	25.0	7.7	188
	3	6.25%	M	7.9	24.7	7.1	284	M	8.1	25.1	7.5	299
	3	12.5%	M	7.9	24.9	7.2	377	M	8.0	25.1	7.4	369
	3	25%	M	8.0	24.9	7.2	581	M	8.0	24.9	7.5	543
	3	50%	M	8.1	24.8	7.2	946	M	8.2	24.8	7.3	888
	3	100%	M	8.2	24.6	7.2	1712	M	8.4	24.8	7.4	1574
	Measured by:		[redacted]	AGR	AGR	AGR	AGR	[redacted]	MF	MF	MF	MF
	Recorded by:		[redacted]	MF	MF	MF	MF	[redacted]	MF	MF	MF	MF
Day 5	sample:	Control	M	8.1	24.7	7.7	178	M	8.1	25.1	7.6	182
	3	6.25%	M	8.0	25.0	7.7	288	M	8.1	25.0	7.6	291
	3	12.5%	M	8.0	25.0	7.8	387	M	8.1	24.9	7.6	393
	3	25%	M	8.0	24.8	7.8	585	M	8.2	24.9	7.6	601
	3	50%	M	8.0	24.7	8.1	970	M	8.2	24.8	7.7	1012
	3	100%	M	8.0	24.4	8.3	1709	M	8.4	25.0	7.7	1803
	Measured by:		[redacted]	MF	MF	MF	MF	[redacted]	MF	MF	MF	MF
	Recorded by:		[redacted]	MF	MF	MF	MF	[redacted]	MF	MF	MF	MF
Day 6	sample:	Control	M					M	7.8	24.2	6.9	175
	3	6.25%	M					M	7.9	24.0	7.0	287
	3	12.5%	M					M	8.0	24.0	7.0	393
	3	25%	M					M	8.1	24.0	7.1	619
	3	50%	M					M	8.3	24.0	7.2	1020
	3	100%	M					M	8.5	24.1	7.2	1683
	Measured by:		[redacted]					[redacted]	BA	BA	BA	BA
	Recorded by:		[redacted]					[redacted]	BA	BA	BA	BA
Day 7	sample:	Control	M	[redacted]				M				
	3	6.25%	M					M				
	3	12.5%	M					M				
	3	25%	M					M				
	3	50%	M					M				
	3	100%	M					M				
	Measured by:		[redacted]					[redacted]				
	Recorded by:		[redacted]					[redacted]				

Comments: M for old ~~test~~ sample = Rep A MF 3-15-09 for each test day measured

Replicate M= "Metered" vial, a surrogate vial for parameters

revised 08/24/06 MF/SP

Test Page 5 of 5

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FDEP Biology Laboratory - Chronic Bioassay Bench Sheet

Pimphales promelas or Menidia beryllina

Facility: Howard F Curren AWWTP
Address: 2700 Maritime Boulevard, Tampa
County: Hillsborough
NPDES Permit #: FL0020940
Contact/District: Peter Werner / Southwest

Test Species (circle one)
P. promelas SOP#: TA07_09 EPA-821-R-02-013 Method 1000.0
M. beryllina SOP#: TA07_14 EPA-821-R-02-014 Method 1006.0

Start Date: 3-10-09 Time: 1310
End Date: 3.19.09 Time: 1115

Diluent/ Batch:
MHW / 3-6-09 Test Days Used: 0-2
MHW / 3-12-09 Test Days Used: 3-6
ASW / Test Days Used:
ASW / Test Days Used:

Organism Batch # : 3-10-09 Organism age : <48 hours ~~days~~ MF 3-10-09
Feeding Prior to Test and Daily Artemia Lot # : 65438
Chamber size : 1000 ml
Test volume : 500 ml

Artemia Batch #			
Day 0	33-09	Day 3	36-09
Day 1	34-09	Day 4	37-09
Day 2	35-09	Day 5	38-09
		Day 6	39-09

LIMS:	Date	Initials
Entry:	3-19-09	MF
Verification:	3-19-09	BA

Sample Received	Lab Sample #	LIMS Job #	LIMS Sample #	Collection Date/Time	Received Date/Time
Test Day 0	1	TLH-2009-03-10-34	1171647	3-9-09 0930	3-10-09 1025
Test Day 2	2	TLH-2009-03-12-44	1172582	3-11-09 1135	3-12-09 1018
Test Day 4	3	TLH-2009-03-17-01	1173065	3-13-09 0915	3-14-09 0902

Water Quality Parameters	Batch # 3-6-09 ☑ MHW ☐ ASW	3-12-09 ☐ MHW ☐ ASW	NA Sample 1	NA Sample 2	NA Sample 3	Other:	Measured by:	Verified by:
Field Total Residual Cl_2 (mg/L):	NA	NA	<0.01	NA Forward	NA Forward		~~JD~~ ~~JS~~ MF w/ meter	MF 3-12-09
Lab Total Residual Cl_2 (mg/L):	<0.03	<0.03	<0.03	<0.03	<0.03		JD/AGR/MF	MF/JS
Alkalinity (mg/L as $CaCO_3$):	74	97	221	263	233		BA/JS/AGR	MF
Hardness (mg/L as $CaCO_3$):	88	95	341	348	347		BA/JS/AGR	MF
Total Ammonia (mg/L as N):	<0.017	<0.017	<0.017	<0.017	<0.017		MF	BA
Conductivity: (umhos) mmhos:	352	332	1593	1563	1737		BA/JH/MF	MF/JS
Salinity (ppth):	—	—	—	—	—		—	—

Temperature Shipped ≤6° C (all samples) (yes) no
Holding Time ≤36 hours (yes) no
Light Intensity : 50 - 100 ft. candles
Photoperiod : 16 light 8 dark

Temperature Range °C: (if used)
Incubator # 2 min. 25.8 max. 26.6 mean 26.2
Water bath # ____ min. ____ max. ____ mean ____
Room B246 min. 24.1 max. 26.1 mean 25.5

Test Incubated in: ☑ Incubator #: 2 ☐ Waterbath #: ____

Investigators' signatures
Jamison Daniels
Marshall Faircloth
Jonathan Parker
Jackie Klein
Bob Reeder

REVIEWER Marta Wolfe

Statistics	
Control %cv:	15.9%
Dunnetts PMSD:	15.3%
Survival NOEC:	100%
Survival LOEC:	>100%
Growth NOEC:	6.25
Growth LOEC:	12.5*
Growth IC20	>100%
Growth IC25	>100%

Comments:
* Interrupted dose response, MF 3/19/09
for growth, IC20 = >100%
IC25 = >100%

[redacted]

PAGE 00 015

revised 7/15/08 MF

Appendix B. (continued)

Chronic Bioassay Survival Benchsheet

Facility: Howard F Curren AWWTP

LIMS Sample Number: 117647
(for Lab Sample # 1)

Department of Environmental Protection
Biology Laboratory Chronic Screening Bioassay
***P. promelas* SOP TA07_09 *M. beryllina* SOP TA07_14**

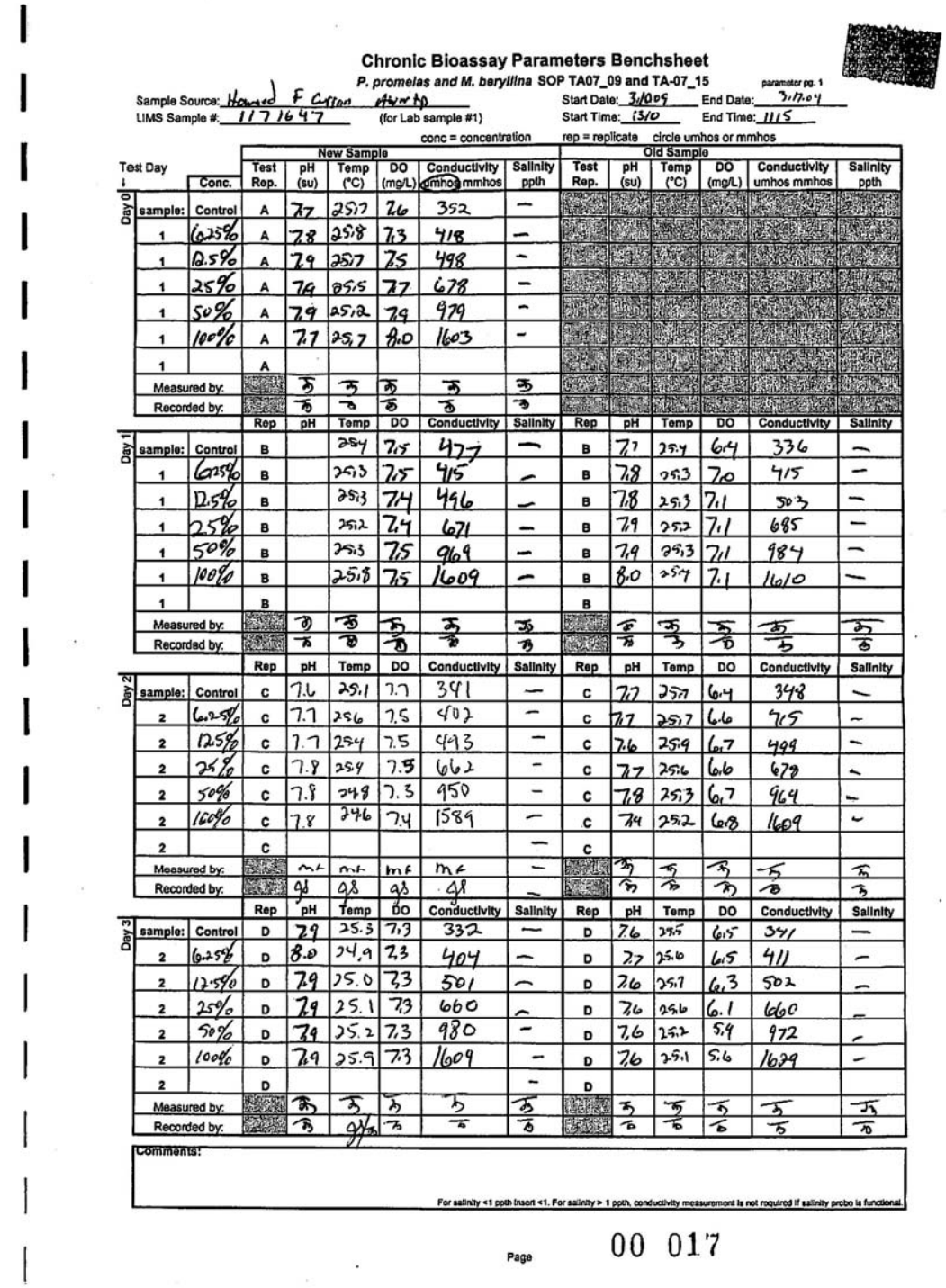
Organism: (*P. promelas*) *M.beryllina* (circle one)

Concentration	Replicate	TEST DAY 0	1	2	3	4	5	6	7
Control	A	10	10	10	9,10	9	9	9	8,10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
Sample 6.25 %	A	10	9,10	9	8,10	8	8	8	8
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
Sample 12.5 %	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
Sample 25 %	A	10	10	10	10	10	10	10	10
	B	10	9,10	9	9	9	9	9	9
	C	10	10	10	9,10	9	9	9	9
	D	10	10	10	10	10	10	10	10
Sample 50 %	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	9,10	9	9	9	9	9	9
Sample 100 %	A	10	10	10	9,10	9	9	9	9
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	9,10
	D	10	10	10	10	10	9,10	9	9
Sample %	A	10	~~10~~ (A)						
	B	10	~~10~~						
	C	10	~~10~~						
	D	10	~~10~~						
Loaded by: TD	Checked by: [redacted]		TD	TD	TD	MF	BA	TD	TD
Verified by: BA									

Comments: (A) Not needed. 3-17-09 BA

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Appendix B. (continued)



Chronic Bioassay Parameters Benchsheet

P. promelas and M. beryllina SOP TA07_09 and TA-07_15 parameter pg. 1

Sample Source: Howard F Curran Ave ND — Start Date: 3/10/09 — End Date: 3.17.09

LIMS Sample #: 117647 (for Lab sample #1) — Start Time: 1310 — End Time: 1115

conc = concentration — rep = replicate — circle umhos or mmhos

Test Day		Conc.	New Sample Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity umhos mmhos	Salinity ppth	Old Sample Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity umhos mmhos	Salinity ppth
Day 0	sample:	Control	A	7.7	25.7	7.6	352	—						
	1	6.25%	A	7.8	25.8	7.3	418	—						
	1	12.5%	A	7.9	25.7	7.5	498	—						
	1	25%	A	7.9	25.5	7.7	678	—						
	1	50%	A	7.9	25.2	7.9	979	—						
	1	100%	A	7.7	25.7	8.0	1603	—						
	1		A											
	Measured by:		JS	JS	JS	JS	JS	JS						
	Recorded by:		JS	JS	JS	JS	JS	JS						
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 1	sample:	Control	B		25.4	7.5	477	—	B	7.7	25.4	6.4	336	—
	1	6.25%	B		25.3	7.5	415	—	B	7.8	25.3	7.0	415	—
	1	12.5%	B		25.3	7.4	496	—	B	7.8	25.3	7.1	503	—
	1	25%	B		25.2	7.4	671	—	B	7.9	25.2	7.1	685	—
	1	50%	B		25.3	7.5	969	—	B	7.9	25.3	7.1	984	—
	1	100%	B		25.8	7.5	1609	—	B	8.0	25.4	7.1	1610	—
	1		B						B					
	Measured by:		JS	JS	JS	JS	JS	JS	JS	JS	JS	JS	JS	JS
	Recorded by:		JS	JS	JS	JS	JS	JS	JS	JS	JS	JS	JS	JS
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 2	sample:	Control	C	7.6	25.1	7.7	341	—	C	7.7	25.7	6.4	348	—
	2	6.25%	C	7.7	25.6	7.5	402	—	C	7.7	25.7	6.6	415	—
	2	12.5%	C	7.7	25.4	7.5	493	—	C	7.6	25.9	6.7	499	—
	2	25%	C	7.8	25.4	7.5	662	—	C	7.7	25.6	6.6	679	—
	2	50%	C	7.8	24.8	7.3	950	—	C	7.8	25.3	6.7	964	—
	2	100%	C	7.8	24.6	7.4	1589	—	C	7.9	25.2	6.8	1609	—
	2		C					—	C					
	Measured by:		mf	mf	mf	mf	mf	—	JS	JS	JS	JS	JS	JS
	Recorded by:		gs	gs	gs	gs	gs	—	JS	JS	JS	JS	JS	JS
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 3	sample:	Control	D	7.9	25.3	7.3	332	—	D	7.6	25.5	6.5	341	—
	2	6.25%	D	8.0	24.9	7.3	404	—	D	7.7	25.6	6.5	411	—
	2	12.5%	D	7.9	25.0	7.3	501	—	D	7.6	25.7	6.3	502	—
	2	25%	D	7.9	25.1	7.3	660	—	D	7.6	25.6	6.1	660	—
	2	50%	D	7.9	25.2	7.3	980	—	D	7.6	25.2	5.9	972	—
	2	100%	D	7.9	25.9	7.3	1609	—	D	7.6	25.1	5.6	1629	—
	2		D					—	D					
	Measured by:		JS	JS	JS	JS	JS	JS	JS	JS	JS	JS	JS	JS
	Recorded by:		JS	gs/JS	JS	JS	JS	JS	JS	JS	JS	JS	JS	JS

Comments:

For salinity <1 ppth insert <1. For salinity > 1 ppth, conductivity measurement is not required if salinity probe is functional.

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Appendix B. (continued)



Chronic Bioassay Parameters Benchsheet

P. promelas and M. beryllina SOP TA07_09 and TA-07_15 parameter pg. 2

Sample Source: Hawaii E Cuttyhunk — Start Date: 3/10/09 — End Date: 3/17/09

LIMS Sample #: 117647 (for Lab sample #1) — Start Time: 1310 — End Time: 1115

conc = concentration — rep = replicate

Test Day ↓		Conc.	New Sample Test Rep.	pH (su)	Temp (A)(°C)	DO (mg/L)	(B) Conductivity umhos/mmhos	Salinity ppth	Old Sample Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity umhos/mmhos	Salinity ppth
Day 4	sample:	Control	A	7.9	25.82	7.1	~~337~~ 334	—	A	7.7	25.5	6.3	337	—
	3	6.25%	A	7.9	25.73	7.2	~~415~~ 427	—	A	7.7	25.7	6.0	413	—
	3	12.5%	A	7.9	25.73	7.2	~~505~~ 515	—	A	7.7	25.4	6.1	506	—
	3	25%	A	7.9	25.83	7.1	688	—	A	7.7	25.4	6.2	668	—
	3	50%	A	8.0	25.86	7.1	1008	—	A	7.8	25.4	6.1	990	—
	3	100%	A	8.2	25.81	7.1	1685	—	A	7.9	25.5	5.9	1624	—
	3		A					—	A					—
	Measured by:			AGR	AGR	AGR	AGR	—		MF	MF	MF	MF	MF — Not necessary 3-17-09
	Recorded by:			MF	MF	MF	MF	—		MF	MF	MF	MF	—
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 5	sample:	Control	B	7.7	24.5	7.0	332	—	B	7.5	24.3	5.6	337	—
	3	6.25%	B	7.7	24.9	6.8	433	—	B	7.5	24.3	5.7	439	—
	3	12.5%	B	7.7	24.9	6.8	514	—	B	7.5	24.4	5.7	526	—
	3	25%	B	7.7	24.8	6.8	689	—	B	7.4	24.7	5.6	700	—
	3	50%	B	7.7	24.5	6.8	1054	—	B	7.5	24.6	5.5	1030	—
	3	100%	B	7.8	24.2	6.8	1720	—	B	7.9	24.4	5.5	1696	—
	3	—	B	—	—	—	—	—	B	—	—	—	—	—
	Measured by:			BA	BA	BA	BA	—		BA	BA	BA	BA	—
	Recorded by:			BA	BA	BA	BA	—		BA	BA	BA	BA	—
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 6	sample:	Control	C	7.9	24.7	7.5	335	—	C	7.5	25.4	6.6	341	—
	3	6.25%	C	7.9	24.6	7.3	418	—	C	7.5	25.6	6.1	438	—
	3	12.5%	C	7.9	24.4	7.3	524	—	C	7.5	25.6	6.2	526	—
	3	25%	C	7.9	24.5	7.1	702	—	C	7.5	25.4	6.1	709	—
	3	50%	C	7.9	24.7	7.1	1033	—	C	7.6	25.7	6.2	1095	—
	3	100%	C	8.0	25.0	7.1	1741	—	C	8.1	25.7	6.1	1754	—
	3		C					—	C					—
	Measured by:			JS	JS	JS	JS	—		JS	JS	JS	JS	—
	Recorded by:			JS by MF	JS by MF	JS by MF	JS by MF	—		JS	JS	JS	JS	—
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 7	sample:	Control							D	7.7	25.5	6.0	335	—
	3	6.25%							D	7.6	25.5	5.3	422	—
	3	12.5%							D	7.6	25.5	5.0	535	—
	3	25%							D	7.6	25.7	5.5	725	—
	3	50%							D	7.5	25.5	5.1	1041	—
	3	100%							D	7.6	25.5	5.1	1765	—
	3								D					—
	Measured by:									JS	JS	JS	JS	—
	Recorded by:									JS	JS	JS	JS	—

Comments: (A) wrote Old in New MF 3-14-09
(B) wrote old in new MF 3-14-09

For salinity <1 ppth insert <1. For salinity > 1 ppth, conductivity measurement is not required if salinity probe is functional

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Appendix B. (continued)

Chronic Definitive Bioassay Weighing Benchsheet

Facility: Hoval F Curran

LIMS Sample Number: 117647
(for Lab Sample # 1)

P. promelas and *M. beryllina* Bench Sheet
SOP TA06_21

Concentration	Replicate	Pan #	Pan wt. g (mean wt = fish wt divided by 10; convert g to mg: move decimal 3 places to right)	Pan + Fish g	Fish wt. g	Original # Fish	Mean wt. mg
Control	A	19	0.02146	0.02617	0.00471	10	0.471
	B	20	0.02166	0.02695	0.00529	10	0.529
	C	21	0.02110	0.02724	0.00614	10	0.614
	D	22	0.02273	0.02950	0.00677	10	0.677
sample 6.25%	A	23	0.02177	0.02617	0.00440	10	0.440
	B	24	0.02215	0.02684	0.00469	10	0.469
	C	25	0.02175	0.02604	0.00444	10	0.444
	D	26	0.02166	0.02755	0.00589	10	0.589
sample 12.5 %	A	27	0.02167	0.02631	0.00464	10	0.464
	B	28	0.02131	0.02594	0.00463	10	0.463
	C	29	0.02150	0.02639	0.00489	10	0.489
	D	30	0.02034	0.02483	0.00449	10	0.449
sample 25 %	A	31	0.02114	0.02598	0.00484	10	0.484
	B	32	0.02101	0.02648	0.00547	10	0.547
	C	33	0.02118	0.02688	0.00570	10	0.570
	D	34	0.02146	0.02696	0.00550	10	0.550
sample 50 %	A	35	0.02111	0.02748	0.00637	10	0.637
	B	36	0.02294	0.02858	0.00564	10	0.564
	C	37	0.02199	0.02821	0.00622	10	0.622
	D	38	0.02246	0.02817	0.00571	10	0.571 ~~0.577~~
sample 100 %	A	39	0.02228	0.02746	0.00518	10	0.518
	B	40	0.02206	0.02727	0.00521	10	0.521
	C	41	0.02224	0.02732	0.00508	10	0.508
	D	42	0.02103	0.02574	0.00471	10	0.471
sample %	A					10	
	B					10	
	C					10	
	D					10	
	Weighed by initials:		[redacted]	[redacted]			revised 7/16/08 mf

Comments:

Balance: Ohaus 250D Ser# 1125481084
S-Weights: BIO-S-Weights-01

Note: Pan number (#) refers to actual Pan number.

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Appendix B. (continued)

Chronic Bioassay Weighing Benchsheet

Quality Control

Facility: Howard F Curran

LIMS Sample Number: 117647
(for Lab Sample # 1)

P. promelas and M. beryllina **Bench sheet**
SOPs TA07_09, TA07_14 and TA06_21

Drying Oven ID:	VWR #2	Tare weighed by:	JS
Temperature °C:	95	Final weighed by:	JS
Hours:	8		

Tare Weighing Date: 3/16/09		Final Weighing Date: 3/19/09		Measured Value (g)		S-weight Value (g)
Tare Pan 1 after Pan 5 (g)	0.02375	@ 0.02375	S-weights	0.02004	@	0.02
Tare Pan 1 after Pan 10 (g)	0.02378	@ 0.02375	at tare	0.05006	@	0.05
Tare Pan 1 after Pan 15 (g)	0.02376	@ 0.02375	S-weights	0.02	@	0.02
Tare Pan 1 after Pan 20 (g)	0.02378	@ 0.02375	at final	0.05001	@	0.05
Tare Pan 1 after Pan 25 (g)	0.02378	@ 0.02375				
Tare Pan 1 after Pan 30 (g)		@	Balance: Ohaus 250D Ser# 1125481084			
Tare Pan 1 after Pan 35 (g)		@	S-Weights: BIO-S-Weights-01			
Tare Pan 1 after Pan 40 (g)		@				
Tare Pan 1 after Pan 45 (g)		@				
Tare Pan 1 after Pan 48 (g)		@				
Final Pan 1 after Pan 5 (g)	0.02615	@ 0.02617				
Final Pan 1 after Pan 10 (g)	0.02614	@ 0.02617				
Final Pan 1 after Pan 15 (g)	0.02615	@ 0.02617				
Final Pan 1 after Pan 20 (g)	0.02617	@ 0.02617				
Final Pan 1 after Pan 25 (g)	0.02616	@ 0.02617				
Final Pan 1 after Pan 30 (g)		@				
Final Pan 1 after Pan 35 (g)		@				
Final Pan 1 after Pan 40 (g)		@				
Final Pan 1 after Pan 45 (g)		@				
Final Pan 1 after Pan 48 (g)		@				

Note: Pan numbers (5, 10, etc.) for Tare and Final refers to sequence of weighing as actual Pan #s may differ.

Comments:

revised 7/16/08 MF

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Bioassay Instrument ID

Test ID: Howard Curran AWWTP Dates: March 10-17, 2009

METER / DEVICE	ID	SOP	Parameter	Method	√used
YSI Model 58 Dissolved Oxygen Meter	90H018262	TA06_04	Dissolved Oxygen	SM 4500 O G	✓
Accumet AR-10 pH Meter	93312105	TA06_23	pH	SM 4500 H+	✓
Mettler-Toledo SevenMulti Conductivity Meter	SN 1225117049 Probe H04257	TA06_25	Conductivity/Salinity	SM 2510 B 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	-	✓
Dry Oven	UWR #2				✓

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 M. Faircloth 3/19/09

V 1.1 6/12/08 MF

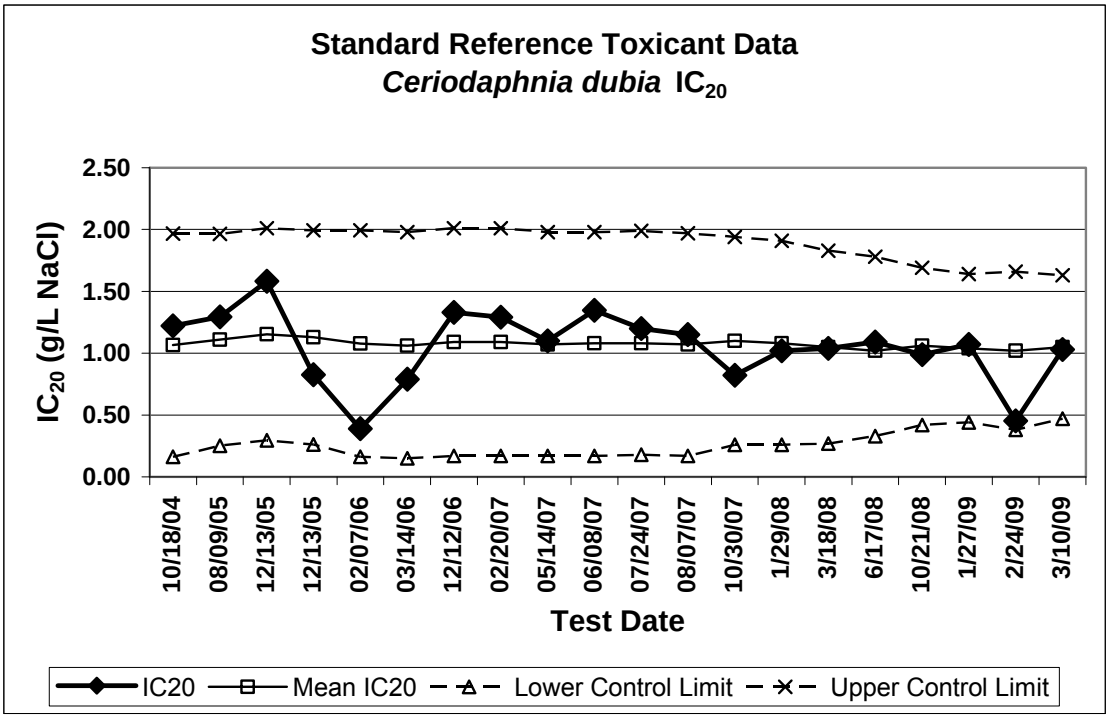
Appendix C. SRT Bench Sheets and Statistical Analysis

Florida Department of Environmental Protection
Bureau of Laboratories

Standard Reference Toxicant (SRT) Test Data - 7-Day Chronic Toxicity
Ceriodaphnia dubia (water flea) - Sodium Chloride (NaCl)

Date	IC20	Mean IC20	Std Dev	Lower Control Limit	Upper Control Limit
10/18/04	1.22	1.07	0.45	0.16	1.97
11/16/04	1.29	1.11	0.43	0.25	1.96
08/09/05	1.58	1.15	0.43	0.30	2.01
12/13/05	0.83	1.13	0.43	0.26	1.99
02/07/06	0.39	1.08	0.46	0.16	1.99
03/14/06	0.79	1.06	0.46	0.15	1.98
12/12/06	1.33	1.09	0.46	0.17	2.01
02/20/07	1.29	1.09	0.46	0.17	2.01
05/14/07	1.10	1.07	0.45	0.17	1.98
06/08/07	1.35	1.08	0.45	0.17	1.98
07/24/07	1.20	1.08	0.45	0.18	1.99
08/07/07	1.15	1.07	0.45	0.17	1.97
10/30/07	0.82	1.10	0.42	0.26	1.94
1/29/08	1.02	1.08	0.41	0.26	1.91
3/18/08	1.04	1.05	0.39	0.27	1.83
6/17/08	1.09	1.02	0.36	0.33	1.78
10/21/08	0.99	1.06	0.32	0.42	1.69
1/27/09	1.07	1.04	0.30	0.44	1.64
2/24/09	0.45	1.02	0.32	0.38	1.66
3/10/09	1.03	1.05	0.29	0.47	1.63

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



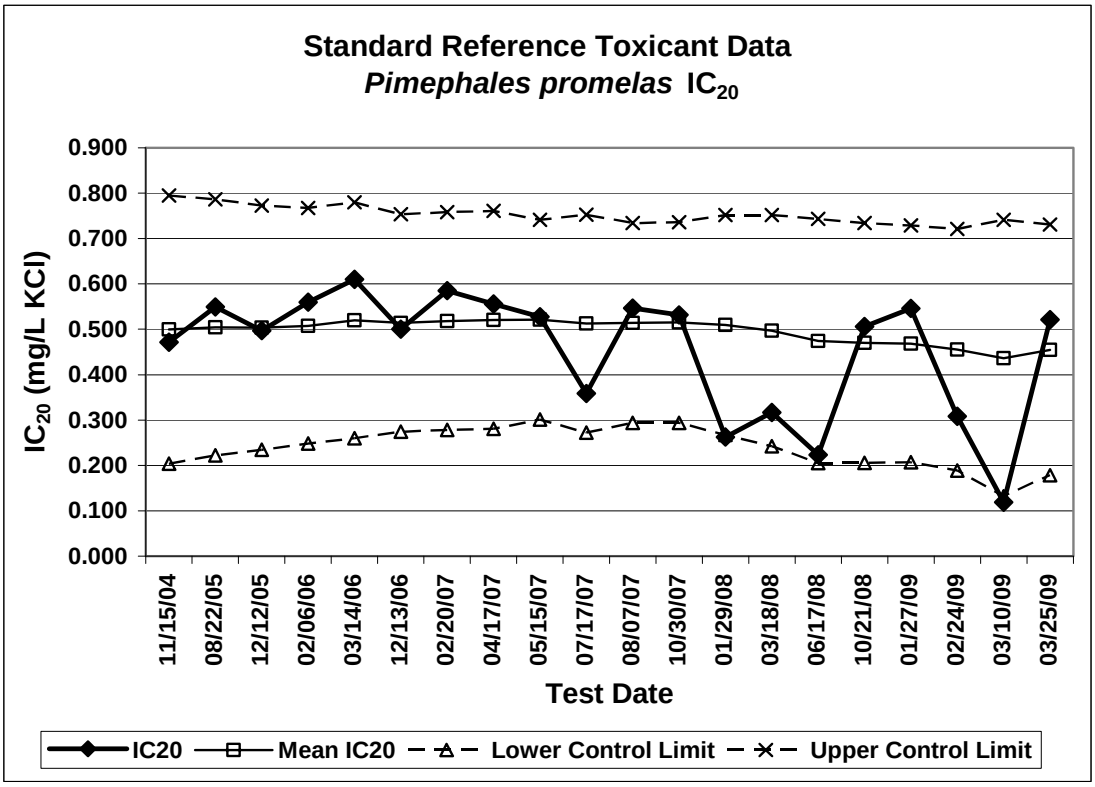
Appendix C. (continued)

Florida Department of Environmental Protection
Bureau of Laboratories

Standard Reference Toxicant (SRT) Test Data - 7-Day Chronic Toxicity
Pimephales promelas (fathead minnow) - Potassium Chloride (KCl)

Date	IC20	Mean IC20	Std Dev	Lower Control Limit	Upper Control Limit
11/15/04	0.472	0.499	0.15	0.204	0.795
08/22/05	0.549	0.504	0.14	0.222	0.786
12/12/05	0.497	0.503	0.13	0.234	0.772
02/06/06	0.559	0.508	0.13	0.248	0.767
03/14/06	0.610	0.520	0.13	0.260	0.780
12/13/06	0.501	0.514	0.12	0.274	0.754
02/20/07	0.585	0.518	0.12	0.278	0.758
04/17/07	0.556	0.521	0.12	0.281	0.761
05/15/07	0.528	0.521	0.11	0.301	0.741
07/17/07	0.358	0.513	0.12	0.273	0.753
08/07/07	0.547	0.514	0.11	0.294	0.734
10/30/07	0.531	0.515	0.11	0.294	0.736
01/29/08	0.263	0.509	0.12	0.267	0.752
03/18/08	0.317	0.497	0.13	0.242	0.752
06/17/08	0.223	0.474	0.13	0.205	0.743
10/21/08	0.506	0.470	0.13	0.206	0.734
01/27/09	0.546	0.468	0.13	0.207	0.729
02/24/09	0.308	0.455	0.13	0.189	0.721
03/10/09	0.119	0.437	0.15	0.132	0.741
03/25/09	0.521	0.455	0.14	0.178	0.731

Means are from all SRT tests, up to 20 tests..
Lower Confidence Limit = mean - 2 * Std Dev
Upper Confidence Limit = mean + 2 * Std Dev



Appendix C. (continued)

FDEP Biology Laboratory - Chronic SRT Bench Sheet

Ceriodaphnia dubia

Diluent/ Batch: 20% DMW / 3-3-09 Test Days Used: 0
20% DMW / 3-9-09 Test Days Used: 1-5
Toxicant/ Batch: NaCl / 3-9-09

SOP # : TA 07_05
EPA-821-R-02-013 Method 1002.0

Organism: *Ceriodaphnia dubia*
Organism Batch #/ Age: 10-09 / <24 hr.
Feeding: Prior to Test and Daily
Food: YCT *P. subcapitata*
Food Batch: 1-22-09 2.13-09
Chamber size: 30 mL
Test Volume: 20 mL

Start Date: 3-10-09 Time: ~~1200~~ 1310 MF corrected time 3-17-09
End Date: 3-16-09 Time: 1400

Water Quality Parameters	20% DMW	Diluent (or other) 3-3-09 / 3-9-09	Method	Measured by:	Verified by:
Lab Total Residual Cl_2 (mg/L):	<0.03	<0.03	HACH	JDS / JD	BA
Alkalinity (mg/L as $CaCO_3$):	53	93	HACH	BA / JS	MF
Hardness (mg/L as $CaCO_3$):	84	94	HACH	BA / JS	MF
Total Ammonia (mg/L as N):	<0.017	<0.017	DENVER	MF	BA
Conductivity µmhos-cm mmhos-cm :	178	177	YSI / Mettler	BA	MF

Results	
Control % CV:	27.1%
Dunnetts PMSD:	20.9%
Reproduction NOEC:	0.89 g/L
Reproduction LOEC:	1.3 g/L
Survival NOEC:	2g/L
Survival LOEC:	3g/L
ICP_{20}:	1.03 g/L
ICP_{25}:	1.09 g/L

Day	Concentrations prepared by	Counted by
0	BA/JS	MF
1	JS	BA
2	BA	BA
3	BA	MF
4	BA	MF/BA
5	BA	MF
6		
7		
8		

Test Replicate	Loaded from culture vial
1	A2
2	A3
3	A1
4	A15
5	A28
6	~~BA~~ B1 3-10-09
7	B4
8	B15
9	B14
10	B18

Comments:

Investigators' signatures

Brett Alexander
Marshall Faircloth
Abbie Sims
Amelia Yankie
Winn M. Spencer
James Daniel
Loretta C. Wolfe
REVIEWER

Light Intensity : 50 - 100 ft. candles
Photoperiod : 16 light 8 dark
Temperature Range °C:
Incubator # 2 min. 25.8 max. 26.6 mean 26.2
Incubator # ____ min. _____ max. _____ mean _____
Room B246 min. 24.9 max. 26.1 mean 25.5

Test Page 1 of 5 PAGE 000036 08/24/06 MF/SP

Appendix C. (continued)

Ceriodaphnia dubia Survival and Reproduction

Start Date: 3-10-09 Time: 13:10 Loaded by: BA
End Date: 3-16-09 Time: 1400 Verified by: MF

Concentration	Day	Replicate Number 1	2	3	4	5	6	7	8	9	10	Total neonates	Live adults	Neonates per adult
Control	0												10	
	1												10	
	2	0	0	0	0	0	0	0	0	0	0	0	10	
	3	0	0	0	0	0	0	0	0	0	5	5	10	0.5
	4	5 (B) (M)	6 (A)	5	6	4	6	5	3	1	0	41	10	4.1
	5	13	9	8	9	9	12	9	9	0	9	87	10	8.7
	6	13	14	12	17	11	13	9	14	7	14	124	10	12.4
	7													
	8													
	Total	31	29	25	32	24	31	23	26	8	28	257	10	25.7
0.59 ppth	0												10	
	1												10	
	2	0	0	0	0	0	0	0	0	0	0	0	10	0
	3	0	0	0	0	0	0	0	0	0	4	4	10	0.4
	4	6	6	4	5	7	6	5	7	2	0	48	10	4.8
	5	11	11	7	9	11	12	8	8	8	7	92	10	9.2
	6	13	13	10	17	9	11	10	14	9	10	116	10	11.6
	7													
	8				31 BA									
	Total	30	30	21	~~25~~	27	29	23	29	19	21	260	10	26.0
0.89 ppth	0												10	
	1												10	
	2	0	0	0	0	0	0	0	0	0	0	0	10	0
	3	0	0	0	0	0	0	0	0	0	4	4	10	0.4
	4	6	6	0	5	5	3	4	5	6	0	40	10	4.0
	5	10	9	5	10	9	11	9	11	8	8	90	10	9.0
	6	9	11	0	13	9	14	12	15	11	10	104	10	10.4
	7													
	8													
	Total	25	26	5	28	23	38	25	31	25	22	238	10	24.3

Comments: (A) MF wrote 0's in Day 4 rather than Day 3 MF 3/13/09

Test Page 2 of 5 PAGE 000037 08/24/06 MF/SP

Appendix C. (continued)

FDEP Biology Laboratory - Chronic SRT Bench Sheet

Ceriodaphnia dubia Survival and Reproduction

Concentration	Day	Replicate Number 1	2	3	4	5	6	7	8	9	10	Total neonates	Live adults	Neonates per adult
1.3 ppth	0												10	
	1												10	
	2	0	0	0	0	0	0	0	0	0	0	0	10	0
	3	0	0	0	0	0	0	0	0	0	0	0	10	0
	4	2	4	1	1	2	2	4	2	0	0	18	10	1.8
	5	9	10	7	6	8	6	5	6	3	7	67	10	6.7
	6	10	8	6	7	7	6	5	0	X4	9	~~60~~ 62 (B)	9	~~6.7~~ 6.2 (B)
	7													
	8													
	Total	21	22	14	14	17	14	14	8	7	16	(A) 147	9	14.5
2.0 ppth	0												10	
	1												10	
	2	0	0	0	0	X	0	0	0	0	0	0	9	0
	3	0	0	0	0	|	X0	0	0	0	0	0	8	0
	4	0	0	0	X	|	|	0	0	0	0	0	~~7~~ (A)	0
	5	0	0	0	|	|	|	0	0	0	2	2	7	0,2
	6	0	0	0	|	|	|	4	4	0	1	9	7	0,9
	7				|	|	|							
	8				|	|	|							
	Total	0	0	0	0	0	0	4	4	0	3	11	7	1,1
3.0 ppth	0												10	
	1					X		X	X				7	
	2	X	X	X	X	|	X	|	|	X	X			
	3					|		|	|					
	4					|		|	|					
	5					|		|	|					
	6					|		|	|					
	7					|		|	|					
	8					|		|	|					
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0

Comments: (A) transcription error 3-14-09 BK
(B) transcription error 3/18/09 gs

Test Page 3 of 5 PAGE 000038 08/24/06 MF/SP

Appendix C. (continued)

FDEP Biology Laboratory - Chronic SRT Bench Sheet

Ceriodaphnia dubia Parameters

Test Day ↓	Conc.	New Sample Replicate	pH (su)	Temp (°C)	DO (mg/L)	Conductivity (µmhos/cm) (mmhos/cm)	Old Sample Replicate	pH (su)	Temp (°C)	DO (mg/L)	Conductivity (µmhos/cm) (mmhos/cm)
Day 0	Control	M	7,8	24,0	7,6	0,178					
	0.59 ppth	M	7,8	24,1	7,5	1,42					
	0.89 ppth	M	7,8	24,0	7,4	1,99					
	1.3ppth	M	7,8	24,0	6,9	2,90					
	2.0 ppth	M	7,9	24,2	7,2	4,11					
	3.0 ppth	M	7,9	24,0	7,3	6,03					
	Measured by:		BA	BA	BA	BA					
	Recorded by:		BA	BA	BA	BA					
Day 1	Control	M	7,6	24,0	7,4	0,177	A	7,7	24,0	7,2	0,184
	0.59 ppth	M	7,7	24,0	7,4	1,38	A	7,8	24,1	7,2	1,47
	0.89 ppth	M	7,7	24,0	7,3	1,95	A	7,9	24,0	7,2	2,11
	1.3ppth	M	7,8	24,0	7,3	2,80	A	7,9	24,0	7,1	3,06
	2.0 ppth	M	7,8	24,0	7,3	4,04	A	7,9	24,0	7,2	4,21
	3.0 ppth	M	7,9	24,0	7,3	5,85	A	7,9	24,0	7,2	6,00
	Measured by:		BA	BA	BA	BA		BA	BA	BA	BA
	Recorded by:		BA	BA	BA	BA		BA	BA	BA	BA
Day 2	Control	M	7,9	24,0	7,5	0,170	A	7,7	24,0	7,2	0,185
	0.59 ppth	M	7,8	24,0	7,3	1,34	A	7,7	24,0	7,1	1,49
	0.89 ppth	M	7,9	24,0	7,1	1,94	A	7,7	24,0	7,1	2,14
	1.3ppth	M	7,9	24,0	7,1	2,77	A	7,8	24,0	7,1	2,92
	2.0 ppth	M	8,0	24,0	7,2	3,97	A	7,8	24,0	7,1	4,21
	3.0 ppth	M	8,0	24,0	7,2	5,75	A	7,8	24,0	7,1	6,22
	Measured by:		BA	BA	BA	BA		BA	BA	BA	BA
	Recorded by:		BA	BA	BA	BA		BA	BA	BA	BA
Day 3	Control	M	7,8	24,0	7,4	0,172	A	8,0	24,7	7,5	0,185
	0.59 ppth	M	7,8	24,0	7,2	1,35	A	8,0	24,6	7,6	1,48
	0.89 ppth	M	7,9	24,0	7,3	1,93	A	8,0	24,6	7,5	2,05
	1.3ppth	M	7,9	24,0	7,3	2,76	A	8,0	24,7	7,4	2,90
	2.0 ppth	M	7,9	24,0	7,1	3,97	A	8,0	24,8	7,4	4,12
	3.0 ppth	M	—	—	—	—	—	—	—	—	—
	Measured by:		BA	BA	BA	BA		MF	MF	MF	MF
	Recorded by:		BA	BA	BA	BA		MF	MF	MF	MF

Comments:

M= "Metered" vial, a surrogate vial for parameters

Test Page 4 of 5 PAGE 000039 08/24/06 MF/SP

Appendix C. (continued)

FDEP Biology Laboratory - Chronic SRT Bench Sheet

Ceriodaphnia dubia Parameters

Test Day ↓	Conc.	New Sample Replicate	pH (su)	Temp (°C)	DO (mg/L)	Conductivity (µmhos/cm) (mmhos/cm)	Old Sample Replicate	pH (su)	Temp (°C)	DO (mg/L)	Conductivity (µmhos/cm) (mmhos/cm)
Day 4	Control	M	7.9	24.6	7.9	0.176	A	8.1	25.0	7.6	0.188
	0.59 ppth	M	7.9	24.8	7.9	1213	A	8.2	25.2	7.5	1.39
	0.89 ppth	M	7.9	24.8	7.4	1814	A	8.2	24.8	7.5	1.99
	1.3ppth	M	7.9	25.0	7.4	2630	A	8.1	25.1	7.4	2.85
	2.0 ppth	M	8.0	25.1	7.2	3.64	A	8.1	25.2	7.4	4.11
	3.0 ppth	M									
	Measured by:		AGR	AGR	AGR	AGR		MF	MF	MF	MF
	Recorded by:		MF	MF	MF	MF		MF	MF	MF	MF
Day 5	Control	M	8.1	24.7	7.7	0.178	A	8.1	24.9	7.5	0.183
	0.59 ppth	M	8.1	24.6	7.7	1.27	A	8.2	24.8	7.6	1.33
	0.89 ppth	M	8.1	24.5	7.6	1.85	A	8.1	24.8	7.5	1.92
	1.3ppth	M	8.1	24.4	7.6	2.63	A	8.1	24.8	7.5	2.81
	2.0 ppth	M	8.1	24.5	7.6	3.64	A	8.1	24.9	7.5	3.67
	3.0 ppth	M									
	Measured by:		MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:		MF	MF	MF	MF		MF	MF	MF	MF
(A) Day 6	Control	M	7.1	24.2	7.5	197					
	0.59 ppth	M	7.2	24.1	7.4	1242					
	0.89 ppth	M	7.4	24.1	7.4	1850					
	1.3ppth	M	7.5	24.2	7.5	2648					
	2.0 ppth	M	7.6	24.4	7.6	3660					
	3.0 ppth	M									
	Measured by:		gs	gs	gs	gs					
	Recorded by:		gs	gs	gs	gs					
Day 7	Control	M									
	0.59 ppth	M									
	0.89 ppth	M									
	1.3ppth	M									
	2.0 ppth	M									
	3.0 ppth	M									
	Measured by:										
	Recorded by:										
Day 8	Control	M									
	0.59 ppth	M									
	0.89 ppth	M									
	1.3ppth	M									
	2.0 ppth	M									
	3.0 ppth	M									
	Measured by:										
	Recorded by:										

(A) Day 6 Samples recorded in Wrong Slot - Samples taken from "old" sample vials BA 3-17-09

Replicate M= "Metered" vial, a surrogate vial for parameters

Test Page 5 of 5 PAGE 000040 08/24/06 MF/SP

Appendix C. (continued)

FDEP Biology Laboratory - Chronic SRT Benchsheet

Pimephales promelas or *Menidia beryllina*

Test Species (circle one)

(*P. promelas*)	SOP#: TA07_09	EPA-821-R-02-013	Method 1000.0
M. beryllina	SOP#: TA07_14	EPA-821-R-02-014	Method 1006.0

Diluent/ Batch: 3-6-09 Test Days Used: 0-2 Start Date: 3,1009 Time: 1300

Diluent/ Batch: 3-12-09 Test Days Used: 3-6 End Date: 3/7/09 Time: 1100

Toxicant/ Batch # : 3-9-09 Organism Batch #/ Age: 3-10-09 < 48 hours

Artemia Lot # : 38438 ent 3/17/09

Artemia Batch #	Day 2 ~~3/6-09~~ 35-09 mf	Day 5 38-09
Day 0 33-09	Day 3 36-09	Day 6 39-09
Day1 34-09	Day 4 37-09	

Chamber size : 1000 ml

Test volume : 500 ml

Feeding: *P. promelas* 0.15 g wet wt. 2X day 6 hour interval

M. beryllina 0.10 g wet wt days 0-2 0.15g wet wt. days 3-7

Water Quality Parameters	Diluent	Diluent (or other)	Method	Measured by	Verified by
Total Residual Cl_2 (mg/L):	<0.03	<0.03	HACH	JD	MF
Alkalinity (mg/L as $CaCO_3$):	74	97	HACH	BA/JS	MF
Hardness (mg/L as $CaCO_3$):	88	95	HACH	BA/JS	MF
Total Ammonia (mg/L as N):	<0.017	<0.017	DENVER	MF	BA
Conductivity (umhos-cm) mmhos-cm:	352	332	METTLER	JD	MF

Statistics	
Growth NOEC:	<0.125 g/L
Growth LOEC:	0.125 g/L
Growth IC_{20}:	0.119 g/L
Growth IC_{25}:	0.287 g/L
Ctrl % CV:	15.3%
Dunnetts PMSD:	16.7%
Survival NOEC:	0.25 g/L
Survival LOEC:	0.5 g/L

Test incubated in : ☑ Incubator # 2

☐ Waterbath #_____

Light Intensity : 50 - 100 ft. candles

Photoperiod : 16 light 8 dark

Temperature Range °C:

Incubator # 2 min. 25.8 max. 26.6 mean 26.2

Water bath # ____ min.____ max.____ mean____

Room B246 min. 24.9 max. 26.1 mean 25.5

P. promelas PMSD Bounds for Growth: Lower 12 Upper 30

M. beryllina PMSD Bounds for Growth: Lower 11 Upper 28

Investigators' signatures

Marshall Faircloth

Ameka Rankin

Jacqui Sluiter

Dave Beach

Jones Daniels

Loretta C. Wolfe

REVIEWER

Comments:

Test repeated 3-25-09 due to IC_{20} falling below −2 S.D.'s. MF 4-13-09

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revised 7/16/08 MF

Appendix C. (continued)

FDEP Biology Laboratory - Chronic SRT Benchsheet

Pimephales promelas or Menidia beryllina Survival

Organism: *P. promelas* *M.beryllina* (circle one) D = dead M = missing

Concentration: µg/L (g/L) (circle one)

			TEST DAY							
Concentration	Replicate	Chamber	0	1	2	3	4	5	6	7
Control	A		10	10	10	10	10	10	10	10
	B		10	10	10	10	10	10	10	10
	C		10	10	10	10	10	10	10	10
	D		10	10	10	10	10	10	10	10
.125	A		10	10	10	10	10	10	10	10
	B		10	10	10	10	10	10	10	10
	C		10	10	10	10	10	10	10	10
	D		10	10	9 D	9	9	9	9	9
.25	A		10	10	10	10	10	10	10	10
	B		10	9 D	9	9	9	9	9	9
	C		10	10	10	10	10	10	10	10
	D		10	10	9 D	9	9	9	9	9
.5	A		10	9 D	9	9	9	9	9	9
	B		10	7 3D	7	7	7	7	7	7
	C		10	8 3D	7 D	7	7	7	7	7
	D		10	7 3D	6 D	6	6	6	6	6
1.0	A		10	2 8D	2	2	1 D	1	1	1
	B		10	0 DD	–	–	–	–	–	–
	C		10	3 7D	3	2 D	1 D	1	1	1
	D		10	1 9D	1	1	0 D	–	–	–
2.0	A		10	0 DD	–	–	–	–	–	–
	B		10	0 DD	–	–	–	–	–	–
	C		10	0 DD	–	–	–	–	–	–
	D		10	0 DD	–	–	–	–	–	–
	A		10							
	B		10							
	C		10							
	D		10							
Loaded by (0 hr): [illegible]		Checked by:		[illegible]	[illegible]	[illegible]	MF	BA	[illegible]	[illegible]
Verified by (0 hr): [illegible]										
Concentrations prepared by:				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments:

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revised 7/16/08 MF

Appendix C. (continued)

Chronic SRT Parameters Benchsheet

P. promelas and M. beryllina SOP TA07_09 and TA-07_15 parameter pg. 1

Start Date: 3.10.09 End Date: 3.17.09

Start Time: 1300 End Time: 1100

conc = concentration rep = replicate circle umhos or mmhos

Test Day		New Sample							Old Sample						
↓	Conc.	Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity umhos mmhos	Salinity ppth		Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity umhos mmhos	Salinity ppth
Day 0	Control	A	8.0	25.4	7.8	331	—							
	.125	A	8.1	25.4	7.7	557	—							
	.25	A	8.1	25.4	7.7	794	—							
	.5	A	8.1	25.8	7.7	1253	—							
	1.0	A	8.1	25.8	7.6	2160	—							
	2.0	A	8.1	25.4	7.7	3980	—							
		A												
	Measured by		JD	JD	JD	JD	JD							
	Recorded by		JD	JD	JD	JD	JD							
		Rep	pH	Temp	DO	Conductivity	Salinity		Rep	pH	Temp	DO	Conductivity	Salinity
Day 1	Control	B	7.6	25.8	7.6	330	—		B	7.7	25.5	7.3	333	—
	.125	B	7.8	25.7	7.2	545	—		B	7.9	25.5	7.1	569	—
	.25	B	7.9	25.5	7.2	802	—		B	7.8	25.6	6.9	807	—
	.5	B	8.0	25.3	7.3	1256	—		B	7.7	24.8	7.0	1247	—
	1.0	B	8.0	25.1	7.4	2160	—		B	7.7	24.5	7.2	2180	—
	2.0	B							B	7.7	24.1	7.2	3920	—
		B	ⓓ JD measured & recorded MF						B					
	Measured by		A	A	A	A	—			JD by MF	JD	JD	JD	JD
	Recorded by		A	A	A	A	—			JD by MF	JD	JD	JD	JD
		Rep	pH	Temp	DO	Conductivity	Salinity		Rep	pH	Temp	DO	Conductivity	Salinity
Day 2	Control	C	7.9	25.0	7.6	333	—		C	7.5	25.4	6.2	341	—
	.125	C	7.9	25.1	7.4	561	—		C	7.6	25.9	6.3	557	—
	.25	C	8.0	25.2	7.4	773	—		C	7.6	25.8	6.5	799	—
	.5	C	8.0	25.0	7.4	1280	—		C	7.6	25.4	6.6	1256	—
	1.0	C	8.0	24.8	7.4	2210	—		C	7.7	24.6	6.6	2150	—
	2.0	C							C					
		C							C					
	Measured by		JD by MF	JD	JD by MF	JD by MF	JD			JD	JD	JD	JD	JD
	Recorded by		gs	JD	gs	gs	JD			JD	JD	JD	JD	JD
		Rep	pH	Temp	DO	Conductivity	Salinity		Rep	pH	Temp	DO	Conductivity	Salinity
Day 3	Control	D	7.9	25.2	7.0	334	—		D	7.5	25.3	5.3	341	—
	.125	D	7.9	25.3	7.1	569	—		D	7.5	25.6	5.2	541	—
	.25	D	7.9	25.4	7.1	787	—		D	7.5	25.8	5.2	782	—
	.5	D	7.9	25.4	7.2	1252	—		D	7.5	25.8	5.4	1242	—
	1.0	D	7.9	25.5	7.2	2220	—		D	7.5	25.0	5.9	2210	—
		D							D					
		D							D					
	Measured by		JD	JD	JD	JD	JD			JD	JD	JD	JD	JD
	Recorded by		JD	gs	JD	JD	JD			JD	JD	JD	JD	JD

Comments:

For salinity <1 ppth insert <1. For salinity > 1 ppth, conductivity measurement is not required if salinity probe is functional.

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Appendix C. (continued)

Chronic SRT Parameters Benchsheet

P. promelas and M. beryllina SOP TA07_09 and TA-07_15 parameter pg. 2

Start Date: 3-10-09 End Date: 3/20/9

Start Time: 1300 End Time: 1100

conc = concentration rep = replicate

Test Day ↓	Conc.	New Sample: Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity (umhos/mmhos)	Salinity ppth	Old Sample: Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity (umhos/mmhos)	Salinity ppth
Day 4	Control	A	8.0	25.2	7.4	328		A	7.6	25.6	5.7	333	
	.125	A	7.9	25.3	7.3	570		A	7.6	25.0	5.6	568	
	.25	A	7.9	25.3	7.3	831		A	7.6	25.2	5.9	786	
	.5	A	7.9	25.2	7.2	1251		A	7.6	24.9	6.1	1250	
	1.0	A	8.0	25.2	7.2	2210		A	7.7	25.9	6.4	2220	
		A						A					
		A						A					
	Measured by		AGR	AGR	AGR	AGR	—		MF	MF	MF	MF	—
	Recorded by		MF	MF	MF	MF	—		MF	MF	MF	MF	—
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 5	Control	B	8.1	24.4	7.1	346	—	B	8.0	24.3	6.0	Ⓐ 337 339	—
	.125	B	8.0	24.2	6.9	576	—	B	7.9	24.3	5.9	Ⓐ 439 581	—
	.25	B	8.0	24.1	6.9	753	—	B	7.8	24.4	5.9	Ⓐ ~~524~~ 652	—
	.5	B	8.0	24.0	6.9	1271	—	B	7.8	24.7	5.9	Ⓐ ~~720~~ 1277	—
	1.0	BC	8.0	24.2	6.9	2270	—	BC	7.8	24.0	4.9	2250	—
		B	—	—	—	—	—	B	—	—	—	—	—
		B	—	—	—	—	—	B	—	—	—	—	—
	Measured by		BA	BA	BA	BA	—		BA	BA	BA	BA	—
	Recorded by		BA	BA	BA	BA	—		BA	BA	BA	BA	—
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 6	Control	C	8.1	24.5	7.4	327	—	C	8.0	25.3	6.8	338	—
	.125	C	8.0	24.9	7.4	597	—	C	7.9	25.1	6.5	635	—
	.25	C	8.0	25.0	7.3	809	—	C	7.9	25.2	6.6	816	—
	.5	C	8.0	25.0	7.3	1277	—	C	7.9	25.1	6.7	1292	—
	1.0	C	8.0	25.4	7.4	2220	—	C	7.9	25.8	6.7	2280	—
		C						C					
		C						C					
	Measured by		BA	BA	BA	BA			~~BA~~	~~BA~~	~~BA~~	~~BA~~	—
	Recorded by		BA	BA	BA	BA			~~BA~~	~~BA~~	~~BA~~	~~BA~~	—
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 7	Control							D	7.8	25.4	5.4	343	—
	.125							D	7.7	25.6	5.6	589	—
	.25							D	7.8	24.8	5.6	809	—
	.5							D	7.7	24.9	6.0	1292	—
	1.0							AD	7.8	25.4	6.2	2260	—
								D					
								D					
	Measured by								~~BA~~	~~BA~~	~~BA~~	~~BA~~	—
	Recorded by								~~BA~~	~~BA~~	~~BA~~	~~BA~~	—

Ⓐ wrong book BA 3-13-09

For salinity <1 ppth insert <1. For salinity > 1 ppth, conductivity measurement is not required if salinity probe is functional.

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Appendix C. (continued)

FDEP Biology Laboratory - Chronic SRT Benchsheet

Pimephales promelas or *Menidia beryllina* Weights

SOP TA06_21

Organism: *P. promelas* *M.beryllina* (circle one)

Concentration: µg/L g/L (circle one)

mean wt = fish wt divided by 10

convert g to mg: move decimal 3 places to right

Concentration	Replicate	Pan #	Pan wt. (g)	Pan + Fish (g)	Fish wt. (g)	Original # of fish	Mean wt. (mg)
Control	A	1	0.03376	0.02913	0.00537	10	0.537
	B	2	0.02172	0.02865	0.00693	10	0.693
	C	3	0.02148	0.02796	0.00598	10	0.598
	D	4	0.03278	0.02766	0.00488	10	0.488
.175	A	5	0.02270	0.02706	0.00436	10	0.436
	B	6	0.01277	0.02800	0.00523	10	0.523
	C	7	0.02221	0.02684	0.00463	10	0.463
	D	8	0.02345	0.02754	0.00409	10	0.409
.25	A	9	0.02203	0.02632	0.00429	10	0.429
	B	10	0.02236	0.02633	0.00397	10	0.397
	C	11	0.02187	0.02693	0.00506	10	0.506
	D	12	0.02174	0.02611	0.00437	10	0.437
.5	A	13	0.02201	0.02650	0.00449	10	0.449
	B	14	0.02121	0.02477	0.00356	10	0.356
	C	15	0.02281	0.02680	0.00399	10	0.399
	D	16	0.02123	0.02472	0.00349	10	0.349
1.0	A	17	0.02162	0.02241	0.00079	10	0.079
	B	—	—	—	—	10	—
	C	18	0.02139	0.02227	0.00089	10	0.089
	D	—	—	—	—	10	—
	A					10	
	B					10	
	C					10	
	D					10	
	A					10	
	B					10	
	C					10	
	D					10	
		Weighed by:	SD by ML	SD by MF			

Comments:

Note: Pan number (#) refers to actual Pan number.

Test Page 5 of 6 PAGE 26 revised 8/24/06 MF/SP

FDEP Biology Laboratory - Chronic SRT Benchsheet

Pimephales promelas or *Menidia beryllina* QC

SOPs TA07_09, TA07_14 and TA06_21

all weights in grams

Empty Pan Weights Date: 3/16/09 Weighed by: JD

	Pan 1 wt.	Pan 1 initial wt.
after Pan 5	0.02376	@ 0.02376
after Pan 10	0.02377	@ 0.02376
after Pan 15	0.02374	@ 0.02376
after Pan 20	0.02375	@ 0.02376
after Pan 25	0.02375	@ 0.02376
after Pan 30		@
after Pan 35		@
after Pan 40		@
after Pan 45		@
after Pan 48		@

	Measured Value	S-weight Value
S-weights	0.07004	@ 0.02
	0.05006	@ 0.05

Balance: Ohaus 250D Ser# 1125481084

S-Weights: BIO-S-Weights-01

Fish + Pan Weights Date: 3/19/09 Weighed by: JD

	Pan 1 wt.	Pan 1 initial wt.
after Pan 5	0.02913	@ 0.02913
after Pan 10	0.02911	@ 0.02913
after Pan 15	0.02913	@ 0.02913
after Pan 20	0.02913	@ 0.02913
after Pan 25		@
after Pan 30		@
after Pan 35		@
after Pan 40		@
after Pan 45		@
after Pan 48		@

	Measured Value	S-weight Value
S-weights	0.02	@ 0.02
	0.05001	@ 0.05

Drying Oven ID: VWR #2

Temperature °C: 95

Drying Hours: 3

Note: Pan number (5, 10, etc.) refers to sequence of weighing as actual Pan #s may differ.

Comments:

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revised 7/16/08 MF

Appendix C. (continued)

Bioassay Instrument ID

Test ID: P. promelas Chronic SRT Dates: March 10-17, 2009

METER / DEVICE	ID	SOP	Parameter	Method	√used
YSI Model 58 Dissolved Oxygen Meter	90H018262	TA06_04	Dissolved Oxygen	SM 4500 O G	✓
Accumet AR-10 pH Meter	93312105	TA06_23	pH	SM 4500 H+	✓
Mettler-Toledo SevenMulti Conductivity Meter	SN 1225117049 Probe H04257	TA06_25	Conductivity Salinity	SM 2510 B 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	-	✓
Drying Oven					✓

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 M. Faircloth March 19, 2009

V 1.1 6/12/08 MF

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Appendix C. (continued)

Start Date:	3/10/2009 13:10	Test ID:	cdsrtmar09	Sample ID:	REF-Ref Toxicant
End Date:	3/16/2009 14:00	Lab ID:	C dubia chronic srt march 2009	Sample Type:	NACL-Sodium chloride
Sample Date:		Protocol:	EPAFW02-EPA/821/R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:	SRT concurrent with Howard F. Curren AWWTF				

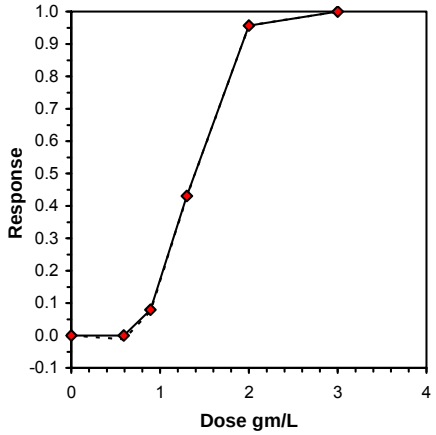
Conc-gm/L	1	2	3	4	5	6	7	8	9	10
D-Control	31.000	29.000	25.000	32.000	24.000	31.000	23.000	26.000	8.000	28.000
0.59	30.000	30.000	21.000	31.000	27.000	29.000	23.000	29.000	19.000	21.000
0.89	25.000	26.000	5.000	28.000	23.000	28.000	25.000	31.000	25.000	22.000
1.3	21.000	22.000	14.000	14.000	17.000	14.000	14.000	8.000	7.000	16.000
2	0.000	0.000	0.000	0.000	0.000	0.000	4.000	4.000	0.000	3.000
3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

			Transform: Untransformed					Isotonic	
Conc-gm/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	25.700	1.0000	25.700	8.000	32.000	27.086	10	25.850	1.0000
0.59	26.000	1.0117	26.000	19.000	31.000	17.391	10	25.850	1.0000
0.89	23.800	0.9261	23.800	5.000	31.000	29.829	10	23.800	0.9207
1.3	14.700	0.5720	14.700	7.000	22.000	32.554	10	14.700	0.5687
2	1.100	0.0428	1.100	0.000	4.000	162.905	10	1.100	0.0426
3	0.000	0.0000	0.000	0.000	0.000	0.000	10	0.000	0.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.852481	0.93	-1.76486	4.728654
Bartlett's Test indicates unequal variances (p = 4.81E-03)	14.9465	13.2767		

Linear Interpolation (200 Resamples)

Point	gm/L	SD	95% CL		Skew
IC05	0.7791	0.2372	0.2190	0.9476	-0.6560
IC10	0.9141	0.1575	0.4381	1.0052	-1.0345
IC15	0.9723	0.1097	0.7196	1.0639	-1.1575
IC20	1.0306	0.0928	0.8035	1.1270	-0.9381
IC25	1.0888	0.0838	0.8772	1.1969	-0.6195
IC40	1.2635	0.0664	1.1333	1.3926	0.2151
IC50	1.3914	0.0657	1.2420	1.5067	0.0476



Appendix C. (continued)

Larval Fish Growth and Survival Test-7 Day Biomass

Start Date:	3/10/2009 13:00	Test ID:	ppsrtmar09	Sample ID:	REF-Ref Toxicant
End Date:	3/17/2009 11:00	Lab ID:	P. promelas chronic srt march 0	Sample Type:	KCL-Potassium chloride
Sample Date:		Protocol:	EPAFW02-EPA/821/R-02-013	Test Species:	PP-Pimephales promelas
Comments:	P. promelas chronic srt concurrent with Curre AWWTF				

Conc-gm/L	1	2	3	4
D-Control	0.5370	0.6930	0.5980	0.4880
0.125	0.4360	0.5230	0.4630	0.4090
0.25	0.4290	0.3970	0.5060	0.4370
0.5	0.4490	0.3560	0.3990	0.3490
1	0.0790	0.0000	0.0890	0.0000
2	0.0000	0.0000	0.0000	0.0000

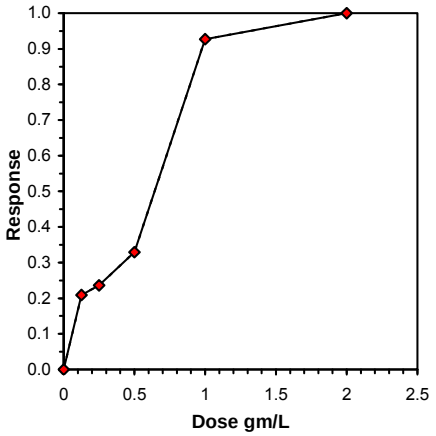
			Transform: Untransformed					Isotonic	
Conc-gm/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	0.5790	1.0000	0.5790	0.4880	0.6930	15.254	4	0.5790	1.0000
0.125	0.4578	0.7906	0.4578	0.4090	0.5230	10.654	4	0.4578	0.7906
0.25	0.4423	0.7638	0.4423	0.3970	0.5060	10.374	4	0.4423	0.7638
0.5	0.3883	0.6706	0.3883	0.3490	0.4490	11.884	4	0.3883	0.6706
1	0.0420	0.0725	0.0420	0.0000	0.0890	115.878	4	0.0420	0.0725
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4	0.0000	0.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.950815	0.868	0.477738	-0.29278
Bartlett's Test indicates equal variances (p = 0.73)	2.04189	13.2767		

Linear Interpolation (200 Resamples)

Point	gm/L	SD	95% CL(Exp)		Skew
IC05*	0.0298	0.0235	0.0127	0.1140	5.8096
IC10*	0.0597	0.0441	0.0255	0.3122	3.5793
IC15*	0.0895	0.0760	0.0382	0.4919	2.5612
IC20*	0.1194	0.1126	0.0509	0.6467	1.2529
IC25	0.2870	0.1402	0.0000	0.6650	0.3457
IC40	0.5590	0.0565	0.3416	0.6853	-0.9200
IC50	0.6426	0.0397	0.5101	0.7556	-0.1423

* indicates IC estimate less than the lowest concentration



Appendix C. (continued)

Start Date:	3/10/2009 14:40	Test ID:	Curren309	Sample ID:	FL0020940-NPDES Permit #
End Date:	3/16/2009 14:49	Lab ID:	Howard F Curren AWWTF	Sample Type:	EFF1-POTW
Sample Date:	3/9/2009	Protocol:	EPAFW02-EPA/821/R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	13.000	30.000	4.000	23.000	29.000	21.000	15.000	4.000	30.000	24.000
6.25	25.000	17.000	14.000	15.000	29.000	14.000	26.000	18.000	26.000	27.000
12.5	19.000	29.000	10.000	7.000	18.000	5.000	27.000	25.000	26.000	25.000
25	11.000	29.000	14.000	9.000	18.000	19.000	24.000	25.000	31.000	22.000
50	13.000	29.000	32.000	26.000	24.000	19.000	32.000	19.000	27.000	20.000
100	16.000	27.000	19.000	12.000	18.000	5.000	22.000	18.000	20.000	3.000

			Transform: Untransformed					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	19.300	1.0000	19.300	4.000	30.000	51.470	10			
6.25	21.100	1.0933	21.100	14.000	29.000	28.475	10	-0.518	2.287	7.944
12.5	19.100	0.9896	19.100	5.000	29.000	46.401	10	0.058	2.287	7.944
25	20.200	1.0466	20.200	9.000	31.000	36.513	10	-0.259	2.287	7.944
50	24.100	1.2487	24.100	13.000	32.000	25.983	10	-1.382	2.287	7.944
100	16.000	0.8290	16.000	3.000	27.000	46.398	10	0.950	2.287	7.944

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.01)	0.97133	1.035	-0.42605	-0.84319
Bartlett's Test indicates equal variances (p = 0.65)	3.308988	15.08627		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	7.943706	0.411591	70.70667	60.34074	0.335057	5, 54
Treatments vs D-Control										

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date:	3/10/2009 14:40	Test ID:	Curren309	Sample ID:	FL0020940-NPDES Permit #
End Date:	3/16/2009 14:49	Lab ID:	Howard F Curren AWWTF	Sample Type:	EFF1-POTW
Sample Date:	3/9/2009	Protocol:	EPAFW02-EPA/821/R-02-013	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical
D-Control	1.0000	1.0000	0	10	10	10		
6.25	1.0000	1.0000	0	10	10	10	1.0000	0.0500
12.5	1.0000	1.0000	0	10	10	10	1.0000	0.0500
25	1.0000	1.0000	0	10	10	10	1.0000	0.0500
50	1.0000	1.0000	0	10	10	10	1.0000	0.0500
100	1.0000	1.0000	0	10	10	10	1.0000	0.0500

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Fisher's Exact Test	100	>100		1
Treatments vs D-Control				

Appendix C. (continued)

Larval Fish Growth and Survival Test-7 Day Biomass

Start Date:	3/10/2009 13:10	Test ID:	curren0309	Sample ID:	FL0020940-NPDES Permit #
End Date:	3/17/2009 11:15	Lab ID:	Howard F. Curren BSY-CD-FFS	Sample Type:	EFF1-POTW
Sample Date:	3/9/2009 08:30	Protocol:	EPAFW02-EPA/821/R-02-013	Test Species:	PP-Pimephales promelas
Comments:	P. promelas chronic bioassay for Howard F Curren AWWTF March 2009				

Conc-%	1	2	3	4
D-Control	0.4710	0.5290	0.6140	0.6770
6.25	0.4400	0.4690	0.4940	0.5890
12.5	0.4640	0.4630	0.4890	0.4490
25	0.4840	0.5470	0.5700	0.5500
50	0.6370	0.5640	0.6220	0.5710
100	0.5180	0.5210	0.5080	0.4710

			Transform: Untransformed					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	0.5728	1.0000	0.5728	0.4710	0.6770	15.886	4			
6.25	0.4980	0.8695	0.4980	0.4400	0.5890	12.963	4	2.049	2.410	0.0879
*12.5	0.4663	0.8141	0.4663	0.4490	0.4890	3.569	4	2.920	2.410	0.0879
25	0.5378	0.9389	0.5378	0.4840	0.5700	6.929	4	0.959	2.410	0.0879
50	0.5985	1.0450	0.5985	0.5640	0.6370	6.087	4	-0.706	2.410	0.0879
100	0.5045	0.8808	0.5045	0.4710	0.5210	4.562	4	1.871	2.410	0.0879

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.972315	0.884	0.232076	0.836001
Bartlett's Test indicates equal variances (p = 0.09)	9.668446	15.08627		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	6.25	12.5	8.838835	16	0.087913	0.153493	0.009854	0.002661	0.017643	5, 18
Treatments vs D-Control										

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	3/10/2009 13:10	Test ID:	curren0309	Sample ID:	FL0020940-NPDES Permit #
End Date:	3/17/2009 11:15	Lab ID:	Howard F. Curren BSY-CD-FFS	Sample Type:	EFF1-POTW
Sample Date:	3/9/2009 08:30	Protocol:	EPAFW02-EPA/821/R-02-013	Test Species:	PP-Pimephales promelas
Comments:	P. promelas chronic bioassay for Howard F Curren AWWTF March 2009				

Conc-%	1	2	3	4
D-Control	0.8000	1.0000	1.0000	1.0000
6.25	0.8000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000
25	1.0000	0.9000	0.9000	1.0000
50	1.0000	1.0000	1.0000	0.9000
100	0.9000	1.0000	0.9000	0.9000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	0.9500	1.0000	1.3358	1.1071	1.4120	11.411	4		
6.25	0.9500	1.0000	1.3358	1.1071	1.4120	11.411	4	18.00	10.00
12.5	1.0000	1.0526	1.4120	1.4120	1.4120	0.000	4	20.00	10.00
25	0.9500	1.0000	1.3305	1.2490	1.4120	7.072	4	17.00	10.00
50	0.9750	1.0263	1.3713	1.2490	1.4120	5.942	4	18.50	10.00
100	0.9250	0.9737	1.2898	1.2490	1.4120	6.318	4	15.50	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.864244	0.884	-1.19078	1.013309
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1
Treatments vs D-Control				

Appendix D. Test Organism Receipt

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Organism Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Date: 3/9/09

Shipped to: FDEP

P.O. No: _____

Species	Quantity	Age	Brood Number	Temp.	pH	Salinity
Mysidopsis bahia						
Menidia beryllina						
						Hardness
Cyprinella leedsi						
Pimephales promelas	500	< 24 Hrs	FM090308-1605	25°C	7.9	80 mg/L

Packed by: _____

Shipped Via: FedEx

Notes: _____

Thank you for your order.

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

Appendix E. Chemical Analyses performed on the effluent from the City of Tampa Howard F. Curren AWWTF Facility Outfall D-001, sampled on March 9, 2009.

Date Sampled	Field ID	Analysis	Component	Results	Remark	Units	MDL	PQL
3/9/2009 9:30	Effluent Grab	AGP/LN	Algal Growth Potential	114		mg DryWt/L	0.3	0.9
3/9/2009 9:30	Effluent Grab	AGP/LN	Algal Growth Potential-Salinity Adjusted	40.5		mg DryWt/L	3	3
3/9/2009 9:30	Effluent Grab	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	0.55	U	ug/L	0.55	1.7
3/9/2009 9:30	Effluent Grab	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.24	U	ug/L	0.24	0.71
3/9/2009 9:30	Effluent Grab	Overflow	Fecal Coliforms-Membrane Filter	1	U	#/100 mL	1	
3/9/2009 9:30	Effluent Grab	Nutrients	TSS	4	U	mg/L	4	16
3/9/2009 9:30	Effluent Grab	Nutrients	O-Phosphate-P	2.4		mg P/L	0.16	0.4
3/9/2009 9:30	Effluent Grab	Pesticides	Heptachlor	0.01	U	ug/L	0.01	0.04
3/9/2009 9:30	Effluent Grab	Pesticides	Alachlor	0.6	UJ	ug/L	0.6	2.4
3/9/2009 9:30	Effluent Grab	Pesticides	Azinphos Methyl	0.2	UJ	ug/L	0.2	0.8
3/9/2009 9:30	Effluent Grab	Pesticides	Bromacil	0.2	U	ug/L	0.2	0.8
3/9/2009 9:30	Effluent Grab	Pesticides	Butylate	0.2	UJ	ug/L	0.2	0.8
3/9/2009 9:30	Effluent Grab	Pesticides	Chlorpyrifos Ethyl	0.05	U	ug/L	0.05	0.2
3/9/2009 9:30	Effluent Grab	Pesticides	Diazinon	0.05	U	ug/L	0.05	0.2
3/9/2009 9:30	Effluent Grab	Pesticides	Aldrin	0.01	U	ug/L	0.01	0.04
3/9/2009 9:30	Effluent Grab	Pesticides	Alpha-BHC	0.01	U	ug/L	0.01	0.04
3/9/2009 9:30	Effluent Grab	Pesticides	Ametryn	0.05	U	ug/L	0.05	0.2
3/9/2009 9:30	Effluent Grab	Pesticides	Ethion	0.05	U	ug/L	0.05	0.2
3/9/2009 9:30	Effluent Grab	Pesticides	Metribuzin	0.1	U	ug/L	0.1	0.4
3/9/2009 9:30	Effluent Grab	Pesticides	Simazine	0.05	U	ug/L	0.05	0.2
3/9/2009 9:30	Effluent Grab	Pesticides	DDT-p,p'	0.03	U	ug/L	0.03	0.12
3/9/2009 9:30	Effluent Grab	Pesticides	Delta-BHC	0.01	U	ug/L	0.01	0.04
3/9/2009 9:30	Effluent Grab	Pesticides	Dieldrin	0.02	U	ug/L	0.02	0.08
3/9/2009 9:30	Effluent Grab	Pesticides	Endrin	0.05	U	ug/L	0.05	0.2
3/9/2009 9:30	Effluent Grab	Pesticides	Atrazine	1.7		ug/L	0.05	0.2
3/9/2009 9:30	Effluent Grab	Pesticides	Prometryn	0.15	U	ug/L	0.15	0.6
3/9/2009 9:30	Effluent Grab	Pesticides	Ethoprop	0.1	U	ug/L	0.1	0.4
3/9/2009 9:30	Effluent Grab	Pesticides	Hexazinone	0.1	U	ug/L	0.1	0.4
3/9/2009 9:30	Effluent Grab	Pesticides	Malathion	0.15	U	ug/L	0.15	0.6
3/9/2009 9:30	Effluent Grab	Pesticides	Endrin Aldehyde	0.02	U	ug/L	0.02	0.08
3/9/2009 9:30	Effluent Grab	Pesticides	Chlorpyrifos Methyl	0.1	U	ug/L	0.1	0.4
3/9/2009 9:30	Effluent Grab	Pesticides	Metalaxyl	0.25	U	ug/L	0.25	1
3/9/2009 9:30	Effluent Grab	Pesticides	Naled	0.8	U	ug/L	0.8	3.2

Appendix E. (continued)

Date Sampled	Field ID	Analysis	Component	Results	Remark	Units	MDL	PQL
3/9/2009 9:30	Effluent Grab	Pesticides	Parathion Ethyl	0.15	U	ug/L	0.15	0.6
3/9/2009 9:30	Effluent Grab	Pesticides	Parathion Methyl	0.1	U	ug/L	0.1	0.4
3/9/2009 9:30	Effluent Grab	Pesticides	Beta-BHC	0.012	U	ug/L	0.012	0.048
3/9/2009 9:30	Effluent Grab	Pesticides	Chlordane	0.2	U	ug/L	0.2	0.8
3/9/2009 9:30	Effluent Grab	Pesticides	Endosulfan I	0.02	U	ug/L	0.02	0.08
3/9/2009 9:30	Effluent Grab	Pesticides	Endosulfan Sulfate	0.02	U	ug/L	0.02	0.08
3/9/2009 9:30	Effluent Grab	Pesticides	Methoxychlor	0.05	UJ	ug/L	0.05	0.2
3/9/2009 9:30	Effluent Grab	Pesticides	Fenamiphos	0.2	U	ug/L	0.2	0.8
3/9/2009 9:30	Effluent Grab	Pesticides	Phorate	0.05	U	ug/L	0.05	0.2
3/9/2009 9:30	Effluent Grab	Pesticides	DDD-p,p'	0.02	U	ug/L	0.02	0.08
3/9/2009 9:30	Effluent Grab	Pesticides	Endosulfan II	0.02	U	ug/L	0.02	0.08
3/9/2009 9:30	Effluent Grab	Pesticides	DDE-p,p'	0.02	U	ug/L	0.02	0.08
3/9/2009 9:30	Effluent Grab	Pesticides	Norflurazon	0.15	U	ug/L	0.15	0.6
3/9/2009 9:30	Effluent Grab	Pesticides	Fonofos	0.1	U	ug/L	0.1	0.4
3/9/2009 9:30	Effluent Grab	Pesticides	Heptachlor Epoxide	0.02	U	ug/L	0.02	0.08
3/9/2009 9:30	Effluent Grab	Pesticides	Gamma-BHC	0.01	U	ug/L	0.01	0.04
3/9/2009 9:30	Effluent Grab	Pesticides	Mevinphos	0.2	U	ug/L	0.2	0.8
3/9/2009 9:30	Effluent Grab	Pesticides	Toxaphene	0.75	U	ug/L	0.75	3
3/9/2009 9:30	Effluent Grab	Pesticides	Metolachlor	0.5	UJ	ug/L	0.5	2
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	2.9	U	ug/L	2.9	12
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	3,3'-Dichlorobenzidine	39	UJ	ug/L	39	150
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Pyrene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	2,4-Dimethylphenol	9.7	U	ug/L	9.7	39
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Anthracene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Benzo(b)fluoranthene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Dimethyl phthalate	9.7	UJ	ug/L	9.7	39
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	2,4-Dinitrotoluene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	2-Nitrophenol	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Acenaphthylene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Benzo(k)fluoranthene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Chrysene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Di-n-octyl phthalate	0.97	U	ug/L	0.97	3.9

Appendix E. (continued)

Date Sampled	Field ID	Analysis	Component	Results	Remark	Units	MDL	PQL
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Hexachlorobenzene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Hexachlorocyclopentadiene	2.9	U	ug/L	2.9	12
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	1.9	U	ug/L	1.9	7.7
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	2.9	U	ug/L	2.9	12
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Naphthalene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Phenanthrene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	2,4-Dichlorophenol	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	2-Chloronaphthalene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	1.9	U	ug/L	1.9	7.7
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	4-Nitrophenol	14	U	ug/L	14	58
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Benzidine	97	U	ug/L	97	390
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Benzo(a)anthracene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	2.9	U	ug/L	2.9	12
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	14	U	ug/L	14	58
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Isophorone	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Diethyl phthalate	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	N-Nitrosodimethylamine	1.9	U	ug/L	1.9	7.7
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Benzo(a)pyrene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Butyl benzyl phthalate	4.8	U	ug/L	4.8	19
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Fluorene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Hexachloroethane	2.9	U	ug/L	2.9	12
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Nitrobenzene	1.9	U	ug/L	1.9	7.7
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Pentachlorophenol	2.9	U	ug/L	2.9	12
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Phenol	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	2,4-Dinitrophenol	14	U	ug/L	14	58
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	2-Chlorophenol	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Fluoranthene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	2,6-Dinitrotoluene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.97	U	ug/L	0.97	3.9

Appendix E. (continued)

Date Sampled	Field ID	Analysis	Component	Results	Remark	Units	MDL	PQL
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Acenaphthene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.97	U	ug/L	0.97	3.9
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Di-n-butyl phthalate	4.8	U	ug/L	4.8	19
3/9/2009 9:30	Effluent Grab	Priority Organic Pollutants	Hexachlorobutadiene	2.9	U	ug/L	2.9	12
3/9/2009 9:30	Effluent Grab	Field Parameter	Specific Conductance	1497		umhos/cm		
3/9/2009 9:30	Effluent Grab	Field Parameter	pH	7.41				
3/9/2009 9:30	Effluent Grab	Field Parameter	Temperature	24.97		C		
3/9/2009 9:30	Effluent Grab	Field Parameter	Dissolved Oxygen	9.02		mg/L		
3/9/2009 8:30	Effluent Composite	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	1.8	I	mg/L	0.2	2
3/9/2009 8:30	Effluent Composite	Toxicology	Bioassay-Chron-Def-FW-C.dubia, IC20	93.6		IC20		
3/9/2009 8:30	Effluent Composite	Toxicology	Bioassay-Chron-Def-FW-C.dubia, NOEC	100		NOEC		
3/9/2009 8:30	Effluent Composite	Toxicology	Bioassay-Chron-Def-FW-Fish, NOEC	6.25		NOEC		
3/9/2009 8:30	Effluent Composite	Toxicology	Bioassay-Chron-Def-FW-Fish, IC20	100	L	IC20		
3/9/2009 8:30	Effluent Composite	Metals	Silver	0.025	U	ug/L	0.025	0.1
3/9/2009 8:30	Effluent Composite	Metals	Lead	0.2	U	ug/L	0.2	0.8
3/9/2009 8:30	Effluent Composite	Metals	Zinc	14	I	ug/L	5	20
3/9/2009 8:30	Effluent Composite	Metals	Magnesium	27.6		mg/L	0.04	0.16
3/9/2009 8:30	Effluent Composite	Metals	Aluminum	60	U	ug/L	60	240
3/9/2009 8:30	Effluent Composite	Metals	Chromium	0.3	U	ug/L	0.3	1.2
3/9/2009 8:30	Effluent Composite	Metals	Cadmium	0.03	U	ug/L	0.03	0.12
3/9/2009 8:30	Effluent Composite	Metals	Antimony	0.57	I	ug/L	0.25	1
3/9/2009 8:30	Effluent Composite	Metals	Calcium	98.5		mg/L	0.075	0.3
3/9/2009 8:30	Effluent Composite	Metals	Beryllium	0.025	U	ug/L	0.025	0.1
3/9/2009 8:30	Effluent Composite	Metals	Arsenic	0.8	I	ug/L	0.25	1
3/9/2009 8:30	Effluent Composite	Metals	Iron	34	I	ug/L	30	120
3/9/2009 8:30	Effluent Composite	Metals	Nickel	2.4		ug/L	0.25	1
3/9/2009 8:30	Effluent Composite	Metals	Selenium	1.45		ug/L	0.2	0.8
3/9/2009 8:30	Effluent Composite	Metals	Copper	2.69		ug/L	0.5	0.5
3/9/2009 8:30	Effluent Composite	Nutrients	Ammonia-N	0.049		mg N/L	0.01	0.02
3/9/2009 8:30	Effluent Composite	Nutrients	Kjeldahl Nitrogen	1.2		mg N/L	0.08	0.2
3/9/2009 8:30	Effluent Composite	Nutrients	TSS	4	U	mg/L	4	16
3/9/2009 8:30	Effluent Composite	Nutrients	Total-P	3.2		mg P/L	0.036	0.09
3/9/2009 8:30	Effluent Composite	Nutrients	NO2NO3-N	1.2		mg N/L	0.04	0.1
3/9/2009 9:55	Field Blank	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	0.2	U	mg/L	0.2	2

Appendix E. (continued)

Date Sampled	Field ID	Analysis	Component	Results	Remark	Units	MDL	PQL
3/9/2009 9:55	Field Blank	Metals	Arsenic	0.25	U	ug/L	0.25	1
3/9/2009 9:55	Field Blank	Metals	Copper	0.77		ug/L	0.5	0.5
3/9/2009 9:55	Field Blank	Metals	Nickel	0.25	U	ug/L	0.25	1
3/9/2009 9:55	Field Blank	Metals	Antimony	0.25	U	ug/L	0.25	1
3/9/2009 9:55	Field Blank	Metals	Selenium	0.2	U	ug/L	0.2	0.8
3/9/2009 9:55	Field Blank	Metals	Lead	0.2	U	ug/L	0.2	0.8
3/9/2009 9:55	Field Blank	Metals	Aluminum	60	U	ug/L	60	240
3/9/2009 9:55	Field Blank	Metals	Calcium	0.075	U	mg/L	0.075	0.3
3/9/2009 9:55	Field Blank	Metals	Zinc	5	U	ug/L	5	20
3/9/2009 9:55	Field Blank	Metals	Chromium	0.3	U	ug/L	0.3	1.2
3/9/2009 9:55	Field Blank	Metals	Silver	0.025	U	ug/L	0.025	0.1
3/9/2009 9:55	Field Blank	Metals	Iron	30	U	ug/L	30	120
3/9/2009 9:55	Field Blank	Metals	Magnesium	0.04	U	mg/L	0.04	0.16
3/9/2009 9:55	Field Blank	Metals	Beryllium	0.025	U	ug/L	0.025	0.1
3/9/2009 9:55	Field Blank	Metals	Cadmium	0.03	U	ug/L	0.03	0.12
3/9/2009 9:55	Field Blank	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
3/9/2009 9:55	Field Blank	Nutrients	Total-P	0.004	U	mg P/L	0.004	0.01
3/9/2009 9:55	Field Blank	Nutrients	O-Phosphate-P	0.014		mg P/L	0.004	0.01
3/9/2009 9:55	Field Blank	Nutrients	Kjeldahl Nitrogen	0.08	U	mg N/L	0.08	0.2
3/9/2009 9:55	Field Blank	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
3/9/2009 9:55	Field Blank	Pesticides	Mevinphos	0.2	U	ug/L	0.2	0.8
3/9/2009 9:55	Field Blank	Pesticides	Endosulfan II	0.02	U	ug/L	0.02	0.08
3/9/2009 9:55	Field Blank	Pesticides	Norflurazon	0.15	U	ug/L	0.15	0.6
3/9/2009 9:55	Field Blank	Pesticides	DDD-p,p'	0.02	U	ug/L	0.02	0.08
3/9/2009 9:55	Field Blank	Pesticides	Toxaphene	0.75	U	ug/L	0.75	3
3/9/2009 9:55	Field Blank	Pesticides	Butylate	0.2	UJ	ug/L	0.2	0.8
3/9/2009 9:55	Field Blank	Pesticides	Ethoprop	0.1	U	ug/L	0.1	0.4
3/9/2009 9:55	Field Blank	Pesticides	Aldrin	0.01	U	ug/L	0.01	0.04
3/9/2009 9:55	Field Blank	Pesticides	Alpha-BHC	0.01	U	ug/L	0.01	0.04
3/9/2009 9:55	Field Blank	Pesticides	Dieldrin	0.02	U	ug/L	0.02	0.08
3/9/2009 9:55	Field Blank	Pesticides	Gamma-BHC	0.01	U	ug/L	0.01	0.04
3/9/2009 9:55	Field Blank	Pesticides	Heptachlor Epoxide	0.02	U	ug/L	0.02	0.08
3/9/2009 9:55	Field Blank	Pesticides	Chlorpyrifos Methyl	0.1	U	ug/L	0.1	0.4
3/9/2009 9:55	Field Blank	Pesticides	Metribuzin	0.1	U	ug/L	0.1	0.4

Appendix E. (continued)

Date Sampled	Field ID	Analysis	Component	Results	Remark	Units	MDL	PQL
3/9/2009 9:55	Field Blank	Pesticides	Naled	0.8	U	ug/L	0.8	3.2
3/9/2009 9:55	Field Blank	Pesticides	Beta-BHC	0.01	U	ug/L	0.01	0.04
3/9/2009 9:55	Field Blank	Pesticides	DDE-p,p'	0.02	U	ug/L	0.02	0.08
3/9/2009 9:55	Field Blank	Pesticides	DDT-p,p'	0.03	U	ug/L	0.03	0.12
3/9/2009 9:55	Field Blank	Pesticides	Delta-BHC	0.01	U	ug/L	0.01	0.04
3/9/2009 9:55	Field Blank	Pesticides	Endrin Aldehyde	0.02	U	ug/L	0.02	0.08
3/9/2009 9:55	Field Blank	Pesticides	Atrazine	0.05	U	ug/L	0.05	0.2
3/9/2009 9:55	Field Blank	Pesticides	Azinphos Methyl	0.2	UJ	ug/L	0.2	0.8
3/9/2009 9:55	Field Blank	Pesticides	Bromacil	0.2	U	ug/L	0.2	0.8
3/9/2009 9:55	Field Blank	Pesticides	Chlorpyrifos Ethyl	0.05	U	ug/L	0.05	0.2
3/9/2009 9:55	Field Blank	Pesticides	Fonofos	0.1	U	ug/L	0.1	0.4
3/9/2009 9:55	Field Blank	Pesticides	Hexazinone	0.1	U	ug/L	0.1	0.4
3/9/2009 9:55	Field Blank	Pesticides	Malathion	0.15	U	ug/L	0.15	0.6
3/9/2009 9:55	Field Blank	Pesticides	Parathion Ethyl	0.15	U	ug/L	0.15	0.6
3/9/2009 9:55	Field Blank	Pesticides	Parathion Methyl	0.1	U	ug/L	0.1	0.4
3/9/2009 9:55	Field Blank	Pesticides	Phorate	0.05	U	ug/L	0.05	0.2
3/9/2009 9:55	Field Blank	Pesticides	Endosulfan Sulfate	0.02	U	ug/L	0.02	0.08
3/9/2009 9:55	Field Blank	Pesticides	Endrin	0.05	U	ug/L	0.05	0.2
3/9/2009 9:55	Field Blank	Pesticides	Methoxychlor	0.05	UJ	ug/L	0.05	0.2
3/9/2009 9:55	Field Blank	Pesticides	Alachlor	0.6	UJ	ug/L	0.6	2.4
3/9/2009 9:55	Field Blank	Pesticides	Metolachlor	0.5	UJ	ug/L	0.5	2
3/9/2009 9:55	Field Blank	Pesticides	Prometryn	0.15	U	ug/L	0.15	0.6
3/9/2009 9:55	Field Blank	Pesticides	Simazine	0.05	U	ug/L	0.05	0.2
3/9/2009 9:55	Field Blank	Pesticides	Endosulfan I	0.02	U	ug/L	0.02	0.08
3/9/2009 9:55	Field Blank	Pesticides	Fenamiphos	0.2	U	ug/L	0.2	0.8
3/9/2009 9:55	Field Blank	Pesticides	Chlordane	0.2	U	ug/L	0.2	0.8
3/9/2009 9:55	Field Blank	Pesticides	Heptachlor	0.01	U	ug/L	0.01	0.04
3/9/2009 9:55	Field Blank	Pesticides	Ametryn	0.05	U	ug/L	0.05	0.2
3/9/2009 9:55	Field Blank	Pesticides	Diazinon	0.05	U	ug/L	0.05	0.2
3/9/2009 9:55	Field Blank	Pesticides	Ethion	0.05	U	ug/L	0.05	0.2
3/9/2009 9:55	Field Blank	Pesticides	Metalaxyl	0.25	U	ug/L	0.25	1
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Acenaphthylene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Benzo(b)fluoranthene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Benzo(k)fluoranthene	0.97	U	ug/L	0.97	3.9

Appendix E. (continued)

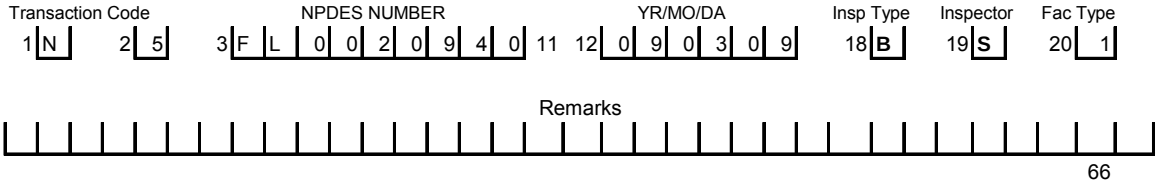
Date Sampled	Field ID	Analysis	Component	Results	Remark	Units	MDL	PQL
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	2.9	U	ug/L	2.9	12
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Chrysene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Di-n-butyl phthalate	4.9	U	ug/L	4.9	19
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Hexachlorobenzene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	N-Nitrosodimethylamine	1.9	U	ug/L	1.9	7.8
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	2.9	U	ug/L	2.9	12
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	2,4-Dinitrotoluene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Benzidine	97	U	ug/L	97	390
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Benzo(a)anthracene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	15	U	ug/L	15	58
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Fluoranthene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	1.9	U	ug/L	1.9	7.8
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	2,4-Dinitrophenol	15	U	ug/L	15	58
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	2-Chloronaphthalene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Hexachlorobutadiene	2.9	U	ug/L	2.9	12
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Isophorone	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Phenol	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Dimethyl phthalate	9.7	UJ	ug/L	9.7	39
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Hexachloroethane	2.9	U	ug/L	2.9	12
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Pentachlorophenol	2.9	U	ug/L	2.9	12
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Pyrene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Acenaphthene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Anthracene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Benzo(a)pyrene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Naphthalene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Phenanthrene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	2,4-Dimethylphenol	9.7	U	ug/L	9.7	39
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	2-Nitrophenol	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	4-Nitrophenol	15	U	ug/L	15	58

Appendix E. (continued)

Date Sampled	Field ID	Analysis	Component	Results	Remark	Units	MDL	PQL
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Diethyl phthalate	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	2,6-Dinitrotoluene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	2.9	U	ug/L	2.9	12
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	1.9	U	ug/L	1.9	7.8
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Di-n-octyl phthalate	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Fluorene	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Hexachlorocyclopentadiene	2.9	U	ug/L	2.9	12
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	2,4-Dichlorophenol	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	2-Chlorophenol	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	3,3'-Dichlorobenzidine	39	UJ	ug/L	39	160
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.97	U	ug/L	0.97	3.9
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Butyl benzyl phthalate	4.9	U	ug/L	4.9	19
3/9/2009 9:55	Field Blank	Priority Organic Pollutants	Nitrobenzene	1.9	U	ug/L	1.9	7.8

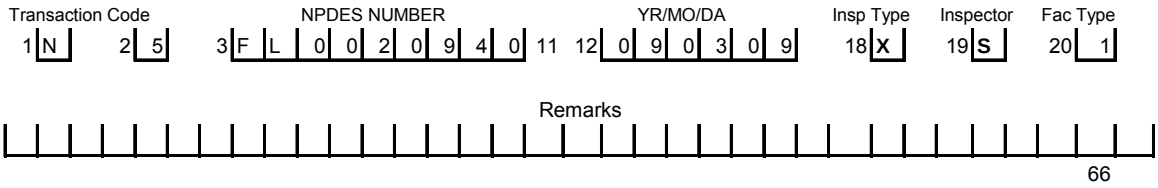
The Bioassay of the City of Tampa Howard F. Curren Advanced Wastewater Treatment Facility effluent sampled on March 9, 11 and 13, 2009. NPDES #FL0020940.

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



The Priority Pollutants Analysis of the City of Tampa Howard F. Curren Advanced Wastewater Treatment Facility effluent sampled on March 9, 2009. NPDES #FL0020940.

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



Biological Analyses of the City of Tampa Howard F. Curren Advanced Wastewater Treatment Facility effluent sampled on March 9, 2009. NPDES #FL0020940.

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

