

Effluent Quality Assessment
Hastings Water Treatment Plant

St. Johns County

NPDES #FL0169226

Sampled December 12, 14 and 16, 2011

February 2012

Biology Section
Bureau of Laboratories
Division of Environmental Assessment and Restoration

Quality Manual No. 870346G
NELAC Certification No. E31780

CONTENTS

Introduction

Methods

Results and Discussion

Literature Cited

Tables

Table 1	Measured and predicted freshwater algal growth potential (AGP)
Table 2	Effluent limits, Class III Freshwater Criteria and chemical data, and qualifiers

Appendices

Appendix A	Chain of Custody
Appendix B	Bioassay Bench Sheets
Appendix C	SRT Bench Sheets and Statistical Analyses
Appendix D	Organism Receipts
Appendix E	Chemical Analyses of Effluent
Appendix F	Pages 1 -7 of NPDES Permit # FL0169226
Appendix G	EPA End Sheet

Hastings Water Treatment Plant, 102 South Dancy Avenue, Hastings, St. Johns County, Florida, 32145. NPDES #FL0169226. Effluent grab samples for biological and chemical analyses for this facility were collected on December 12, 2011. Effluent grab samples for bioassay analyses were collected on December 12, 14 and 16, 2011.

Introduction

The Hastings Water Treatment Plant is a water treatment plant which uses reverse osmosis technology to produce potable water. The permitted capacity of the reject water treatment and disposal system is 0.087 million gallons per day. Reject water is treated by aeration prior to discharge into the Class III Freshwaters of Deep Creek. (See Appendix F for pages 1-7 of the facility's NPDES permit.)

Methods

Samples were collected from the EFF-1 NPDES sampling point for Outfall D-001 by Eesa Ali, Sharon Piltz, Bipin Adhyaru, Carl Padgett and Jim Wright (FDEP Northeast District) following DEP-SOP-001/01 FS 2400 Wastewater Sampling. All DEP SOPs are available on the web at: http://www.floridadep.org/labs/bars/sas/sop/index.htm.

See Appendix A for the completed chain of custody form.

The chronic toxicity tests and algal growth potential (AGP) 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.

Results and Discussion

- **Toxicity Test Results**
  Tests performed December 13 - 21, 2011.

  **Ceriodaphnia dubia* 7-day chronic definitive bioassay = No Result

  Pimephales promelas 7-day chronic screening bioassay – growth IC25 = > 100%

  The samples were not chronically toxic to the *Pimephales promelas* test species, producing an IC25 for growth of > 100% sample.

  *The *Ceriodaphnia dubia* test was invalidated due to control reproduction failure. The test was reported as no result and a Non Conformance Report (3989) was created.

  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 test that correspond to the facility test. Bioassay bench sheets and SRT bench sheets for the invalidated *Ceriodaphnia dubia* bioassay are not included. See Appendix D for test organism receipts.

- **Algal Growth Potential**
  The effluent Algal Growth Potential (AGP) was 5.3 mg dry wt/L of the unicellular green alga, *Pseudokirchneriella subcapitata*, formerly known as *Selenastrum capricornutum*. Raschke and Schultz (1987) determined that AGP values above 5.0 mg dry weight/L represent a "problem" threshold for fresh receiving waters, implying nutrient enrichment. The analytical chemistry results for inorganic nitrogen and ortho-phosphate suggest that the effluent is phosphorus limited; whereas, the analytical chemistry results for total nitrogen and total phosphorus suggest the effluent is co-limited by both nitrogen and phosphorus. To determine actual nutrient limitation, a limiting-nutrient algal growth potential test with associated nutrient chemistry should be performed (Miller et al. 1978).

See Table 1 for AGP results and qualifiers.

- **Chemistry Results**
  Total residual chlorine (TRC) and total ammonia were not detected in the three bioassay samples in the bioassay laboratory. The total ammonia concentration in the effluent grab sample collected and preserved for chemical analysis was 1.0 mg N/L. Based on the pH, salinity, and temperature of the effluent sample as collected, the estimated unionized ammonia concentration in the composited effluent was 0.02 mg/L.

  The effluent's specific conductance as measured in the field on December 12 (5,380 µmhos-cm), 14 (5,800 µmhos-cm) and 16 (5,280 µmhos-cm), 2011, exceeded the facility's permitted limit for specific conductance (5089 µmhos-cm).

  Total alpha particles, radium 226+228, total phosphorus, unionized ammonia and total nitrogen were detected in the effluent at levels that comply with Class III freshwater criteria (62-302.530, F.A.C.) and/or the facility's permitted limits (NPDES permit # FL0169226). Copper, nickel, and total suspended solids (TSS) were detected between the laboratory method detection limits (MDL) and practical quantitation limits (PQL).

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

Conclusion

The effluent samples collected from the EFF-1 NPDES sampling point for Outfall D-001 for this facility on December 12, 14 and 16, 2011, were not chronically toxic to the *Pimephales promelas* test organisms during the chronic bioassay. The *Ceriodaphnia dubia* bioassay was invalidated and reported as no result. The effluent AGP result was slightly greater than the "problem" threshold for fresh receiving waters.

The effluent's specific conductance as measured in the field on December 12 (5,380 µmhos-cm), 14 (5,800 µmhos-cm) and 16 (5,280 µmhos-cm), 2011, exceeded the facility's permitted limit for specific conductance (5089 µmhos-cm).

Additional effluent water quality samples collected on December 12, 2011, did not exceed any applicable water quality standards or limits found in NPDES permit #FL0169226.

Literature Cited

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

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

Table 1. Measured 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 Hastings Water Treatment Plant on December 12, 2012.

Hastings Water Treatment Plant							
Location	AGP (measured)	Predicted AGP (TSIN) ± 20%	Predicted AGP (OP) ± 20%	Predicted AGP (TN) ± 20%	Predicted AGP (TP) ± 20%	Inorganic N:P ratio	Total N:P ratio
EFF-1	5.3	47.1 ± 9.4	10.8 ± 2.2	54.7 ± 10.9	33.1 ± 6.6	49.6	18.7

Table 2. Effluent limits, Class III Freshwater Criteria and chemical data for samples collected from the Hastings Water Treatment Plant on December 12, 14 and 16, 2012.

Hastings Water Treatment Plant NPDES# FL0169226	Class III Criteria	Effluent Limits	EFF-1 Collected Dec. 12, 2011	
Organic Constituents (µg/L)				
None Detected	-	-	None Detected	
Metals (µg/L unless otherwise noted)				
Aluminum	-	-	5	U
Arsenic	≤ 50	-	0.25	U
Cadmium	≤ 0.76 b	-	0.05	U
Calcium (mg/L)	-	-	665	
Chromium-III	≤ 268.22 b	-	0.3	U
Copper	≤ 30.50 b	-	0.52	I
Iron	≤ 1,000	-	30	U
Lead	≤ 18.58 b	-	0.2	U
Magnesium (mg/L)	-	-	387	
Nickel	≤ 168.54 b	-	0.45	I
Selenium	≤ 5.0	-	0.2	U
Silver	≤ 0.07	≤ 0.286 s	0.025	U
Zinc	≤ 387.83 b	-	5	U
Nutrients (mg/L)				
Ortho-phosphate	-	-	0.025	
Total Phosphorus	-	≤ 1.0 a	0.077	
Total Ammonia	-	Report	1.0	
Un-ionized Ammonia	≤ 0.02 s	≤ 0.16 sc	0.02	c
Nitrate and Nitrite	-	-	0.24	
Total Kjeldahl Nitrogen	-	-	1.2	
Organic Nitrogen	-	-	0.2	c
Total Nitrogen	-	≤ 3.0 a	1.44	c

Value exceeds the Class III Water Quality Criteria or permit limits

a - Annual average

b - Value is calculated based on hardness

c - Value is calculated

s - Single sample

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

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

Table 2. continued.

Hastings Water Treatment Plant NPDES# FL0169226	Class III Criteria	Effluent Limits	EFF-1 Collected Dec. 12, 2011	EFF-1 Collected Dec. 14, 2011	EFF-1 Collected Dec. 16, 2011
General Physical and Chemical Parameters					
Dissolved Oxygen (mg/L)	≥ 5.0 s	≥ 5.0 s	7.4	5.5	8.3
pH (SU)	6.0 - 8.5 s	6.0 - 8.5 s	7.6	7.6	7.6
Conductivity (µmhos/cm)	≤ 1,275 s	5089.0 s	5380	5800	5258
Temperature (°C)	-	Report	22.0	23.4	22.5
Salinity	-	-	3.1 c	3.3 c	5.1 c
Total Residual Chlorine (mg/L)	≤ 0.01 s	-	0.03 UQ£	0.03 UQ£	0.03 UQ£
Chlorophyll *a* (µg/L) - Corrected	-	-	1.1 I	-	-
Phaeophytin (µg/L)	-	-	0.4 U	-	-
Total Suspended Solids (mg/L)	-	≤ 5.0 a	4 I	-	-
CBOD, 5 day (mg/L), N - inhibited	-	≤ 5.0 a	0.2 UJ	-	-
Chloride (mg/L)	-	-	830	-	-
Fluoride (mg/L)	≤ 10.0	-	1.4	-	-
Sulfate (mg/L)	-	-	2300	-	-
Alpha, Total (pCi/L)	≤ 15	≤ 43.7 a	30.8	-	-
Alpha-Counting Error (pCi/L)	-	-	7.9	-	-
Radium 226 (pCi/L)	-	-	5.8	-	-
Radium 226-Counting Error (pCi/L)	-	-	0.3	-	-
Radium 228 (pCi/L)	-	-	1.2	-	-
Radium 228-Counting Error (pCi/L)	-	-	0.7	-	-
Radium 226 + 228 (pCi/L)	≤ 5	≤ 12.2 a	7 c	-	-
Flow (MGD)	-	0.087 a	0.0277 m	-	-
Hardness (mg $CaCO_3$)	-	-	3254 c	-	-

Value exceeds the Class III Water Quality Criteria or permit limits

a - Annual average
c - Value is calculated
m - Monthly average 12/01/10 - 11-30-11
s - Single sample
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
J - Estimated value
Q - Sample held beyond normal holding time
U - Material analyzed for but not detected; value reported is the method detection limit
£ - measurement taken in the FDEP laboratory

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2011-12-12-34
FYI3 Hastings WTP RO Sampling Inspection

Requester: Michelle Fish
Field Report Prepared By: E. Ali
Collected By: E. Ali / S. Pilz / C Padgett
Send Final Report To: Tom Rauth
Sampling Agency: DEP

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

Lab ID *	Loc / Hastings RO EFF-1 FL0169226			☐ Comp ☑ Grab	Collection (begin) Date 12/12/11 Time 931 Eastern Central		Collection (end) Date Time Eastern Central		Bottle Group(s)**	A	
	Fiel				Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L) 7.44	Storet Station Number				
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C) 22.00	pH 7.63	Sample Depth ☐ m ☐ ft Surface		☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm) 5340		NPDES Number FL0169226			
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms		Comments Rainy cats + frogs !!!							
Lab ID *	Loc / blank			☐ Comp ☑ Grab	Collection (begin) Date 12/12/11 Time 955 Eastern Central		Collection (end) Date Time Eastern Central		Bottle Group(s)**	B	
	Fiel				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 ☐ dd ☐ dms	Longitude ☐ dd ☐ dms		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 ☐ dd ☐ dms	Longitude ☐ dd ☐ dms		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 ☐ dd ☐ dms	Longitude ☐ dd ☐ dms		Comments 2 biomass Recd in Tox by JD 10:42 12/13/11							

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[illegible]	12.12.11	Fed Ex					[illegible]	12-13-11 / 9:45a

* 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-2011-12-12-34
FYI3 Hastings WTP RO Sampling Inspection

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

Requester: Michelle Fish
Collected By: JIM WRIGHT / BIPIN ADHYARU
Sampling Agency: FDEP (NED) JAX,
Field Report Prepared By: BIPIN ADHYARU
Send Final Report To: Tom Rauth

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Hastings WTP RO Effluent	☐ Comp ☒ Grab Date 12/14/11 Time 1335 Eastern Central	Date Time Eastern Central	A
	Field ID	Tot Res Chlorine (mg/L): —	Diss Oxygen (mg/L): 5.49	Storet Station Number: —
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C): 23.4	pH: 7.61	Sample Depth ☐ m ☐ ft: —
		Salinity (PPTh): 3.15	Sp Conductance (umho/cm): 5800	NPDES Number: —
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
		☐ Comp ☐ Grab Date Time Eastern Central	Date Time Eastern Central	
	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 ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
		☐ Comp ☐ Grab Date Time Eastern Central	Date Time Eastern Central	
	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 ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
		☐ Comp ☐ Grab Date Time Eastern Central	Date Time Eastern Central	
	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 ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments: 2 biomass Recd in Tox by SD, 10:50 12.15.11	

Relinquished By	Date/Time	Shipping Method	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
Bipin Adhyaru	12/14/11	Fed Ex	ABB	12/15/11				

$0.955

* Shaded Areas for Lab use only

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Appendix A. continued

NED F00511 **Florida Department of Environmental Protection *North East District* Field sheet**

Sample Project Hastings 8603YT LabRequest number 2011-12-12-34

Collected By: S.P. Hz Date Collected: Dec 16 - 2011

Lab ID #	Storet#	Site Name	Matrix:Water Surface Fresh Surface Salt ~~Effluent~~	Comments Air Temp ____ Wind Sp ____ Wind Dir ____
11Z 528		Hastings RO Eff-1		

Time	Total depth(m)	Sample depth(m)	Temp (C)	Conductivity (µmhos)	Salinity (%)	pH s.u.	D.O. mg/l	D.O. (%)	Secchi meters	Velocity ft./sec.	Tide Ebb/Flood/Slack	Turb. NTU
1035	Tap		22.51	5258	2.84	7.62	8.26	96.6	—	—	—	—

Grab/Composite Not applicable	Parameter/Method Horizontal Sampler(HS), Grab(G), Pole(P)	Preservation	Bottle/Suite =A/B/C,etc.	Initials
G / C / Na	Nutrients: NH_3, NO_2+ NO_3, TKN, TOC, TP ☐HS ☐G ☐P	Ice& H_2SO_4 less than 2 pH*		
G / C / Na	Ortho Phosphorous ☐HS ☐G ☐P	Ice & .45µm filtered		
G / C / Na	BOD/CBOD ☐HS ☐G ☐P	Ice		
G / C / Na	Chlorophyll,Phaeophytin ½ secchi ½ tot depth ☐HS ☐G ☐P	Ice		
G / C / Na	Physical Aggregate:TSS,TDS,Turb.,Color,Alk,Cl,F,SO_4 ☐HS ☐G ☐P	Ice		
G / C / Na	Metals: ICP,ICPMS ☐HS ☐G ☐P	Ice& HNO_3 less than 2 pH*		
G / C / Na	Other: TOX ☐HS ☒G ☐P	Ice/	SPC → A	
G / C / Na	Microbiology: Fecal Coliform ☐HS ☐G ☐P	Ice		

Lab ID #	Storet#	Site Name	Matrix:Water Surface Fresh Surface Salt Effluent	Comments

Time	Total depth(m)	Sample depth(m)	Temp (C)	Conductivity (µmhos)	Salinity (%)	pH s.u.	D.O. mg/l	D.O. (%)	Secchi meters	Velocity ft./sec	Tide Ebb/Flood/Slack	Turb NTU

Grab/Composite Not applicable	Parameter/Method Horizontal Sampler(HS), Grab(G), Pole(P)	Preservation	Bottle/Suite =A/B/C,etc.	Initials
G / C / Na	Nutrients: NH_3, NO_2+ NO_3, TKN, TOC, TP ☐HS ☐G ☐P	Ice& H_2SO_4 less than 2 pH*		
G / C / Na	Ortho Phosphorous ☐HS ☐G ☐P	Ice & .45µm filtered		
G / C / Na	BOD/CBOD ☐HS ☐G ☐P	Ice		
G / C / Na	Chlorophyll,Phaeophytin ½ secchi ½ tot depth ☐HS ☐G ☐P	Ice		
G / C / Na	Physical Aggregate:TSS,TDS,Turb.,Color,Alk,Cl,F,SO_4 ☐HS ☐G ☐P	Ice		
G / C / Na	Metals: ICP,ICPMS ☐HS ☐G ☐P	HNO_3 less than 2 pH*		
G / C / Na	Other: ☐HS ☐G ☐P	Ice/		
G / C / Na	Microbiology: Fecal Coliform ☐HS ☐G ☐P	Ice		

Lab ID #	Storet#	Site Name	Matrix:Water Surface Fresh Surface Salt Effluent	Comments

Time	Total depth(m)	Sample depth(m)	Temp (C)	Conductivity (µmhos)	Salinity (%)	pH s.u.	D.O. mg/l	D.O. (%)	Secchi meters	Velocity ft./sec	Tide Ebb/Flood/Slack	Turb NTU

Grab/Composite Not applicable	Parameter/Method Horizontal Sampler(HS), Grab(G), Pole(P)	Preservation	Bottle/Suite =A/B/C,etc.	Initials

J. Faircloth 12-17-11 / 0930.

Appendix B. Bench Sheets

FDEP Biology Laboratory - Chronic Bioassay Bench Sheet

Pimphales promelas or Menidia beryllina

Facility: Hastings water Treatment plant
Address: 102 South Dancy Avenue, Hastings
County: St. Johns Zip 32145
NPDES Permit #: FL 0169226
Contact/District: Eesa Ali / Northeast

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: 12.13.11 Time: 1345
End Date: 12.20.11 Time: 1000

Diluent/ Batch:
MHW / 12.12.11 Test Days Used: 0-7
MHW /_____ Test Days Used: _____
ASW /_____ Test Days Used: _____
ASW /_____ Test Days Used: _____

Organism age : 24 hrs days
Feeding Prior to Test and Daily
Artemia Lot # 23613
Chamber size : 1000 ml
Test volume (500 ml)

Artemia Batch #	Day 3 206 -11
Day 0 203 -11	Day 4 207-11
Day 1 204 -11	Day 5 208 -11
Day 2 205 -11	Day 6 209 -11

12-28-11
Lims entry – 12-28-11 MF Lims verification BA:

Sample Received	Lab Sample #	LIMS Job #	LIMS Sample #	Collection Date/Time	Received Date/Time
Test Day 0	1	TLH- 2011-12-13-12	1396790	12/12/11 0931	13 Dec 2011 0945
Test Day 2	2	TLH- 2011-12-15-57	1397893	12/14/11 1335	15 Dec 2011 0955
Test Day 4	3	TLH- 2011-12-19-03	1398337	12/16/11 1035	17 Dec 2011 0936

Water Quality Parameters	Field Chlorine (mg/L)			Lab Chlorine (mg/L)			Alkalinity (mg/L as $CaCO_3$)			Hardness (mg/L as $CaCO_3$)		
Lab Sample #:	MF	MF 2	MF 3	1	2	3	1	2	3	1	2	3
Sample:	~~<0.03~~	~~<0.03~~	~~<0.03~~	<0.03	<0.03	<0.03	335	345	290	—	—	—
Diluent/Control:				<0.03	<0.03	<0.03	78	—	—	94	—	—
Method:	not measured			Hach	Hach	Hach	Hach	Hach	Hach	Hach	Hach	Hach
Measured by:				JD	JD	JD	BA	JD	JD	BA	~~JD~~ JD	~~JD~~ JD
Verified by:	MF	MF	MF	MF	MF	MF	JD	MF	MF	JD		

	Conductivity (circle one) (umhos-cm) mmhos-cm)			Ammonia (mg/L)			Salinity (ppth)		
Lab Sample#:	1	2	3	1	2	3	1	2	3
Sample:	6210	6070	5450	<0.017	<0.017	<0.017			
Diluent/Control:	333	—	—	<0.017	—	—			
Method:	Mettler	Mettler	Mettler	Denver	Denver	Denver	Mettler	Mettler	Mettler
Measured by:	JD	JD	JD	MF	MF	MF			
Verified by:	MF	MF	MF	JD	JD	JD			

Statistics	
Growth NOEC:	100%
Growth LOEC:	>100%
Growth IC_{20}:	>100%
Growth IC_{25}:	>100%
Ctrl % CV:	5.485%
Dunnetts PMSD:	27.4%
Survival NOEC:	100%
Survival LOEC:	>100%

Light Intensity : 50 - 100 ft. candles
Photoperiod : 16 light 8 dark
Temperature Range °C:
Incubator # 3 min. 24.5 max 26.4 mean —
Water bath # ____ min. _____ max. _____ mean ____
Room B246 min. 24.7 max 25.5 mean —

Investigators' signatures
James Daniels
Marshall Faircloth
Brian Nelson
Stephen Miller
REVIEWER

Comments:

revised 08/24/06 MF/SP

Appendix B. continued

Chronic Bioassay Survival Benchsheet

Facility: Hastings

LIMS Sample Number: 1396790
(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)

		TEST DAY							
Concentration	Replicate	0	1	2	3	4	5	6	7
Control	A	10	10	10	9 1D	9	9	9	9
	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 10 %	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	9 1D	9
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	9 1D	9
Sample 20 %	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	7 3D	7	7
	D	10	10	10	10	10	10	10	10
Sample 40 %	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	9 1D	9	9	9	9
	D	10	10	10	10	10	9 1D	9	9
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	10	10	10	10	10	9 1D	9
Sample 100 %	A	10	10	10	10	10	10	9 1D	9
	B	10	10	10	9 1D	9	8 2D	7 1D	7
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
Sample %	A	10							
	B	10							
	C	10							
	D	10							
Loaded by: JD	Checked by:		JD	JD	JD	JD	JD	JD	JD
Verified by: BA									

Comments:

Page 30

Appendix B. continued

Chronic Bioassay Parameters Benchsheet

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

Sample Source: Hastings
LIMS Sample #: 1396790 (for Lab sample #1)
Start Date: 12/12/11 End Date: 12,20.11
Start Time: 1345 JD End Time: 1000

conc = concentration rep = replicate circle umhos or mmhos

Test Day		Conc.	Before Renewal: Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity (umhos) mmhos	Salinity ppth	After Renewal: Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity (umhos) mmhos	Salinity ppth
Day 0	sample:	Control	A	7.7	25.9	8.0	333							
	1	10%	A	7.8	25.9	7.8	679							
	1	20%	A	8.0	25.4	7.7	1055							
	1	40%	A	8.1	25.3	7.9	1734							
	1	50%	A	8.1	25.5	8.0	2030							
	1	100%	A	8.0	25.9	8.4	6210							
	1		A											
	Measured by:			JD	JD	JD	JD							
	Recorded by:			JD	JD	JD	JD							
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 1	sample:	Control	B	7.8	25.0	7.6	340		B	7.5	24.9	7.1	339	
	1	10%	B	7.8	25.5	7.9	668		B	7.6	24.9	7.3	871	
	1	20%	B	7.9	25.3	7.8	1059		B	8.0	25.0	7.4	1458	
	1	40%	B	8.1	25.3	7.7	1724		B	8.2	24.8	7.6	2400	
	1	50%	B	8.2	25.3	7.7	2050		B	8.2	24.7	7.7	2880	
	1	100%	B	8.3	25.9	7.8	6000		B	8.3	24.4	7.6	5870	
	1		B						B					
	Measured by:			JD	JD	JD	JD			JD	JD	JD	JD	
	Recorded by:			JD	JD	JD	JD			JD	JD	JD	JD	
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 2	sample:	Control	C	7.8	25.4	6.8	347		C	7.8	24.0	7.3	349	
	2	10%	C	7.7	25.8	6.7	867		C	7.8	24.0	7.3	967	
	2	20%	C	7.7	25.8	6.6	1454		C	8.0	24.1	7.3	1629	
	2	40%	C	8.1	25.6	6.9	2450		C	8.1	24.3	7.4	2770	
	2	50%	C	8.2	25.5	6.8	2850		C	8.1	24.0	7.4	3250	
	2	100%	C	8.3	25.3	6.6	6090		C	8.1	24.0	7.3	6070	
	2		C						C					
	Measured by:			JD	JD	JD	JD			JD	JD	JD	JD	
	Recorded by:			JD	JD	JD	JD			JD	JD	JD	JD	
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 3	sample:	Control	D	7.4	25.1	6.0	342		D	7.8	24.0	6.7	341	
	2	10%	D	7.3	24.7	6.1	956		D	7.7	24.1	6.7	966	
	2	20%	D	7.6	24.5	5.6	1569		D	7.8	24.2	6.7	1642	
	2	40%	D	8.0	24.4	5.5	2640		D	8.0	24.1	6.5	2730	
	2	50%	D	8.0	24.8	5.5	3210		D	8.0	24.1	6.6	3270	
	2	100%	D	8.2	24.8	5.7	5850		D	8.0	24.0	6.5	5780	
	2		D						D					
	Measured by:			JD	JD	JD	JD			JD	JD	JD	JD	
	Recorded by:			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.

Page 31

Appendix B. continued

Chronic Bioassay Parameters Benchsheet

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

Sample Source: Hastings
LIMS Sample #: 13967990 9mf (for Lab sample #1)
Start Date: 12.13.11 End Date: 12.20.11
Start Time: 1345 End Time: 1000

conc = concentration rep = replicate

Test Day		Conc.	Before Renewal: Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity umhos mmhos	Salinity ppth	After Renewal: Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity umhos mmhos	Salinity ppth
Day 4	sample:	Control	A	7.5	25.9	5.1	354		A	7.4	25.2	6.7	335	
	3	10%	A	7.3	25.9	4.9	1011		A	7.5	25.6	6.7	907	
	3	20%	A	7.4	25.8	4.9	1701		A	7.7	25.7	6.6	1606	
	3	40%	A	7.8	25.9	5.3	2830		A	8.0	25.7	6.7	2650	
	3	50%	A	8.0	25.9	5.1	3340		A	8.1	25.5	6.8	3080	
	3	100%	A	8.1	25.9	5.4	5960		A	8.1	25.7	6.9	5450	
	3		A						A					
	Measured by:			JD	JD	JD	JD			JD	JD	JD	JD	
	Recorded by:			JD	JD	JD	JD			JD	JD	JD	JD	
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 5	sample:	Control	B	7.3	25.8	5.3	354		B	7.7	24.8	6.4	326	
	3	10%	B	7.3	25.5	4.8	947		B	7.6	24.7	6.5	957	
	3	20%	B	7.4	25.8	5.0	1692		B	7.7	24.7	6.6	1552	
	3	40%	B	7.7	25.9	4.9	2820		B	7.9	24.8	6.6	2590	
	3	50%	B	7.9	25.6	4.9	3250		B	8.0	24.8	6.6	3060	
	3	100%	B	8.1	25.9	5.0	5860		B	8.0	25.3	6.9	5410	
	3		B						B					
	Measured by:			JD	JD	JD	JD			JD	JD	JD	JD	
	Recorded by:			JD	JD	JD	JD			JD	JD	JD	JD	
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 6	sample:	Control	C	7.6	25.9	7.1	326		C	7.7	24.4	7.5	316	
	3	10%	C	7.6	25.9	7.3	959		C	7.7	24.3	7.5	886	
	3	20%	C	7.7	25.9	7.2	1539		C	7.7	24.3	7.6	1461	
	3	40%	C	7.9	25.9	6.9	2570		C	7.9	24.3	7.4	2520	
	3	50%	C	8.1	25.3	6.7	3020		C	8.0	24.2	7.4	3040	
	3	100%	C	8.2	25.5	6.6	5350		C	7.9	24.4	8.1	5340	
	3		C						C					
	Measured by:			JD	JD	JD	JD			JD	JD	JD	JD	
	Recorded by:			JD	JD	JD	JD			JD	JD	JD	JD	
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 7	sample:	Control	D	7.3	25.3	6.3	347		D					
	3	10%	D	7.4	25.6	15.9	975		D					
	3	20%	D	7.6	25.6	6.4	1602		D					
	3	40%	D	7.8	25.9	6.1	2760		D					
	3	50%	D	7.9	25.8	6.1	3230		D					
	3	100%	D	8.0	25.4	5.8	5630		D					
	3								D					
	Measured by:			JD	JD	JD	JD							
	Recorded by:			JD	JD	JD	JD							

Comments: (A) 7.5 10% D.O. Day 7 FD.

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

Page 32

Appendix B. continued

Chronic Bioassay Weighing Benchsheet

Facility: Hastings

LIMS Sample Number: 1396790 (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	21	2477 JD 0.0 ~~3121~~	0.03121	0.00644	10	.644	
	B	22	2486 JD 0.0 ~~3163~~	0.03163	0.00677	10	.677	
	C	23	2482 JD 0.0 ~~3079~~	0.03079	0.00597	10	.597	.646
	D	24	2411 JD 0.0 ~~3077~~	0.03077	0.00666	10	.666	
sample 10 %	A	25	2296 JD 0.0 ~~3255~~	0.03255	0.00959	10	.959	
	B	26	2356 JD 0.0 ~~2926~~	0.02926	0.00570	10	.570	
	C	27	2510 JD 0.0 ~~3235~~	0.03235	0.00725	10	.725	.738
	D	28	2475 JD 0.0 ~~3173~~	0.03173	0.00698	10	.698	
sample 20 %	A	29	2643 JD 0.0 ~~3508~~	0.03508	0.00865	10	.865	
	B	30	2444 JD 0.0 ~~3283~~	0.03283	0.00839	10	.839	
	C	31	0.0 2494	0.0 3064	0.00570	10	.570	.772
	D	32	0.0 2452	0.0 3256	0.00804	10	.804	
sample 40 ~~33~~ %	A	33	0.0 2451	0.0 3242	0.00791	10	.791	
	B	34	0.0 2539	0.0 3359	0.00820	10	.820	.773
	C	35	0.0 2586	0.0 3300	0.00714	10	.714	
	D	36	0.0 2446	0.0 3212	0.00766	10	.766	
sample 50 %	A	37	0.0 2475	0.0 3233	0.00758	10	.758	
	B	38	0.0 2432	0.0 3366	0.00934	10	.934	
	C	39	0.0 2404	0.0 3367	0.00963	10	.963	.878
	D	40	0.0 2368	0.0 3224	0.00856	10	.856	
sample 100 %	A	41	0.0 2370	0.0 3105	0.00735	10	.735	
	B	42	0.0 2385	0.0 3228	0.00843	10	.843	
	C	43	0.0 2295	0.0 3080	0.00785	10	.785	.799
	D	44	0.0 2441	0.0 3272	0.00831	10	.831	
sample %	A					10		
	B					10		
	C					10		
	D					10		
	Weighed by initials:		JD	JD	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.

Page 33

Appendix B. continued

Chronic Bioassay Weighing Benchsheet

Quality Control

Facility: Hastings

LIMS Sample Number: 1396790
(for Lab Sample # 1)

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

Drying Oven ID:	ER034000
Temperature °C:	100
Hours:	8

Tare weighed by: J.D
Final weighed by: J.D.

Tare Weighing Date: 12.19.11 Final Weighing Date: 12.21.11

				Measured Value (g)		S-weight Value (g)
Tare Pan 1 after Pan 5 (g)	0.02477	@	0.02477	S-weights	@	
Tare Pan 1 after Pan 10 (g)	0.02476	@	0.02477	at tare	@	
Tare Pan 1 after Pan 15 (g)	0.02479	@	0.02477	S-weights	@	
Tare Pan 1 after Pan 20 (g)	0.02478	@	0.02477	at final	@	
Tare Pan 1 after Pan 25 (g)	0.02480	@	0.02477			
Tare Pan 1 after Pan 30 (g)		@				
Tare Pan 1 after Pan 35 (g)		@				
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)	0.03120	@	0.03121			
Final Pan 1 after Pan 10 (g)	0.03119	@	0.03121			
Final Pan 1 after Pan 15 (g)	0.03120	@	0.03121			
Final Pan 1 after Pan 20 (g)	0.03119	@	0.03121			
Final Pan 1 after Pan 25 (g)	0.03119	@	0.03121			
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)		@				

S-weights at tare: 0.01 g @ 0.01 g; 0.03006 g @ 0.03 g
S-weights at final: 0.01001 g @ 0.01 g; 0.05004 g @ 0.05 g

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

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

Page 34

Appendix B. continued

Test ID: Hastings Water Treatment Plant Dates: MF 12-13-11 – 12-20-11

METER / DEVICE	ID	SOP	Parameter	Method	v used
YSI Model 58 Dissolved Oxygen Meter	90H018262	TA06_04	Dissolved Oxygen	SM 4500 O G	J
YSI DO Probe	5905	TA06_04	Dissolved Oxygen	SM 4500 O G	J
Accumet AR-10 pH Meter	93312105	TA06_23	pH	SM 4500 H+	J
Mettler-Toledo SevenMulti Conductivity Meter	SN 1225117049 Probe H04257	TA06_25	Conductivity Salinity	SM 2510 B SM 2520 B	J
Denver Model 225 ISE with ammonia probe	SN K01377	TA06_17	Ammonia	SM 4500 NH3 F	J
Traceable Thermometer	#1-SN101686412 #2-SN221295527 #3-SN240116020 #4-SN80361795 #5-SN61990624	TA06_05	Temperature	SM-2530B modified DEP SOP-001/01 FT1400	J #5
Hach Pocket Colorimeter II	05050C026378	TA06_22	Total Residual Chlorine	EPA 330.5 SM 4500 CL G	J
Alkalinity (Hach Kit)	No SN	TA06_08	Alkalinity	SM 2320 B	J
Hardness (Hach Kit)	No SN	TA06_09	Hardness	SM 2340 C	J
OHAUS Balance 250D	1125481084	TA06_21 TA06_27	Weight	-	J
S-Weights	BIO-S-WEIGHTS-01	NA	Balance check	-	J

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)

12. 21. 11 J.D.

V 1.1 9/21/10 MF/jd

Page 35

Appendix C. SRT Bench Sheets and Statistical Analysis

Bureau of Laboratories

Standard Reference Toxicant (SRT) Test Data - 7-Day Chronic Toxicity

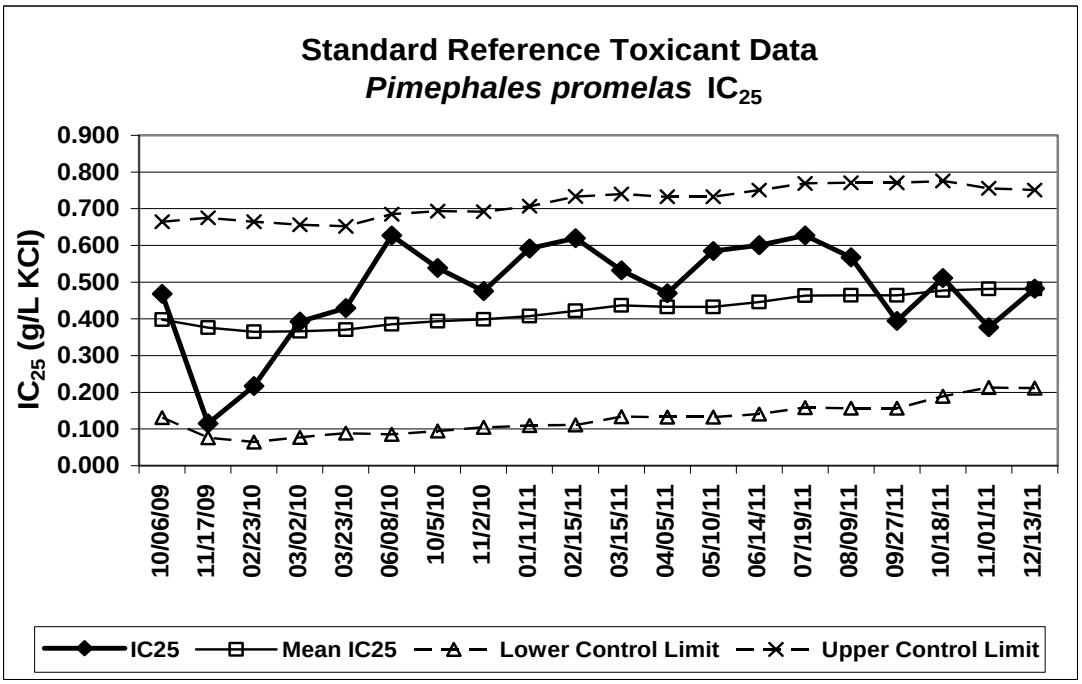
Pimephales promelas (fathead minnow) - Potassium Chloride (KCl)

Date	IC25	Mean IC25	Std Dev	Lower Control Limit	Upper Control Limit
10/06/09	0.468	0.398	0.13	0.131	0.664
11/17/09	0.115	0.376	0.15	0.076	0.676
02/23/10	0.217	0.365	0.15	0.064	0.665
03/02/10	0.393	0.366	0.14	0.077	0.656
03/23/10	0.429	0.370	0.14	0.089	0.652
06/08/10	0.628	0.385	0.15	0.086	0.685
10/05/10	0.539	0.394	0.15	0.094	0.694
11/02/10	0.476	0.398	0.15	0.105	0.692
01/11/11	0.592	0.408	0.15	0.109	0.707
02/15/11	0.620	0.422	0.16	0.111	0.733
03/15/11	0.532	0.436	0.15	0.133	0.740
04/05/11	0.470	0.433	0.15	0.133	0.733
05/10/11	0.585	0.433	0.15	0.133	0.733
06/14/11	0.601	0.446	0.15	0.141	0.751
07/19/11	0.627	0.463	0.15	0.158	0.769
08/09/11	0.568	0.464	0.15	0.157	0.771
09/27/11	0.394	0.464	0.15	0.157	0.771
10/18/11	0.511	0.478	0.14	0.189	0.776
11/01/11	0.377	0.482	0.14	0.213	0.756
12/13/11	0.483	0.481	0.14	0.211	0.751

Means are from the last 20 SRTs.

Lower Confidence Limit = mean - 2 * Std Dev EPA 75th percentile %CV - 38%

Upper Confidence Limit = mean + 2 * Std Dev Lab %CV - 28%



Appendix C. (continued)

Larval Fish Growth and Survival Test-7 Day Growth

Start Date:	12/13/2011 13:30	Test ID:	ppsrtdec11	Sample ID:	REF-Ref Toxicant
End Date:	12/20/2011 10:00	Lab ID:	DEP TOXLAB-FDEP Biology To	Sample Type:	KCL-Potassium chloride
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	PP-Pimephales promelas
Comments:	P. promelas chronic srt December 13, 2011				

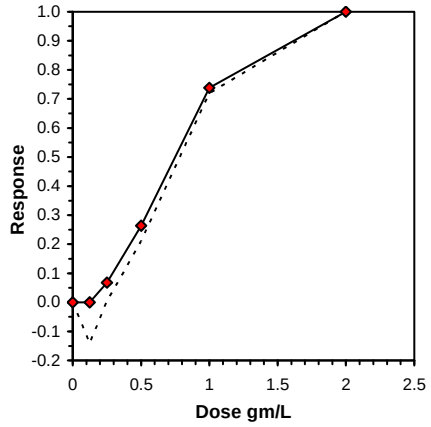
Conc-gm/L	1	2	3	4
D-Control	0.7230	0.7420	0.4190	0.6420
0.125	0.8090	0.6860	0.6500	0.7390
0.25	0.6200	0.6860	0.5850	0.6290
0.5	0.5190	0.5260	0.5090	0.4380
1	0.2100	0.2040	0.2130	0.0820
2	0.0000	0.0000	0.0000	0.0000

			Transform: Untransformed					Isotonic	
Conc-gm/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	0.6315	1.0000	0.6315	0.4190	0.7420	23.461	4	0.6763	1.0000
0.125	0.7210	1.1417	0.7210	0.6500	0.8090	9.587	4	0.6763	1.0000
0.25	0.6300	0.9976	0.6300	0.5850	0.6860	6.648	4	0.6300	0.9316
0.5	0.4980	0.7886	0.4980	0.4380	0.5260	8.153	4	0.4980	0.7364
1	0.1773	0.2807	0.1773	0.0820	0.2130	35.887	4	0.1773	0.2621
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)	0.918391	0.868	-1.18858	2.559954
Bartlett's Test indicates equal variances (p = 0.16)	6.612575	13.2767		

Linear Interpolation (200 Resamples)

Point	gm/L	SD	95% CL(Exp)		Skew
IC05	0.2164	0.0580	0.0629	0.3791	0.1754
IC10	0.2905	0.0600	0.1332	0.4436	0.1166
IC15	0.3545	0.0622	0.1647	0.5162	0.1226
IC20	0.4186	0.0595	0.2246	0.5748	0.0262
IC25	0.4826	0.0541	0.2988	0.6100	-0.1252
IC40	0.6438	0.0421	0.4996	0.7521	-0.0650
IC50	0.7492	0.0389	0.6170	0.8688	0.1118



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: 12.12.11 MW Test Days Used: 0-7

Diluent/ Batch: _____ Test Days Used: _____

Toxicant/ Batch # : KCl 12.12.11

Artemia Lot # : 23613

Start Date: 12.13.11 Time: 1330

End Date: 12.20 11 Time: 1000

Organism Batch #/ Age: 12.13.11 <24hrs

Artemia Batch #	Day 2 205-11	Day 5 208-11
Day 0 203-11	Day 3 206-11	Day 6 209-11
Day1 204-11	Day 4 207-11	

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 12.12-11 MW #6	Diluent (or other)	Method	Measured by	Verified by
Total Residual Cl_2 (mg/L):	<0.03		HACH	JD	MF
Alkalinity (mg/L as $CaCO_3$):	78		HACH	BA	JD
Hardness (mg/L as $CaCO_3$):	94		HACH	BA	JD
Total Ammonia (mg/L as N):	<0.017		DENVER	MF	JD
Conductivity (µmhos-cm) mmhos-cm:	329		METTLER	JD	MF

Statistics	
Growth NOEC:	0.5 g/L
Growth LOEC:	1 g/L mf
Growth IC_{20}:	0,4186 → g/L
Growth IC_{25}:	0,4826 → g/L
Ctrl % CV:	23,5%
Dunnetts PMSD:	21,8%
Survival NOEC:	0,5 g/L
Survival LOEC:	1,0 g/L

Test incubated in : [X] Incubator # 3

[ ] Waterbath #_____

Light Intensity : 50 - 100 ft. candles

Photoperiod : 16 light 8 dark

Temperature Range °C:

Incubator # 3 min. 24.5 max. 26.4 mean –

Water bath # ____ min.____ max.____ mean____

Room B246 min. 24.7 max. 25.5 mean –

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

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

Investigators' signatures

James Daniels

Marshall Faircloth

Bruce Alvarez

Liz Miller

REVIEWER

Comments:

PAGE 15

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	C1	10	9 10D	9	9	9	9	9	9
	B	C2	10	10	10	10	10	10	10	10
	C	C3	10	10	10	10	10	10	10	10
	D	C4	10	9 10D	9	9	9	9	9	9
.125	A	C5	10	10	10	10	10	10	10	10
	B	C6	10	10	10	10	10	10	10	10
	C	C7	10	10	10	10	10	10	10	10
	D	C8	10	10	10	10	10	10	10	10
.25	A	C9	10	10	10	10	10	10	~~8~~ 10 10D	10
	B	C10	10	10	10	10	10	10	9 10 10D	9
	C	C11	10	10	10	10	10	10	10	10
	D	C12	10	10	10	10	10	10	10	10
.5	A	C13	10	8 2D	8	7 1D	7	7	7	7
	B	C14	10	10	10	9 1D	9	9	9	9
	C	C15	10	10	10	10	10	10	10	10
	D	C16	10	9 1D	9	9	9	9	9	9
1	A	C17	10	4 6D	4	4	4	4	4	4
	B	C18	10	6 4D	6	5 1D	5	5	4 1D	4
	C	C19	10	3 7D	3	2 1D	2	2	2	2
	D	C20	10	4 6D	4	2 2D	2	2	1 1D	1
2	A	C21	10	0 10D						
	B	C22	10	0 10D						
	C	C23	10	0 10D						
	D	C24	10	0 10D						
	A		10							
	B		10							
	C		10							
	D		10							
Loaded by (0 hr): JD		Checked by:		JD	JD	JD	JD	JD	JD	JD
Verified by (0 hr): BA										
		Concentrations prepared by:		JD	JD	JD	JD	JD	JD	JD

Comments:

PAGE 16 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: 12.13.11 End Date: 12.20.11

Start Time: 1330 End Time: 1000

conc = concentration rep = replicate circle umhos or mmhos

Test Day		Before Renewal						After Renewal					
	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	7.6	25.9	8.0	329							
	.125	A	7.7	25.9	8.1	564							
	.25	A	7.8	25.9	8.2	814							
	.5	A	7.9	25.9	7.9	1290							
	1	A	7.9	25.9	7.9	2180							
	2	A	8.0	25.9	8.1	4020							
		A											
	Measured by		JD	JD	JD	JD							
	Recorded by		JD	JD	JD	JD							
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 1	Control	B	8.0	24.0	7.1	327		B	8.0	25.1	7.6	331	
	.125	B	7.9	24.4	7.2	549		B	8.0	25.1	7.7	547	
	.25	B	8.0	24.0	7.5	790		B	8.1	25.1	7.8	797	
	.5	B	8.0	24.3	7.7	1259		B	8.1	24.9	7.9	1227	
	1	B	8.0	24.3	7.6	2080		B	8.0	24.8	7.8	2130	
	2	B	8.0	24.7	7.6	3840		B					
		B						B					
	Measured by		JD	JD	JD	JD			JD	JD	JD	JD	
	Recorded by		JD	JD	JD	JD			JD	JD	JD	JD	
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 2	Control	C	7.9	25.2	6.0	337		C	7.5	24.6	6.6	346	
	.125	C	7.8	24.8	6.1	551		C	7.7	24.1	7.3	520	
	.25	C	7.8	25.0	6.5	800		C	7.9	24.1	7.4	731	
	.5	C	7.8	25.0	6.8	1237		C	7.9	24.0	7.3	1296	
	1	C	7.9	24.9	7.1	2170		C	7.9	24.0	7.4	2230	
		C						C					
		C						C					
	Measured by		JD	JD	JD	JD			JD	JD	JD	JD	
	Recorded by		JD	JD	JD	JD			JD	JD	JD	JD	
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 3	Control	D	7.5	25.4	6.4	342		D	7.6	24.5	6.8	337	
	.125	D	7.5	25.4	6.3	529		D	7.8	24.3	6.6	522	
	.25	D	7.5	25.7	6.1	810		D	7.8	24.1	6.5	775	
	.5	D	7.5	25.4	5.8	1277		D	7.8	24.0	6.4	1229	
	1	D	7.6	25.0	5.9	2190		D	7.8	24.0	6.6	2100	
		D						D					
		D						D					
	Measured by		JD	JD	JD	JD			JD	JD	JD	JD	
	Recorded by		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

Page 17

Appendix C. (continued)

Chronic SRT Parameters Benchsheet

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

Start Date: 12.13.11 End Date: 12.20.11

Start Time: 1330 End Time: 1000

conc = concentration rep = replicate

Test Day	Conc.	Before Renewal: Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity umhos mmhos	Salinity ppth	After Renewal: Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity umhos mmhos	Salinity ppth
Day 4	Control	A	8.0	25.3	5.1	350		A	7.3	25.9	7.1	333	
	.125	A	7.9	25.2	5.1	523		A	7.4	25.6	6.6	526	
	.25	A	7.9	24.9	5.4	781		A	7.5	25.6	6.9	764	
	.5	A	7.8	25.2	5.8	1252		A	7.5	25.7	7.1	1211	
	1	A	7.9	25.6	6.1	2180		A	7.7	25.9	7.2	2100	
		A						A					
		A						A					
	Measured by		JD	JD	JD	JD			JD	JD	JD	JD	
	Recorded by		JD	JD	JD	JD			JD	JD	JD	JD	
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 5	Control	B	7.8	25.4	6.0	347		B	7.3	24.6	6.3	326	
	.125	B	7.9	24.9	5.3	567		B	7.5	24.7	6.9	548	
	.25	B	7.8	24.6	5.8	796		B	7.6	24.8	7.1	784	
	.5	B	7.8	24.6	6.6	1270		B	7.6	25.0	7.3	1206	
	1	B	7.8	25.1	6.7	2200		B	7.7	25.9	7.4	2120	
		B						B					
		B						B					
	Measured by		JD	JD	JD	JD			JD	JD	JD	JD	
	Recorded by		JD	JD	JD	JD			JD	JD	JD	JD	
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 6	Control	C	7.6	24.1	6.8	329		C	7.7	24.1	7.5	316	
	.125	C	7.6	24.3	5.8	540		C	7.6	24.1	6.4	JD ~~876~~ 534	
	.25	C	7.6	24.4	5.9	770		C	7.7	24.1	7.0	JD ~~746~~ 759	
	.5	C	7.6	24.3	6.0	1194		C	7.7	24.1	7.4	1213	
	1	C	7.6	24.3	6.4	2050		C	7.8	24.2	7.6	2110	
		C						C					
		C						C					
	Measured by		JD	JD	JD	JD			JD	JD	JD	JD	
	Recorded by		JD	JD	JD	JD			JD	JD	JD	JD	
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 7	Control	D	7.2	24.4	6.3	348		D					
	.125	D	7.2	24.6	5.9	564		D					
	.25	D	7.3	25.2	6.4	830		D					
	.5	D	7.4	24.8	6.7	1304		D					
	1	D	7.5	25.0	6.9	2230		D					
		D						D					
		D						D					
	Measured by		JD	JD	JD	JD							
	Recorded by		JD	JD	JD	JD							

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

Page 18

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	0.0 2371	0.0 3094	0.00723	10	.723	
	B	2	0.0 2433	0.0 3175	0.00 742	10	.742	.632
	C	3	0.0 2431	0.0 2850	0.00 419	10	.419	
	D	4	0.0 2358	0.0 3000	0.00 642	10	.642	
.125	A	5	0.0 2353	0.0 3162	0.00 809	10	.809	
	B	6	0.0 2420	0.0 3106	0.00 686	10	.686	.721
	C	7	0.0 2244	0.0 2894	0.00 650	10	.650	
	D	8	0.0 2363	0.0 3102	0.00 739	10	.739	
.25	A	9	0.0 2335	0.0 2955	0.00 620	10	.620	
	B	10	0.0 2536	0.0 3222	0.00 686	10	.686	.630
	C	11	0.0 2336	0.0 2921	0.00 585	10	.585	
	D	12	0.0 2406	0.0 3035	0.00 629	10	.629	
.5	A	13	0.0 2449	0.0 2968	0.00519	10	.519	
	B	14	0.0 2334	0.0 2860	0.00 526	10	.526	.498
	C	15	0.0 2418	0.0 2927	0.00 509	10	.509	
	D	16	0.0 2506	0.0 2944	0.00 438	10	.438	
1	A	17	0.0 2339	0.0 2549	0.00 210	10	.210	
	B	18	0.0 2339	0.0 2543	0.00 204	10	.204	.177
	C	19	0.0 2466	0.0 2679	0.00 213	10	.213	
	D	20	0.0 2502	0.0 2584	0.00082	10	.082	
	A					10		
	B					10		
	C					10		
	D					10		
	A					10		
	B					10		
	C					10		
	D					10		
		Weighed by:	JD	JD				

Comments:

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

PAGE 19

revised 8/24/06 MF/SP

Appendix C. (continued)

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: 12.19.11 Weighed by: JD

	Pan 1 wt.	Pan 1 initial wt.
after Pan 5	0.02371	@ 0.02371
after Pan 10	0.02372	@ 0.02371
after Pan 15	0.02372	@ 0.02371
after Pan 20	0.02373	@ 0.02371
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	0.0 1 g	@ 0.0 1 g
	0.03006 g	@ 0.03 g

Balance: Ohaus 250D Ser# 1125481084

S-Weights: BIO-S-Weights-01

Fish + Pan Weights Date: 12.21.11 Weighed by: JD

	Pan 1 wt.	Pan 1 initial wt.
after Pan 5	0.03093	@ 0.03094
after Pan 10	0.03094	@ 0.03094
after Pan 15	0.03095	@ 0.03094
after Pan 20	0.03094	@ 0.03094
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	0.0100 1 g	@ 0.0 1 g
	0.05004 g	@ 0.05 g

Drying Oven ID: ER034000

Temperature °C: 100

Drying Hours: 8

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

Comments:

PAGE 20

revised 7/16/08 M

Appendix C. (continued)

Test ID: December 2011 SRT (P. Prowler) Dates: Dec, 13 – 20, 2011

METER / DEVICE	ID	SOP	Parameter	Method	v used
YSI Model 58 Dissolved Oxygen Meter	90H018262	TA06_04	Dissolved Oxygen	SM 4500 O G	✓
YSI DO Probe	5905	TA06_04	Dissolved Oxygen	SM 4500 O G	✓
Accumet AR-10 pH Meter	93312105	TA06_23	pH	SM 4500 H+	✓
Mettler-Toledo SevenMulti Conductivity Meter	SN 1225117049 Probe H04257	TA06_25	Conductivity Salinity	SM 2510 B SM 2520 B	✓
Denver Model 225 ISE with ammonia probe	SN K01377	TA06_17	Ammonia	SM 4500 NH3 F	✓
Traceable Thermometer	#1-SN101686412 #2-SN221295527 #3-SN240116020 #4-SN80361795 #5 SN61990624	TA06_05	Temperature	SM-2530B modified DEP SOP-001/01 FT1400	✓ #5
Hach Pocket Colorimeter II	05050C026378	TA06_22	Total Residual Chlorine	EPA 330.5 SM 4500 CL G	✓
Alkalinity (Hach Kit)	No SN	TA06_08	Alkalinity	SM 2320 B	✓
Hardness (Hach Kit)	No SN	TA06_09	Hardness	SM 2340 C	✓
OHAUS Balance 250D	1125481084	TA06_21 TA06_27	Weight	-	✓
S-Weights	BIO-S-WEIGHTS-01	NA	Balance check	-	✓

SM-2530B modified to allow use of electronic and non-mercury filled thermometers.

Insert other device information in blank spaces(if used). Test ID = Facility or SRTs (acute SRT--Chronic SRT)

12.21.11 JP

V 1.1 9/21/10 MF/jd

Page 21

Appendix C. (continued)

Start Date:	12/13/2011 13:45	Test ID:	Hast121311	Sample ID:	hastings wtp CD-FFS
End Date:	12/20/2011 10:00	Lab ID:	DEP TOXLAB-FDEP Biology To	Sample Type:	EFF2-Industrial
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	PP-Pimephales promelas

Comments: P. promelas chronic bioassay for Hastings WTP December 2011

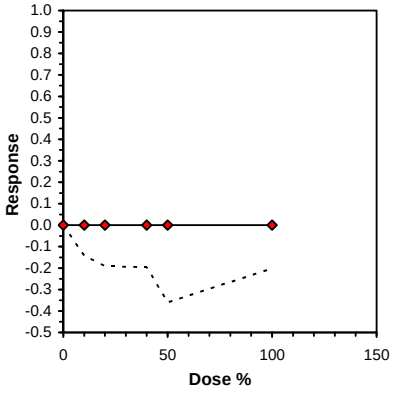
Conc-%	1	2	3	4
D-Control	0.6440	0.6770	0.5970	0.6660
10	0.9590	0.5700	0.7250	0.6980
20	0.8650	0.8390	0.5700	0.8040
40	0.7910	0.8200	0.7140	0.7660
50	0.7580	0.9340	0.9630	0.8560
100	0.6450	0.8430	0.7850	0.8310

			Transform: Untransformed					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	0.6460	1.0000	0.6460	0.5970	0.6770	5.485	4	0.7633	1.0000
10	0.7380	1.1424	0.7380	0.5700	0.9590	21.965	4	0.7633	1.0000
20	0.7695	1.1912	0.7695	0.5700	0.8650	17.586	4	0.7633	1.0000
40	0.7728	1.1962	0.7728	0.7140	0.8200	5.817	4	0.7633	1.0000
50	0.8778	1.3587	0.8778	0.7580	0.9630	10.451	4	0.7633	1.0000
100	0.7760	1.2012	0.7760	0.6450	0.8430	11.706	4	0.7633	1.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.955928	0.884	-0.22036	0.942307
Bartlett's Test indicates equal variances (p = 0.17)	7.714601	15.08627		

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Appendix D. Test Organism Receipt(s)

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Shipping Date: 12/12/11

Ship to: FDEP

P.O. No:

Species	Quantity	Age	Brood/Lot Number	Temp. (°C)	pH (S.U.)	Salinity (‰)
Mysidopsis bahia						
Menidia beryllina						
						Hardness mg/L
Cyprinella leedsi						
Pimephales promelas	550	<24	FM111211-1605	25	7.8	80
	150 ac	7 DAYS	FM111205	25	7.8	80
Ceriodaphnia dubia						
Daphnia magna						
YCT						
P. subcapitata						

Packed by: PM

Shipped Via: Fed Ex

Notes:

Thank you for your order.

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

Appendix E. Chemical Analyses performed on the effluent collected from the Hastings Water Treatment Plant-EFF-1 NPDES sampling point for Outfall D-001, sampled December 12, 2011.

Date	Field ID	Analyses	Component	Result	Remark	Units	MDL	PQL
12/12/2011 9:31	EFF-1	AGP/LN	Algal Growth Potential	5.3		mg DryWt/L	0.3	0.9
12/12/2011 9:31	EFF-1	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	0.2	UJ	mg/L	0.2	2
12/12/2011 9:31	EFF-1	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.4	U	ug/L	0.4	1.2
12/12/2011 9:31	EFF-1	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	1.1	I	ug/L	0.55	1.7
12/12/2011 9:31	EFF-1	Toxicology	Bioassay-Chron-Def-FW-Fish, IC25	100	L	IC25		
12/12/2011 9:31	EFF-1	Toxicology	Bioassay-Chron-Def-FW-C.dubia, IC25	No Result		IC25		
12/12/2011 9:31	EFF-1	Toxicology	Bioassay-Chron-Def-FW-Fish, NOEC	100		NOEC		
12/12/2011 9:31	EFF-1	Toxicology	Bioassay-Chron-Def-FW-C.dubia, NOEC	No Result		NOEC		
12/12/2011 9:31	EFF-1	Metals	Calcium	665		mg/L	0.75	3
12/12/2011 9:31	EFF-1	Metals	Arsenic	0.25	U	ug/L	0.25	1
12/12/2011 9:31	EFF-1	Metals	Selenium	0.2	U	ug/L	0.2	0.8
12/12/2011 9:31	EFF-1	Metals	Lead	0.2	U	ug/L	0.2	0.8
12/12/2011 9:31	EFF-1	Metals	Silver	0.025	U	ug/L	0.025	0.1
12/12/2011 9:31	EFF-1	Metals	Iron	30	U	ug/L	30	120
12/12/2011 9:31	EFF-1	Metals	Zinc	5	U	ug/L	5	20
12/12/2011 9:31	EFF-1	Metals	Cadmium	0.05	U	ug/L	0.05	0.2
12/12/2011 9:31	EFF-1	Metals	Copper	0.52	I	ug/L	0.5	1
12/12/2011 9:31	EFF-1	Metals	Nickel	0.45	I	ug/L	0.25	1
12/12/2011 9:31	EFF-1	Metals	Aluminum	5	U	ug/L	5	20
12/12/2011 9:31	EFF-1	Metals	Chromium	0.3	U	ug/L	0.3	1.2
12/12/2011 9:31	EFF-1	Metals	Magnesium	387		mg/L	0.4	1.6
12/12/2011 9:31	EFF-1	Metals	Sodium	412		mg/L	5	20
12/12/2011 9:31	EFF-1	Nutrients	Alkalinity	325		mg CaCO3/L	0.65	2.5
12/12/2011 9:31	EFF-1	Nutrients	Sulfate	2300		mg SO4/L	8	20
12/12/2011 9:31	EFF-1	Nutrients	Organic Carbon	4.5	I	mg C/L	1	5
12/12/2011 9:31	EFF-1	Nutrients	Chloride	830		mg Cl/L	4	10
12/12/2011 9:31	EFF-1	Nutrients	TSS	4	I	mg/L	2	10
12/12/2011 9:31	EFF-1	Nutrients	Total-P	0.077		mg P/L	0.008	0.02
12/12/2011 9:31	EFF-1	Nutrients	Kjeldahl Nitrogen	1.2		mg N/L	0.16	0.4
12/12/2011 9:31	EFF-1	Nutrients	O-Phosphate-P	0.025		mg P/L	0.004	0.01
12/12/2011 9:31	EFF-1	Nutrients	NO2NO3-N	0.24		mg N/L	0.005	0.01
12/12/2011 9:31	EFF-1	Nutrients	Fluoride	1.4		mg F/L	0.035	0.1
12/12/2011 9:31	EFF-1	Nutrients	Ammonia-N	1		mg N/L	0.05	0.1
12/12/2011 9:31	EFF-1	Overflow	Radium 228	1.2		pCi/L		
12/12/2011 9:31	EFF-1	Overflow	Alpha-Counting Error	7.9		pCi/L		
12/12/2011 9:31	EFF-1	Overflow	Alpha, Total	30.8		pCi/L		

Appendix E. continued

Date	Field ID	Analyses	Component	Result	Remark	Units	MDL	PQL
12/12/2011 9:31	EFF-1	Overflow	Radium 226-Counting Error	0.3		pCi/L		
12/12/2011 9:31	EFF-1	Overflow	Radium 228-Counting Error	0.7		pCi/L		
12/12/2011 9:31	EFF-1	Overflow	Radium 226	5.8		pCi/L		
12/12/2011 9:31	EFF-1	Pesticides	Naled	0.76	UJ	ug/L	0.76	3
12/12/2011 9:31	EFF-1	Pesticides	Diazinon	0.048	U	ug/L	0.048	0.19
12/12/2011 9:31	EFF-1	Pesticides	Phorate	0.048	U	ug/L	0.048	0.19
12/12/2011 9:31	EFF-1	Pesticides	Alachlor	0.57	U	ug/L	0.57	2.3
12/12/2011 9:31	EFF-1	Pesticides	Azinphos Methyl	0.19	U	ug/L	0.19	0.76
12/12/2011 9:31	EFF-1	Pesticides	Metolachlor	0.48	U	ug/L	0.48	1.9
12/12/2011 9:31	EFF-1	Pesticides	Norflurazon	0.14	U	ug/L	0.14	0.57
12/12/2011 9:31	EFF-1	Pesticides	Simazine	0.048	U	ug/L	0.048	0.19
12/12/2011 9:31	EFF-1	Pesticides	Butylate	0.19	U	ug/L	0.19	0.76
12/12/2011 9:31	EFF-1	Pesticides	Bromacil	0.19	U	ug/L	0.19	0.76
12/12/2011 9:31	EFF-1	Pesticides	Parathion Ethyl	0.14	U	ug/L	0.14	0.57
12/12/2011 9:31	EFF-1	Pesticides	Ametryn	0.048	U	ug/L	0.048	0.19
12/12/2011 9:31	EFF-1	Pesticides	Metalaxyl	0.24	U	ug/L	0.24	0.95
12/12/2011 9:31	EFF-1	Pesticides	Fenamiphos	0.19	UJ	ug/L	0.19	0.76
12/12/2011 9:31	EFF-1	Pesticides	Chlorpyrifos Methyl	0.095	U	ug/L	0.095	0.38
12/12/2011 9:31	EFF-1	Pesticides	Atrazine	0.048	U	ug/L	0.048	0.19
12/12/2011 9:31	EFF-1	Pesticides	Prometryn	0.14	U	ug/L	0.14	0.57
12/12/2011 9:31	EFF-1	Pesticides	Parathion Methyl	0.095	U	ug/L	0.095	0.38
12/12/2011 9:31	EFF-1	Pesticides	Mevinphos	0.19	U	ug/L	0.19	0.76
12/12/2011 9:31	EFF-1	Pesticides	Malathion	0.14	U	ug/L	0.14	0.57
12/12/2011 9:31	EFF-1	Pesticides	Hexazinone	0.095	U	ug/L	0.095	0.38
12/12/2011 9:31	EFF-1	Pesticides	Fonofos	0.095	U	ug/L	0.095	0.38
12/12/2011 9:31	EFF-1	Pesticides	Ethoprop	0.095	U	ug/L	0.095	0.38
12/12/2011 9:31	EFF-1	Pesticides	Chlorpyrifos Ethyl	0.048	U	ug/L	0.048	0.19
12/12/2011 9:31	EFF-1	Pesticides	Ethion	0.048	U	ug/L	0.048	0.19
12/12/2011 9:31	EFF-1	Pesticides	Metribuzin	0.095	U	ug/L	0.095	0.38
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Bis(2-chloroethyl)ether	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	3.1	U	ug/L	3.1	12
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.2	U	ug/L	0.2	0.82
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Fluoranthene	0.2	U	ug/L	0.2	0.82
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Hexachlorobenzene	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Naphthalene	0.2	U	ug/L	0.2	0.82
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	2,4-Dinitrotoluene	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	4-Nitrophenol	15	U	ug/L	15	61

Appendix E. continued

Date	Field ID	Analyses	Component	Result	Remark	Units	MDL	PQL
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	15	U	ug/L	15	61
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Butyl benzyl phthalate	5.1	U	ug/L	5.1	20
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	2	U	ug/L	2	8.2
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	2,4-Dichlorophenol	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	2-Chlorophenol	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	3,3'-Dichlorobenzidine	41	U	ug/L	41	160
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Benzo(b)fluoranthene	0.2	U	ug/L	0.2	0.82
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.2	U	ug/L	0.2	0.82
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Dimethyl phthalate	10	U	ug/L	10	41
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Hexachlorocyclopentadiene	3.1	U	ug/L	3.1	12
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	N-Nitrosodimethylamine	2	U	ug/L	2	8.2
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Acenaphthene	0.2	U	ug/L	0.2	0.82
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Anthracene	0.2	U	ug/L	0.2	0.82
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Benzo(a)anthracene	0.2	U	ug/L	0.2	0.82
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Benzo(a)pyrene	0.2	U	ug/L	0.2	0.82
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Diethyl phthalate	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Fluorene	0.2	U	ug/L	0.2	0.82
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Isophorone	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Pentachlorophenol	3.1	U	ug/L	3.1	12
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	3.1	U	ug/L	3.1	12
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	2,6-Dinitrotoluene	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	4-Chloro-3-methylphenol	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	2	U	ug/L	2	8.2
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Benzidine	100	U	ug/L	100	410
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Di-n-butyl phthalate	5.1	U	ug/L	5.1	20
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Di-n-octyl phthalate	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Hexachloroethane	3.1	U	ug/L	3.1	12
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Nitrobenzene	2	U	ug/L	2	8.2
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Pyrene	0.2	U	ug/L	0.2	0.82
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	2,4-Dimethylphenol	10	U	ug/L	10	41
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	2-Chloronaphthalene	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	2-Nitrophenol	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Acenaphthylene	0.2	U	ug/L	0.2	0.82
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Benzo(k)fluoranthene	0.2	U	ug/L	0.2	0.82
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Hexachlorobutadiene	3.1	U	ug/L	3.1	12
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Phenanthrene	0.2	U	ug/L	0.2	0.82

Appendix E. continued

Date	Field ID	Analyses	Component	Result	Remark	Units	MDL	PQL
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Phenol	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	2,4,6-Trichlorophenol	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	2,4-Dinitrophenol	15	U	ug/L	15	61
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	3.1	U	ug/L	3.1	12
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	4-Bromophenyl phenyl ether	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Chrysene	0.2	U	ug/L	0.2	0.82
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.2	U	ug/L	0.2	0.82
12/12/2011 9:31	EFF-1	Priority Organic Pollutants	1,2,4-Trichlorobenzene	1	U	ug/L	1	4.1
12/12/2011 9:31	EFF-1	Field Parameter	Temperature	22		C		
12/12/2011 9:31	EFF-1	Field Parameter	Dissolved Oxygen	7.44		mg/L		
12/12/2011 9:31	EFF-1	Field Parameter	Specific Conductance	5380		umhos/cm		
12/12/2011 9:31	EFF-1	Field Parameter	pH	7.63				
12/12/2011 9:55	Blank	Metals	Chromium	0.3	U	ug/L	0.3	1.2
12/12/2011 9:55	Blank	Metals	Arsenic	0.25	U	ug/L	0.25	1
12/12/2011 9:55	Blank	Metals	Magnesium	0.04	U	mg/L	0.04	0.16
12/12/2011 9:55	Blank	Metals	Lead	0.2	U	ug/L	0.2	0.8
12/12/2011 9:55	Blank	Metals	Zinc	5	U	ug/L	5	20
12/12/2011 9:55	Blank	Metals	Iron	30	U	ug/L	30	120
12/12/2011 9:55	Blank	Metals	Copper	0.5	U	ug/L	0.5	1
12/12/2011 9:55	Blank	Metals	Selenium	0.2	U	ug/L	0.2	0.8
12/12/2011 9:55	Blank	Metals	Nickel	0.25	U	ug/L	0.25	1
12/12/2011 9:55	Blank	Metals	Silver	0.025	U	ug/L	0.025	0.1
12/12/2011 9:55	Blank	Metals	Cadmium	0.05	U	ug/L	0.05	0.2
12/12/2011 9:55	Blank	Metals	Sodium	0.5	U	mg/L	0.5	2
12/12/2011 9:55	Blank	Metals	Calcium	0.075	U	mg/L	0.075	0.3
12/12/2011 9:55	Blank	Metals	Aluminum	5	U	ug/L	5	20
12/12/2011 9:55	Blank	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
12/12/2011 9:55	Blank	Nutrients	Sulfate	0.2	U	mg SO4/L	0.2	0.5
12/12/2011 9:55	Blank	Nutrients	Kjeldahl Nitrogen	0.08	U	mg N/L	0.08	0.2
12/12/2011 9:55	Blank	Nutrients	Fluoride	0.035	U	mg F/L	0.035	0.1
12/12/2011 9:55	Blank	Nutrients	Chloride	0.2	U	mg Cl/L	0.2	0.5
12/12/2011 9:55	Blank	Nutrients	Total-P	0.004	U	mg P/L	0.004	0.01
12/12/2011 9:55	Blank	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
12/12/2011 9:55	Blank	Nutrients	O-Phosphate-P	0.004	U	mg P/L	0.004	0.01
12/12/2011 9:55	Blank	Nutrients	Alkalinity	0.65	U	mg CaCO3/L	0.65	2.5
12/12/2011 9:55	Blank	Nutrients	Organic Carbon	1	U	mg C/L	1	5
12/12/2011 9:55	Blank	Overflow	Radium 226	0.1		pCi/L		

Appendix E. continued

Date	Field ID	Analyses	Component	Result	Remark	Units	MDL	PQL
12/12/2011 9:55	Blank	Overflow	Radium 226-Counting Error	0.1		pCi/L		
12/12/2011 9:55	Blank	Overflow	Radium 228-Counting Error	0.6		pCi/L		
12/12/2011 9:55	Blank	Overflow	Alpha, Total	0.8	U	pCi/L		
12/12/2011 9:55	Blank	Overflow	Alpha-Counting Error	0.5		pCi/L		
12/12/2011 9:55	Blank	Overflow	Radium 228	1	U	pCi/L		
12/12/2011 9:55	Blank	Pesticides	Diazinon	0.047	U	ug/L	0.047	0.19
12/12/2011 9:55	Blank	Pesticides	Metolachlor	0.47	U	ug/L	0.47	1.9
12/12/2011 9:55	Blank	Pesticides	Metribuzin	0.095	U	ug/L	0.095	0.38
12/12/2011 9:55	Blank	Pesticides	Norflurazon	0.14	U	ug/L	0.14	0.57
12/12/2011 9:55	Blank	Pesticides	Chlorpyrifos Ethyl	0.047	U	ug/L	0.047	0.19
12/12/2011 9:55	Blank	Pesticides	Fenamiphos	0.19	UJ	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Pesticides	Parathion Ethyl	0.14	U	ug/L	0.14	0.57
12/12/2011 9:55	Blank	Pesticides	Simazine	0.047	U	ug/L	0.047	0.19
12/12/2011 9:55	Blank	Pesticides	Ethion	0.047	U	ug/L	0.047	0.19
12/12/2011 9:55	Blank	Pesticides	Fonofos	0.095	U	ug/L	0.095	0.38
12/12/2011 9:55	Blank	Pesticides	Malathion	0.14	U	ug/L	0.14	0.57
12/12/2011 9:55	Blank	Pesticides	Mevinphos	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Pesticides	Parathion Methyl	0.095	U	ug/L	0.095	0.38
12/12/2011 9:55	Blank	Pesticides	Atrazine	0.047	U	ug/L	0.047	0.19
12/12/2011 9:55	Blank	Pesticides	Phorate	0.047	U	ug/L	0.047	0.19
12/12/2011 9:55	Blank	Pesticides	Prometryn	0.14	U	ug/L	0.14	0.57
12/12/2011 9:55	Blank	Pesticides	Chlorpyrifos Methyl	0.095	U	ug/L	0.095	0.38
12/12/2011 9:55	Blank	Pesticides	Hexazinone	0.095	U	ug/L	0.095	0.38
12/12/2011 9:55	Blank	Pesticides	Azinphos Methyl	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Pesticides	Bromacil	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Pesticides	Alachlor	0.57	U	ug/L	0.57	2.3
12/12/2011 9:55	Blank	Pesticides	Ametryn	0.047	U	ug/L	0.047	0.19
12/12/2011 9:55	Blank	Pesticides	Metalaxyl	0.24	U	ug/L	0.24	0.95
12/12/2011 9:55	Blank	Pesticides	Naled	0.76	UJ	ug/L	0.76	3
12/12/2011 9:55	Blank	Pesticides	Butylate	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Pesticides	Ethoprop	0.095	U	ug/L	0.095	0.38
12/12/2011 9:55	Blank	Priority Organic Pollutants	2,4-Dinitrophenol	14	U	ug/L	14	57
12/12/2011 9:55	Blank	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	2.9	U	ug/L	2.9	11
12/12/2011 9:55	Blank	Priority Organic Pollutants	Phenanthrene	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Priority Organic Pollutants	Pyrene	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Priority Organic Pollutants	Butyl benzyl phthalate	4.8	U	ug/L	4.8	19
12/12/2011 9:55	Blank	Priority Organic Pollutants	Isophorone	0.95	U	ug/L	0.95	3.8

Appendix E. continued

Date	Field ID	Analyses	Component	Result	Remark	Units	MDL	PQL
12/12/2011 9:55	Blank	Priority Organic Pollutants	Dimethyl phthalate	9.5	U	ug/L	9.5	38
12/12/2011 9:55	Blank	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.95	U	ug/L	0.95	3.8
12/12/2011 9:55	Blank	Priority Organic Pollutants	Anthracene	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Priority Organic Pollutants	3,3'-Dichlorobenzidine	38	U	ug/L	38	150
12/12/2011 9:55	Blank	Priority Organic Pollutants	2-Nitrophenol	0.95	U	ug/L	0.95	3.8
12/12/2011 9:55	Blank	Priority Organic Pollutants	Diethyl phthalate	0.95	U	ug/L	0.95	3.8
12/12/2011 9:55	Blank	Priority Organic Pollutants	Fluoranthene	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Priority Organic Pollutants	Hexachlorobutadiene	2.9	U	ug/L	2.9	11
12/12/2011 9:55	Blank	Priority Organic Pollutants	Nitrobenzene	1.9	U	ug/L	1.9	7.6
12/12/2011 9:55	Blank	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.95	U	ug/L	0.95	3.8
12/12/2011 9:55	Blank	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.95	U	ug/L	0.95	3.8
12/12/2011 9:55	Blank	Priority Organic Pollutants	2,6-Dinitrotoluene	0.95	U	ug/L	0.95	3.8
12/12/2011 9:55	Blank	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	2.9	U	ug/L	2.9	11
12/12/2011 9:55	Blank	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.95	U	ug/L	0.95	3.8
12/12/2011 9:55	Blank	Priority Organic Pollutants	Di-n-butyl phthalate	4.8	U	ug/L	4.8	19
12/12/2011 9:55	Blank	Priority Organic Pollutants	Hexachlorobenzene	0.95	U	ug/L	0.95	3.8
12/12/2011 9:55	Blank	Priority Organic Pollutants	Pentachlorophenol	2.9	U	ug/L	2.9	11
12/12/2011 9:55	Blank	Priority Organic Pollutants	2-Chlorophenol	0.95	U	ug/L	0.95	3.8
12/12/2011 9:55	Blank	Priority Organic Pollutants	Benzidine	95	U	ug/L	95	380
12/12/2011 9:55	Blank	Priority Organic Pollutants	Benzo(b)fluoranthene	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Priority Organic Pollutants	Benzo(k)fluoranthene	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Priority Organic Pollutants	Hexachlorocyclopentadiene	2.9	U	ug/L	2.9	11
12/12/2011 9:55	Blank	Priority Organic Pollutants	2,4-Dimethylphenol	9.5	U	ug/L	9.5	38
12/12/2011 9:55	Blank	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	1.9	U	ug/L	1.9	7.6
12/12/2011 9:55	Blank	Priority Organic Pollutants	4-Nitrophenol	14	U	ug/L	14	57
12/12/2011 9:55	Blank	Priority Organic Pollutants	Acenaphthene	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Priority Organic Pollutants	Benzo(a)anthracene	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	36	I	ug/L	14	57
12/12/2011 9:55	Blank	Priority Organic Pollutants	Chrysene	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Priority Organic Pollutants	Hexachloroethane	2.9	U	ug/L	2.9	11
12/12/2011 9:55	Blank	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Priority Organic Pollutants	N-Nitrosodimethylamine	1.9	U	ug/L	1.9	7.6
12/12/2011 9:55	Blank	Priority Organic Pollutants	Naphthalene	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Priority Organic Pollutants	2,4-Dichlorophenol	0.95	U	ug/L	0.95	3.8
12/12/2011 9:55	Blank	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.95	U	ug/L	0.95	3.8
12/12/2011 9:55	Blank	Priority Organic Pollutants	Acenaphthylene	0.19	U	ug/L	0.19	0.76

Appendix E. continued

Date	Field ID	Analyses	Component	Result	Remark	Units	MDL	PQL
12/12/2011 9:55	Blank	Priority Organic Pollutants	Benzo(a)pyrene	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	2.9	U	ug/L	2.9	11
12/12/2011 9:55	Blank	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	1.9	U	ug/L	1.9	7.6
12/12/2011 9:55	Blank	Priority Organic Pollutants	Phenol	0.95	U	ug/L	0.95	3.8
12/12/2011 9:55	Blank	Priority Organic Pollutants	2,4-Dinitrotoluene	0.95	U	ug/L	0.95	3.8
12/12/2011 9:55	Blank	Priority Organic Pollutants	2-Chloronaphthalene	0.95	U	ug/L	0.95	3.8
12/12/2011 9:55	Blank	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.95	U	ug/L	0.95	3.8
12/12/2011 9:55	Blank	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.19	U	ug/L	0.19	0.76
12/12/2011 9:55	Blank	Priority Organic Pollutants	Di-n-octyl phthalate	0.95	U	ug/L	0.95	3.8
12/12/2011 9:55	Blank	Priority Organic Pollutants	Fluorene	0.19	U	ug/L	0.19	0.76
12/14/2011 13:35	EFF-1	Field Parameter	Specific Conductance	5800		umhos/cm		
12/14/2011 13:35	EFF-1	Field Parameter	pH	7.61				
12/14/2011 13:35	EFF-1	Field Parameter	Temperature	23.4		C		
12/14/2011 13:35	EFF-1	Field Parameter	Dissolved Oxygen	5.49		mg/L		
12/16/2011 10:35	EFF-1	Field Parameter	Temperature	22.5		C		
12/16/2011 10:35	EFF-1	Field Parameter	Specific Conductance	5258		umhos/cm		
12/16/2011 10:35	EFF-1	Field Parameter	Dissolved Oxygen	8.26		mg/L		
12/16/2011 10:35	EFF-1	Field Parameter	pH	7.62				

Appendix F. Pages 1-7 NPDES Permit # FL0169226

Florida Department of
Environmental Protection
Northeast District
7825 Baymeadows Way, Suite B200
Jacksonville, Florida 32256-7590
Phone: 904/807-3300 ♦ Fax: 904/448-4366

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

STATE OF FLORIDA
INDUSTRIAL WASTEWATER FACILITY PERMIT

PERMITTEE:

Town of Hastings
6195 South Main Street, Suite A
Hastings, FL 32145

PERMIT NUMBER: FL0169226 (Minor)
PA FILE NUMBER: FL0169226-003-IW5C
ISSUANCE DATE: September 12, 2007
EXPIRATION DATE: September 11, 2012

RESPONSIBLE AUTHORITY:

Ms. Shelby Jack
Town Manager

FACILITY:

Hastings Water Treatment Plant
RO Reject Water Discharge
102 South Dancy Avenue
Hastings, St. Johns County

Latitude: 29° 43' 45" N Longitude: 81° 29' 15" W

This permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.) and applicable rules of the Florida Administrative Code (F.A.C.), and constitutes authorization to discharge to waters of the state under the National Pollutant Discharge Elimination System (NPDES). This permit is accompanied by an Administrative Order pursuant to paragraphs 403.088(2)(e) and (f), Florida Statutes. Compliance with Administrative Order AO-102-NE is a specific requirement of this permit. The above named permittee is hereby authorized to operate the facilities shown on the application and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

WASTEWATER TREATMENT:

The permit is for the operation of an existing demineralization concentrate (reject water) treatment and disposal system. The concentrate is generated at the water treatment plant that utilizes reverse osmosis membrane technology to produce drinking water. The permitted capacity of the reject water treatment and disposal system is 0.087 MGD maximum daily flow. The reject water is treated with aeration to increase dissolved oxygen prior to being discharged into Deep Creek via a 4 inch force main.

EFFLUENT DISPOSAL:

Appendix F. continued

PERMITTEE:
Town of Hastings
6195 South Main Street, Suite A
Hastings, FL 32145

PERMIT NUMBER: FL0169226
Issuance Date: September 12, 2007
Expiration Date: September 11, 2012

Surface Water Discharge:

An existing 0.087 MGD maximum discharge to Deep Creek (Class III Fresh waters), D-001. The discharge outfall line is 4 inches in diameter, approximately 20 feet in length, discharges at a depth of approximately 3.25 feet above the bottom of the Creek, and is located approximately at latitude 29° 43' 45" N, longitude 81° 29' 15" W.

IN ACCORDANCE WITH: The limitations, monitoring requirements and other conditions as set forth in Part I through Part VIII on pages 3 through 15 of this permit.

2

Appendix F. continued

PERMITTEE:
Town of Hastings
6195 South Main Street, Suite A
Hastings, FL 32145

PERMIT NUMBER: FL0169226
Issuance Date: September 12, 2007
Expiration Date: September 11, 2012

I. Effluent Limitations and Monitoring Requirements

A. Surface Water Discharges

1. During the period beginning on the issuance date and lasting through the expiration date of this permit, the permittee is authorized to discharge reverse osmosis reject water from Outfall D-001. Such discharge shall be limited and monitored by the permittee as specified below and reported in accordance with condition I.E.3.:

	Discharge Limitations			Monitoring Requirements		
Parameters (units)	**Monthly Average**	**Daily Maximum**	**Daily Minimum**	**Monitoring Frequency**	**Sample Type**	**Sample Point**
Flow (MGD)	Report	0.087	--	Continuous	Flow meter	FLW-1
pH (SU)	--	8.5	6.0	Daily	Grab	EFF-1
Oxygen, Dissolved (DO) (MG/L)	--	--	5.0	Daily	Grab	EFF-1
Temperature (F), Water (DEG.F)	--	Report	--	Quarterly	Grab	EFF-1
Nitrogen, Ammonia, Total (as N) (MG/L)	--	Report	--	Quarterly	Grab	EFF-1
Nitrogen, Ammonia, Total unionized (as N) (MG/L)	--	0.16 see I.A.3	--	Quarterly	Calculated	CAL-1
Carbonaceous Biochemical Oxygen Demand, 5-day (CBOD) (MG/L)	5.0 Annual Average	Report	--	Quarterly	Grab	EFF-1
Solids, Total Suspended (MG/L)	5.0 Annual Average	Report	--	Quarterly	Grab	EFF-1
Nitrogen, Total (MG/L)	3.0 Annual Average	Report	--	Quarterly	Grab	EFF-1
Phosphorus, Total (MG/L)	1.0 Annual Average	Report	--	Quarterly	Grab	EFF-1
Specific Conductance (UMHO/CM)	--	5089.0 see I.A.3	--	Quarterly	Grab	EFF-1
Radium 226 + Radium 228, Total (PCI/L)	--	12.2 see I.A.3	--	Quarterly	Grab	EFF-1
Alpha, Gross Particle Activity (PCI/L)	--	43.7 see I.A.3	--	Quarterly	Grab	EFF-1
Silver, Total Recoverable (UG/L)	--	0.286 see I.A.3	--	Quarterly	Grab	EFF-1
Whole Effluent Toxicity (Chronic)	See Permit Condition I.A.4 and Administrative Order AO-102-NE					EFF-1

Appendix F. continued

PERMITTEE:
Town of Hastings
6195 South Main Street, Suite A
Hastings, FL 32145

PERMIT NUMBER: FL0169226
Issuance Date: September 12, 2007
Expiration Date: September 11, 2012

2. Effluent samples shall be taken at the monitoring site locations listed in permit condition I.A.1 and as described below:

Sample Point	Description of Monitoring Location
FLW-1	Flow meter located on force main (in a vault) on the east side of the water treatment plant.
EFF-1	After aeration and prior to discharge, at discharge header of the concentrate pumps.
CAL-1	Calculated value

3. Pursuant to Rule 62-4.244, FAC the permittee is hereby granted mixing zones for the parameters listed below and chronic toxicity. The concentrate discharge shall not cause a violation of the Rule 62-302.530, F.A.C., Class III fresh water quality criteria outside the boundaries of the mixing zones described below.

Parameter	Mixing Zone Size
Un-ionized Ammonia	Radius of 10.0 feet
Specific Conductance	Radius of 5.0 feet
Combined Radium 226+228	Radius of 11.2 feet
Gross Alpha Particle Activity	Radius of 2.5 feet
Total Recoverable Silver	Radius of 5.0 feet

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

   a. Effluent Limitation
      (1) Whole effluent chronic toxicity shall not result in a No Observed Effect Concentration (NOEC) of less than **20%** effluent in any test. [Rule 62-302.530(62), F.A.C.]

   b. Monitoring Frequency
      (1) Routine toxicity tests shall be conducted at time of permit renewal or upon application for a substantial revision to the permit, according to FS 403.0882(5)(b), unless this toxicity test, or any subsequent toxicity test performed by the Department, does not meet toxicity requirements.

   c. Test Requirements
      (1) Routine Tests: All routine tests shall be conducted using a control (0% effluent) and a minimum of five test concentrations: 100%, 50%, 40%, **20%**, and 10% final effluent

      (2) Additional Follow-up Testing, if required:
         (a) If a routine test does not meet the chronic toxicity limitation in 4.a. (1) above, the permittee shall conduct two additional definitive tests on each species that failed the test.
         (b) Each additional test shall be conducted using a control (0% effluent) and a minimum of five dilutions: 100%, 50%, 40%, 20% and 10% effluent. The dilution series may be modified in the second test to more accurately bracket the toxicity, such that at least two dilutions above (not to exceed 100% effluent) and two dilutions below the target concentration and a control are run. All test results shall be statistically analyzed according to the Appendices in EPA-821-R-02-013.
         (c) The first additional test shall be initiated within two weeks of the end of the failed routine test and weekly thereafter until a total of two valid additional tests are completed.

      (3) The permittee shall conduct a daphnid, ***Ceriodaphnia dubia***, Survival and Reproduction Test, and a fathead minnow, ***Pimephales promelas***, Larval Survival and Growth Test, concurrently.

Appendix F. continued

PERMITTEE:
Town of Hastings
6195 South Main Street, Suite A
Hastings, FL 32145

PERMIT NUMBER: FL0169226
Issuance Date: September 12, 2007
Expiration Date: September 11, 2012

(4) All test species, procedures and quality assurance criteria used shall be in accordance with **Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms**, 4th ed., EPA-821-R-02-013. Any deviation of the bioassay procedures outlined herein shall be submitted in writing to the Department for review and approval prior to use. In the event the above method is revised, the permittee shall conduct chronic toxicity testing in accordance with the revised method.

(5) The control water and dilution water used shall be moderately hard water as described in Section 7 of EPA-821-R-02-013.

d. Sampling Requirements

(1) For each routine or additional follow-up test conducted, grab samples of final effluent shall be collected as specified and used per the sampling protocol discussed in EPA-821-R-02-013, Section 8.

(2) The first sample shall be used to initiate the test. The remaining two grab samples shall be collected according to the protocol and used as renewal solutions on Day 3 (48 hours) and Day 5 (96 hours) of the test.

e. Quality Assurance Requirements

(1) A standard reference toxicant (SRT) quality assurance (QA) chronic toxicity test shall be conducted with each species used in the required toxicity tests either concurrently or initiated no more than 30 days before the date of each routine or additional test conducted. The SRT-QA data shall be included in its respective routine or additional test report.

(2) If the mortality in the control (0% effluent) exceeds 20% for either species in any effluent test or does not meet test acceptability criteria, the test for that species (including the control) shall be invalidated and the test repeated. Test acceptability criteria for each species are defined in EPA-821-R-02-013, Section 13.12 (*C. dubia*) and Section 11.12 (*P. promelas*).

(3) If, during any test, 100% mortality occurs in the 20% effluent concentration prior to the end of the test, and control mortality is less than 20% at that time, that test (including the control) shall be terminated with the conclusion that the test fails and constitutes non-compliance.

(4) All tests shall be evaluated for acceptability based on the observed dose-response relationship and the percent minimum significant difference (PMSD) as required by EPA-821-R-02-013, Sections 10.2.6 and 10.2.8, respectively. Results from these evaluations shall be included with the bioassay reports.

f. Reporting Requirements

(1) Results from all required tests shall be reported on the Discharge Monitoring Report (DMR) as follows: Report the % effluent determined to be the NOEC endpoint of each test.

(2) A bioassay laboratory report for each routine test shall be prepared according to EPA-821-R-02-013, Section 10, Report Preparation and Test Review and mailed to the Department at the address below within 30 days of the completion of the test.

(3) For additional tests, a single laboratory report shall be prepared according to EPA-821-R-02-013, Section 10 and mailed within 45 days of completion of the second valid additional test. If any additional tests, or two consecutive routine tests, do not meet the effluent limitations specified in 4.a.(1) above, the permittee shall contact the Department within 30 days of the laboratory report submittal to discuss the appropriate corrective actions necessary to remedy the observed chronic toxicity

(4) All bioassay reports shall be mailed to:
FDEP – Northeast District
Wastewater Compliance Section
7825 Baymeadows Way, Suite B-200
Jacksonville, Florida 32256-7590

5. There shall be no discharge of floating solids or visible foam in other than trace amounts.

Appendix F. continued

6. The discharge shall not cause a visible sheen on the receiving water.

7. The pH shall not vary more than one unit above or below natural background measured at D-001, provided that the pH is not lowered to less than 6 units or raised above 8.5 units. If natural background pH is less than 6 units, the pH shall not vary below natural background or vary more than one unit above natural background. If natural background pH is higher than 8.5 units, the pH shall not vary above natural background or vary more than one unit below natural background.

B. Underground Injection Control Systems

1. This section is not applicable to this facility.

C. Land Application Systems

1. This section is not applicable to this facility.

D. Other Methods of Disposal or Recycling

1. There shall be no discharge of industrial wastewater from this facility to ground or surface waters, except as authorized by this permit.

E. Other Limitations and Monitoring and Reporting Requirements

1. The sample collection, analytical test methods and method detection limits (MDLs) applicable to this permit shall be in accordance with Rule 62-4.246, Chapters 62-160 and 62-601, F.A.C., and 40 CFR 136, as appropriate. The list of Department established analytical methods, and corresponding MDLs (method detection limits) and PQLs (practical quantification limits), which is titled "Florida Department of Environmental Protection Table as Required By Rule 62-4.246(4) Testing Methods for Discharges to Surface Water" is available at http://www.dep.state.fl.us/labs/guidance/index.htm. The MDLs and PQLs as described in this list shall constitute the minimum acceptable MDL/PQL values and the Department shall not accept results for which the laboratory's MDLs or PQLs are greater than those described above unless alternate MDLs and/or PQLs have been specifically approved by the Department for this permit. Any method included in the list may be used for reporting as long as it meets the following requirements:

   a. The laboratory's reported MDL and PQL values for the particular method must be equal or less than the corresponding method values specified in the Department's approved MDL and PQL list;

   b. The laboratory reported MDL for the specific parameter is less than or equal to the permit limit or the applicable water quality criteria, if any, stated in Chapter 62-302, F.A.C. Parameters that are listed as "report only" in the permit shall use methods that provide a MDL, which is equal to or less than the applicable water quality criteria stated in 62-302, F.A.C.; and

   c. If the MDLs for all methods available in the approved list are above the stated permit limit or applicable water quality criteria for that parameter, then the method with the lowest stated MDL shall be used.

   When the analytical results are below method detection or practical quantification limits, the permittee shall report the actual laboratory MDL and/or PQL values for the analyses that were performed following the instructions on the applicable discharge monitoring report.

   Where necessary, the permittee may request approval of alternate methods or for alternative MDLs or PQLs for any approved analytical method. Approval of alternate laboratory MDLs and PQLs are not necessary if the laboratory reported MDLs and PQLs are less than or equal to the permit limit or the applicable water quality criteria, if any, stated in Chapter 62-302, F.A.C. Approval of an analytical method not included in the above-referenced list is not necessary if the analytical method is in accordance with 40 CFR 136.

2. Parameters which must be monitored as a result of a surface water discharge shall be analyzed using a sufficiently sensitive method to assure compliance with applicable water quality standards and effluent

Appendix F. continued

limitations in accordance with 40 CFR Part 136. All monitoring shall be representative of the monitored activity.

3. Monitoring requirements under this permit are effective on the first day of the second month following permit issuance. Until such time, the permittee shall continue to monitor and report in accordance with previously effective permit requirements, if any. During the period of operation authorized by this permit, the permittee shall complete and submit to the Northeast District Office Discharge Monitoring Reports (DMRs) in accordance with the frequencies specified by the REPORT type (i.e., monthly, toxicity, quarterly, semiannual, annual, etc.) indicated on the DMR forms attached to this permit. Monitoring results for each monitoring period shall be submitted in accordance with the associated DMR due dates below.

REPORT Type on DMR	Monitoring Period	DMR Due Date
Monthly or Toxicity	first day of month – last day of month	28th day of following month
Quarterly	January 1 - March 31 April 1 – June 30 July 1 – September 30 October 1 – December 31	April 28 July 28 October 28 January 28
Semiannual	January 1 – June 30 July 1 – December 31	July 28 January 28
Annual	January 1 – December 31	January 28

DMRs shall be submitted for each required monitoring period including months of no discharge.

The permittee shall make copies of the attached DMR form(s) and shall submit the completed DMR form(s) to the Department at the address specified below:

Florida Department of Environmental Protection
Wastewater Compliance Evaluation Section, Mail Station 3551
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

4. Unless specified otherwise in this permit, all reports and notifications required by this permit, including twenty-four hour notifications, shall be submitted to or reported to the Northeast District Office at the address specified below:

Northeast District Office
7825 Baymeadows Way
Suite 200B
Jacksonville, FL 32256-7590
Phone Number - (904) 807-3300
FAX Number - (904) 448-4366 (All FAX copies shall be followed by original copies.)

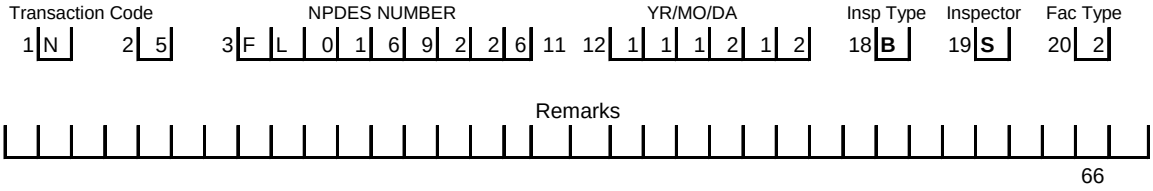
5. All reports and other information shall be signed in accordance with requirements of Rule 62-620.305, F.A.C.

6. The permittee shall provide safe access points for obtaining representative samples which are required by this permit.

Appendix G. EPA End Sheet

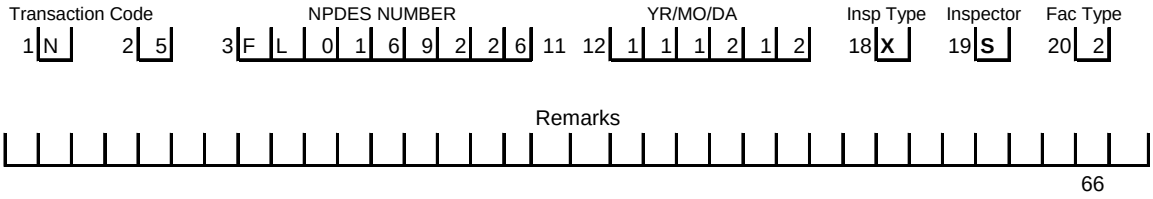
The Bioassays of the Hastings Water Treatment Plant effluent sampled on December 12, 14 and 16, 2011. NPDES #FL0169226.

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



The Priority Pollutants Analysis of the Hastings Water Treatment Plant effluent sampled on December 12, 2011. NPDES #FL0169226.

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



Biological Analyses of the Hastings Water Treatment Plant effluent sampled on December 12, 2011. NPDES #FL0169226.

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

