Biological Assessment of

Pace Water System, Inc. Wastewater Treatment Plant

Santa Rosa County

NPDES # FL0102202

Sampled October 29 and 31, November 2, and December 3, 5, and 7, 2012

May 2013

Biology Section

Bureau of Laboratories

Division of Environmental Assessment and Restoration

Quality Manual No. 870346G
NELAC Certification No. E31780

CONTENTS

Facility Overview

Methods

Results

Conclusion

Literature Cited

Tables

Table 1	Effluent limits, Class III Freshwater Criteria and chemical, microbiological and toxicological data.
Table 2	Effluent limits, Class III Freshwater Criteria and metals data.
Table 3	Measured and predicted algal growth potential (AGP)
Table 4	Bray-Curtis similarities for wetland macrophyte communities
Table 5-1	Control Wetland similarity percentages with species contributions
Table 5-2	Test Wetland similarity percentages with species contributions
Table 5-3	Control vs. Test Wetland dissimilarity percentages with species contributions
Table 6	Wetland Condition Index – Vegetation (WCI-V) community composition percentages

Figures

Figure 1	Non-metric multi-dimensional scaling plot

Appendices

Appendix A	Map of facility
Appendix B	Facility Summary
Appendix C	Explanation of measurements
Appendix D	Chain of Custody
Appendix E	Physical/Chemical and Wetland Condition Index – Vegetation (WCI-V) field sheets
Appendix F	Chemical analyses of effluent and receiving water
Appendix G	Toxicological results
Appendix H	Standard reference toxicant data
Appendix I	Wetland Condition Index – Vegetation (WCI-V) plant taxa list

EPA End Sheet

Facility Overview

The Pace Water System, Inc. Wastewater Treatment Plant is a Domestic Wastewater Treatment Facility. The effluent is discharged into the Pace Swamp wetland which flows to the Simpson River, a Class III Fresh Water (see map Appendix A). The plant discharges its effluent using galvanized diffusers that are distributed along 2,400 linear feet, onto rip-rap rocks dispersing the effluent into Pace Swamp. The design flow of the wastewater system is 5.0 million gallons per day (MGD) annual average daily flow, with a permitted discharge of 1.0 MGD to Pace Swamp, and 4.0 MGD to Part III Public Access Reuse. The annual average flow to Pace Swamp for October 2011 to September 2012 was 0.771 MGD, and the flow measured during this survey was 0.36 MGD (Northwest District sampling staff).

Biological assessments are prepared by FDEP staff to provide information for review of NPDES permit renewal applications. Biological assessments, in conjunction with other information concerning the subject facility and its receiving-water body, are used to determine appropriate permit conditions.

See the Facility Summary (Appendix B) for a description of the facility, summary of permit limits, and Consent Order (CO). The facility is operating under a consent order (OGC File No. 08-1611-57-DW) that provides an interim limit of 6.0 - 8.5 SU for pH of the effluent discharged to the treatment wetland at D-001 for a period of 5 years from the date of execution of the order (September 4, 2008).

Methods

The purpose of this investigation was to determine the discharge's effects on the biota of the receiving waters. Chemical and biological comparisons were made between a Control Wetland (located approximately 1.9 km southeast of the point of discharge near Highway 90) and a Test Wetland (located approximately 500 meters northwest of the point of discharge). Effluent samples were taken as grab or composite samples from monitoring location EFD-01, after dechlorination.

All field and laboratory biological methods followed Bureau of Laboratories and Biology Section Standard Operating Procedures (see http://www.dep.state.fl.us/labs/library/lab_sops.htm and http://www.dep.state.fl.us/water/sas/sop/sops.htm for details) and met DEP quality assurance/quality control standards (see http://www.dep.state.fl.us/water/sas/qa/index.htm). Explanations of specific methods and measurements can be found in Appendix C.

The following were involved in this investigation: Nathan Mulkey, Frank Butera, and Rick Abad (FDEP Northwest District Office, Pensacola), and FDEP Central Laboratory in Tallahassee. The report was reviewed by District representatives and the Point Source Studies Review Committee (Michelle Fish and Mike Tanski).

Results

Organic Constituents (See Table 1 and Appendix F)

- Simazine was detected in the effluent.
- No organic constituents were detected in the Control Wetland grab sample.
- Sucralose was detected in the Test Wetland grab sample. The presence of sucralose at the Test Wetland indicates that the site is receiving effluent.
- No organic constituents were detected in the field blank.

Metals (See Table 2 and Appendix F)

- All metals detected in the effluent grab and composite samples were present at levels that complied with effluent permit limits and Class III Freshwater Quality Criteria (62-302.530, F. A. C.).

- Control Wetland grab sample iron (2,510 µg/L) exceeded Class III Freshwater Quality Criteria (62-302.530(38), F.A.C). All other metals detected in the Control Wetland grab sample complied with Class III Freshwater Quality Criteria (62-302.530, F.A.C.).
- All metals in the Test Wetland grab sample were either undetected or detected at levels that complied with Class III Freshwater Quality Criteria (62-302.530, F. A. C.).
- No metals were detected in the field blank.

Toxicity Whole Effluent Test (See Table 1 and Appendices G and H)

- Tests were performed October 30 through November 6, 2012 and December 4 through December 9, 2012.
- The chronic definitive bioassay for the water flea, *Ceriodaphnia dubia*, performed on October 30, 2012 was invalidated due to fewer than 60% of the surviving control organisms producing a third brood. The retest was run December 4 through 9.
- The effluent sample was toxic (NOEC of 50% effluent) to the water flea, *Ceriodaphnia dubia,* during the chronic definitive bioassay December retest. This toxicity constitutes an exceedance of Class III Water Quality Criterion (62-302.530(61), F.A.C.) and the permit limit.
- The effluent sample NOEC for the fish, *Pimephales promelas,* during the October chronic definitive bioassay was 100%, and therefore, complied with effluent permit limits.

Physical and Chemical Parameters (See Table 1 and Appendices D, E and F)

- The Control Wetland's measured dissolved oxygen (0.7 mg/L) was below the minimum limit for Class III Freshwater Quality Criterion (62-302.530(30), F.A.C.). Dissolved oxygen of the effluent and Test Wetland complied with Class III Freshwater Quality Criterion (62-302.530, F.A.C.) and the effluent permit limit.
- The pH of the Test Wetland (7.5 SU) exceeded the limit for Class III Freshwater Quality Criterion (62-302.530(51)(c), F.A.C.). The facility has submitted a draft petition for a Site Specific Alternative Criterion (SSAC) for pH that is currently under review. The pH of the effluent complied with the interim permit limits. The pH of the Control Wetland complied with Class III Freshwater Quality Criterion (62-302.530, F.A.C.).
- Specific conductance (µmhos/cm) of the effluent, Control Wetland, and Test Wetland complied with Class III Freshwater Quality Criteria (62-302.530, F.A.C.).
- Chlorophyll *a* (corrected) was undetected in the effluent grab sample, detected between the method detection limit (MDL) and practical quantitation limit (PQL) in the Control Wetland grab sample, and detected at a low level in the Test Wetland grab sample.
- Total suspended solids (TSS; mg/L) and carbonaceous biochemical oxygen demand (CBOD; mg/L) of the effluent complied with permit limits.

Microbiology (See Table 1 and Appendix F)

- Fecal coliform analyses were performed by the University of West Florida, Pensacola, Florida.
- Fecal coliforms were not detected in the effluent grab sample or the Control Wetland grab sample.
- Test Wetland grab sample fecal coliforms (460 CFU) exceeded the Class III Freshwater Quality Criterion (62-302.530(6), F.A.C.).

Nutrients (See Table 1 and Appendix F)

- Effluent composite and effluent grab sample nutrient levels complied with permit limits.
- Levels of ortho-phosphate and total phosphorus detected in the Control and Test Wetland grab samples were similar and much lower than levels detected in the effluent grab and composite samples.
- Total Kjeldahl nitrogen (TKN) and total organic carbon (TOC) were higher in the Control Wetland grab sample than in the Test Wetland sample, which may be a reflection of more organic material at the Control Wetland (standing water) than the Test Wetland (good flow).

- Total ammonia levels detected in the Test Wetland grab sample were twice as high as those detected in the Control Wetland grab sample and similar to effluent grab and composite sample levels. Also of note is the elevated nitrate+nitrite level of the Test Wetland grab sample as opposed to non-detect in the Control Wetland grab sample, suggesting influence from the effluent at the Test Wetland.
- No nutrients were detected in the field blank.

Algal Growth Potential (See Table 3 and Appendix F)

- Raschke and Shultz (1987) determined that AGP values above 5.0 mg dry weight/L, which represents a "problem" threshold for fresh receiving waters, imply nutrient enrichment. The AGP value in the effluent grab sample using the freshwater species, *Pseudokirchneriella subcapitata,* was approximately 77 times greater than the problem threshold value. The analytical chemistry suggests that the effluent sample is nitrogen limited.
- The AGP value measured in the Control Wetland grab sample was below the problem threshold value.
- The AGP value measured in the Test Wetland grab sample approximately two times greater than the problem threshold value.
- The analytical chemistry suggests that the Control and Test Wetland grab samples were phosphorus limited.
- The low AGP value of the Control Wetland grab sample in comparison with the elevated AGP value of the Test Wetland grab sample and the further elevated AGP value of the effluent grab sample indicates that the facility's effluent is enriching the Test Wetland when the facility is discharging.

Bioassessment

Wetland Condition Index – Vegetation (See Tables 4, 5-1, 5-2, 5-3, and 6, Appendix I, and Figure 1)

- The Wetland Condition Index – Vegetation (WCI-V) method was conducted at Pace Swamp wetlands on October 29 and 31, 2012. The taxa list from the WCI-V was used to compare the macrophyte communities of the Test and Control Wetlands. Bray-Curtis similarity percentages with species contributions were calculated. Community composition was also compared.
- *Ligustrum sinense,* an exotic species, was present in one of four transects of the Control Wetland and in all four transects of the Test Wetland. The other exotics, *Lygodium japonicum* and *Murdannia sp.* were found in two transects of both the Control and the Test Wetlands.
- The average similarity among the Control Wetland transects was 70% and among the Test Wetland transects was 72%. However, when the Control Wetland transects were compared with the Test Wetland transects, the average similarity dropped to 58%.
- The similarity percentages with species contributions (SIMPER) analysis (PRIMER software version 6, PRIMER-E, Ltd.) determines which species are contributing to the differences between groups and which species are contributing to the similarity within a group. Results of the SIMPER analysis show that the Control and Test Wetlands are 41.7% dissimilar, but this does not indicate that the quality of the macrophyte communities is significantly different. No particular species or group of species contributed substantially to the differences. *Ligustrum sinense* (an exotic species) had the most significant contribution to the dissimilarity (5.79%).
- The similarity profile (SIMPROF) permutation test (PRIMER software version 6, PRIMER-E, Ltd.) checks that samples that cluster together by similarity are actually statistically significant groups (Figure 1). While the SIMPROF test indicated statistical differences in the composition of the Test and Control wetlands, there is no evidence that it indicates a degradation of the Test Site wetland community as a result of the effluent.
- The final WCI-V scores are not presented because this wetland type and region of the Panhandle were not well represented in the original development dataset. The following macrophyte community composition percentages are indicators of change, and are applicable across wetland community types and regions: % exotic, % native perennial, % wetland status, and mean Coefficient

of Conservatism. Those community composition percentages did not differ between the Control and Test Wetlands.

- Although the Bray-Curtis similarities and SIMPROF indicate that there are slight differences in the composition and structure of the macrophyte communities present at the study sites, there is no evidence from the community composition percentages that indicates degradation of the macrophyte community at the Test Wetland as a result of the effluent.

Conclusion

Control Wetland dissolved oxygen was below the minimum limit for Class III Freshwater Quality Criterion (62-302.530(30), F.A.C.). Test Wetland pH exceeded the exceeded the limit for Class III Freshwater Quality Criterion (62-302.530(51)(c), F.A.C. The effluent sample was toxic to the water flea, *Ceriodaphnia dubia*, during the chronic definitive bioassay retest. This toxicity constitutes an exceedance of Class III Water Quality Criterion (62-302.530(61), F.A.C.) and the permit limit. The Test Wetland grab sample fecal coliforms exceeded the Class III Freshwater Quality Criterion (62-302.530(6), F.A.C.). The Control Wetland grab sample iron exceeded Class III Freshwater Quality Criterion (62-302.530(38), F.A.C). The nutrients and AGP of the effluent samples were generally higher than the Control and Test Wetland grab samples. Nitrate+nitrite and total nitrogen detected in the Test Wetland grab sample were higher than the Control Wetland grab sample and the Test Wetland grab sample AGP was higher than the Control Wetland grab sample AGP. This indicates nutrient enrichment of the Test Wetland due to the effluent. The results of the WCI-V did not demonstrate that the effluent is having a detrimental effect on the vascular plant community in the receiving waters.

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.

Reiss, K.C. and M.T. Brown. 2005. The Florida Wetland Condition Index (FWCI): Developing Biological Indicators for Isolated Depressional Forested Wetlands. Howard T. Odum Center for Wetlands. University of Florida. 168 pp.

USEPA. 2000. Nutrient Criteria Technical Guidance Manual – River and Streams. EPA-822-B-00-002.

Table 1. Effluent limits, Class III Freshwater Criteria and chemical, microbiological and toxicological data.

Pace Water System, Inc. WWTP	Class III Criteria	Effluent Limits	Effluent Composite	Effluent Grab	Control Wetland	Test Wetland
Organic Constituents (µg/L)						
Simazine	-	-	-	0.22	-	-
Sucralose	-	-	-	31	0.021 U	0.3
Nutrients (mg/L)						
Ortho-phosphate	-	-	-	3	0.007 I	0.004 U
Total Phosphorus	-	Report *p	3.6	3.1	0.01	0.008
Total Ammonia	-	≤ 2.0 *p	0.031	0.035	0.018 I	0.04
Un-ionized Ammonia	≤ 0.02 s	-	-	≤ 0.02 c	≤ 0.02 c	≤ 0.02 c
Nitrate and Nitrite	-	-	9.3	9	0.004 U	0.32
Total Kjeldahl Nitrogen	-	-	0.73	0.75	0.38	0.2
Organic Nitrogen	-	-	0.699 c	0.715 c	0.362 c	0.16 c
Total Nitrogen	-	Report *p	10.03 c	9.75 c	0.382 c	0.52 c
Total Organic Carbon (mg C/L)	-	-	-	4.4	5.6	1.5
General Physical and Chemical Parameters						
Dissolved Oxygen (mg/L)	≥ 5.0	≥ 6.0	-	8.2	0.7	8.2
pH (SU)	4.35 - 5.35 β	6.0 - 8.5 †	-	6.1	5.3	7.5
Conductivity (µmhos/cm)	≤ 1,275	-	-	452	53	47
Temperature (°C)	-	-	-	22.6	16.7	19.0
Sample Depth (m)	-	-	-	-	0.15	0.15
Total Depth (m)	-	-	-	-	0.20	0.25
Alkalinity (mg CaCO3)		-	-	48	3.5	4.9
Total Residual Chlorine (mg/L)	≤ 0.01	≤ 0.01	≤ 0.03 UQ£	-	-	-
Chlorophyll *a* (µg/L) - Corrected	-	-	-	0.55 U	1 I	1.9
Phaeophytin (µg/L)	-	-	-	0.4 U	0.4 U	0.4 U
Total Suspended Solids (mg/L)	-	≤ 20.0 p	2 U	2 I	8 I	4 I
Turbidity (NTU)	< 29 t	-	-	0.75	2.9	1.2
Color (PCU)	-	-	-	4.3 I	75	2.8 I
CBOD, 5 day (mg/L), N - inhibited	-	≤ 20.0 p	1 IQ	1.2 I	0.67 I	0.49 I
Chloride (mg/L)	-	-	-	54	8.6	7
Fluoride (mg/L)	≤ 10.0	-	-	0.035 U	0.035 U	0.035 U
Sulfate (mg/L)	-	-	-	31	0.74	0.5 I
Sulfide (mg S/L)		-	-	0.05 U	0.5 U	0.5 U
Flow (MGD)	-	≤ 1.0 a	-	0.771 a	-	-
Hardness (mg $CaCO_3$)	-	Report p	-	90.5 c	8.37 c	8.70 c
Toxicity (Chronic Definitive, NOEC, % effluent)						
Bioassay - Water flea *(Ceriodaphnia dubia) - survival and reproduction*	-	-	No Result**	-	-	-
Bioassay - Water flea *(Ceriodaphnia dubia) - survival and reproduction*	-	≥ 100	50	-	-	-
Bioassay - Fish *(Pimephales promelas) -survival and growth*	-	≥ 100	100	-	-	-
Microbiology (Number of colony forming units/100ml)						
Fecal Coliforms ¥	≤ 400s #	≤ 86	-	1 B	1 B	460

Value exceeds the Class III Water Quality Criteria or permit limits

"-" Sample/measurement was not collected or limit/criterion does not exist
a - Annual average
c - Value is calculated
p - 24 hour flow proportioned composite
s - Single sample
t - Shall not exceed 29 NTUs above background
B - Results based on colony counts outside the acceptance range
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
NOEC - A no observed effect concentration less than 100% effluent will constitute a violation of this permit
¥ - Fecal coliform analysis performed by University of West Florida (UWF) lab
- If 10 or fewer samples are taken within a month, the single sample limit is 400 CFU (62-302.530(6), F.A.C.)
£ - Measurement taken in the FDEP laboratory
* - Monthly average
** - See the toxicity discussion on pg.4 of this report for more information
† - Consent order (OGC File No. 08-1611-57-DW) provides this interim limit
β - Based on the receiving wetlands (Pace Swamp) acidic natural background pH of 4.35 SU

Table 2. Effluent limits, Class III Freshwater Criteria and metals data. Class III Criteria based on hardness are presented individually for each site based on hardness at that site.

Pace Water System, Inc. Wastewater Treatment Plant	Effluent Class III Criteria (Composite)	Effluent Composite Limits	Effluent Composite	Effluent Class III Criteria (Grab)	Effluent Grab	Control Wetland Class III Criteria	Control Wetland	Test Wetland Class III Criteria	Test Wetland
Metals (µg/L unless otherwise noted)									
Aluminum	-	-	-	-	8.6 I	-	94 A	-	61
Arsenic	≤ 50	-	-	≤ 50	0.25 U	≤ 50	0.58 I	≤ 50	0.52 I
Cadmium	-	-	-	≤ 0.250 b	0.072 I	≤ 0.10 b	0.05 U	≤ 0.10 b	0.05 U
Calcium (mg/L)	-	-	-	-	31.8	-	1.9 A	-	1.11
Chromium-III	-	-	-	≤ 79.4 b	0.3 U	≤ 27.7 b	0.3 U	≤ 27.7 b	0.3 U
Copper	≤ 8.56 €	≤ 8.56 €	4.57	≤ 8.56 b	4.11	≤ 2.85 b	0.5 U	≤ 2.85 b	0.5 U
Iron	≤ 1,000	-	-	≤ 1,000	43 I	≤ 1,000	2,510 A	≤ 1,000	350
Lead	-	-	-	≤ 2.80 b	0.2 U	≤ 0.54 b	0.2 U	≤ 0.54 b	0.2 U
Magnesium (mg/L)	-	-	-	-	2.69	-	0.88 A	-	1.44
Mercury	≤ 0.012	-	-	≤ 0.012	0.12 U	≤ 0.012	0.12 U	≤ 0.012	0.12 U
Nickel	-	-	-	≤ 47.9 b	2.09	≤ 16.1 b	0.37 I	≤ 16.1 b	0.25 U
Selenium	≤ 5.0	-	-	≤ 5.0	0.2 U	≤ 5.0	0.2 U	≤ 5.0	0.2 U
Silver	≤ 0.07	-	-	≤ 0.07	0.025 U	≤ 0.07	0.025 U	≤ 0.07	0.025 U
Sodium (mg/L)	-	-	-	-	3.8	-	4.6 A	-	-
Zinc	≤ 110 €	≤ 110 €	64	≤ 110 b	70	≤ 37.0 b	8 I	≤ 37.0 b	6.6 I

See Table 1 for calculated hardness.

Value exceeds the Class III Water Quality Criteria or permit limits

b - Value is calculated based on hardness

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

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

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

€ - Limit is based on calcium and magnesium from the effluent grab

Table 3. Measured and predicted algal growth potential (AGP; mg dry weight/L) for total soluble inorganic nitrogen (TSIN), ortho-phosphate (OP), total nitrogen (TN) and total phosphorus (TP) limitation of the freshwater species *Pseudokirchneriella subcapitata* and ratios of nitrogen to phosphorus.

Pace Water System, Inc. Wastewater 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
Effluent	384	354.6 ± 70.9		381.1 ± 76.2		3.1	2.8
Control Wetland	0.760		3.0 ± 0.6		4.3 ± 0.9	3.1	38.4
Test Wetland	8.30		1.7 ± 0.3		3.4 ± 0.7	90.0	65.0

Table 4. Macrophyte Communites - Bray-Curtis similarity percentages

Pace Water System, Inc. WWTP	Control Occurrences Average	Control Occurrences Transect 1	Control Occurrences Transect 2	Control Occurrences Transect 3	Control Occurrences Transect 4	Test Occurrences Transect 1	Test Occurrences Transect 2	Test Occurrences Transect 3	Test Occurrences Transect 4	Test Occurrences Average
Control Occurrences Average	69.59									
Control Occurrences Transect 1		73.19								
Control Occurrences Transect 2		65.82	68.29							
Control Occurrences Transect 3		68.58	72.84	68.79						
Control Occurrences Transect 4		59.53	58.94	60.77	60.30					
Test Occurrences Transect 1		56.69	58.08	51.74	60.89	77.26				
Test Occurrences Transect 2		57.34	58.24	55.35	58.76	80.47	77.65			
Test Occurrences Transect 3		58.71	66.94	55.90	54.39	62.45	68.68	68.02		
Test Occurrences Transect 4										
Test Occurrences Average	58.29									72.42

Table 5-1. Control Wetland similarity percentages with species contributions

Control Wetland					Average Similarity: 69.59
Species	Average Abundance	Average Similarity	Similarity/ Standard Deviation	Contribution %	Cumulative %
Acer rubrum	2.91	5.16	12.59	7.42	7.42
Magnolia virginiana	2.90	5.02	10.59	7.21	14.63
Woodwardia areolata	2.77	4.82	9.85	6.93	21.56
Vitis rotundifolia	2.67	4.48	16.25	6.43	27.99
Itea virginica	2.48	4.24	17.18	6.09	34.08
Toxicodendron radicans	2.31	3.81	10.28	5.48	39.56
Osmunda cinnamonmoea	2.05	3.56	7.90	5.11	44.68
Sphagnum Moss	2.20	3.22	3.62	4.63	49.31
Nyssa sylvatica var. biflora	2.01	3.11	4.46	4.46	53.77
Rhododendron viscosum var. serrulatum	1.98	3.04	2.29	4.37	58.14
Smilax walteri	1.97	2.91	2.37	4.18	62.32
Rubus pensilvanicus	2.05	2.79	2.59	4.01	66.33
Centella asiatica	1.73	2.53	3.69	3.64	69.97
Osmunda regalis	1.66	2.44	3.26	3.50	73.47
Boehmeria cylindrica	1.60	2.34	4.23	3.37	76.84
Smilax laurifolia	1.39	2.27	4.34	3.26	80.10
Lycopodim sp.	1.21	2.01	4.73	2.88	82.98
Hydrocotyle sp.	1.29	2.00	5.78	2.87	85.85
Saururus cernuus	1.21	1.99	6.51	2.86	88.72
Persea palustris	1.57	1.54	0.86	2.21	90.93

Table 5-2. Test Wetland similarity percentages with species contributions

Test Wetland					Average Similarity: 72.42
Species	Average Abundance	Average Similarity	Similarity/ Standard Deviation	Contribution %	Cumulative %
Itea virginica	2.78	5.41	35.19	7.47	7.47
Woodwardia areolata	2.86	5.39	10.60	7.44	14.91
Ligustrum sinense	2.81	5.28	9.63	7.29	22.20
Nyssa sylvatica var. biflora	2.49	4.65	20.13	6.42	28.62
Acer rubrum	2.59	4.51	3.76	6.23	34.85
Magnolia virginiana	2.37	4.29	4.97	5.92	40.77
Sphagnum Moss	2.15	3.86	6.94	5.34	46.11
Decumaria barbara	2.10	3.86	7.90	5.33	51.43
Toxicodendron radicans	2.04	3.68	7.81	5.07	56.51
Smilax laurifolia	2.13	3.58	4.54	4.95	61.46
Osmunda cinnamonmoea	1.90	3.34	5.67	4.61	66.07
Osmunda regalis	1.62	2.86	24.87	3.95	70.02
Ilex coriacea	1.68	2.83	3.34	3.91	73.92
Rubus pensilvanicus	1.62	2.74	3.79	3.78	77.71
Leucothoe axillaris	1.76	2.62	3.52	3.62	81.33
Illicium floridanum	1.83	2.26	0.91	3.13	84.45
Cliftonia monophylla	1.29	2.17	5.07	3.00	87.45
Vitis rotundifolia	1.31	2.02	24.87	2.79	90.24

Table 5-3. Control vs. Test Wetland dissimilarity percentages with species contributions

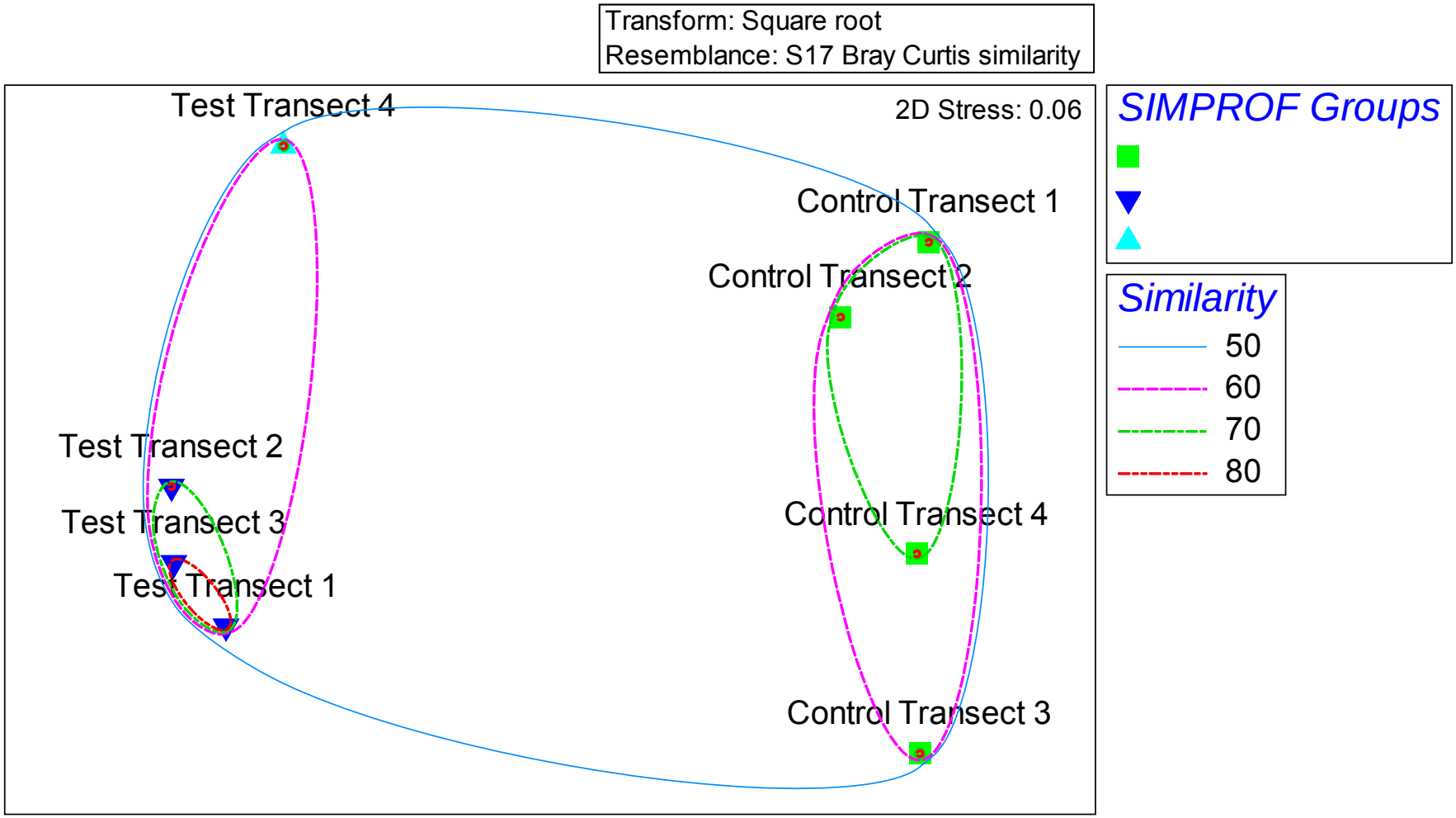
Control vs. Test Wetland						Average Dissimilarity = 41.71
Species	Control Average Abundance	Test Average Abundance	Average Dissimilarity	Dissimilarity/ Standard Deviation	Contribution %	Cumulative %
Ligustrum sinense	0.35	2.81	2.41	3.20	5.79	5.79
Rhododendron viscosum var. serrulatum	1.98	0.00	1.93	3.27	4.62	10.41
Smilax walteri	1.97	0.43	1.58	1.94	3.79	14.20
Decumaria barbara	0.50	2.10	1.56	2.69	3.74	17.95
Illicium floridanum	0.43	1.83	1.56	1.51	3.74	21.69
Boehmeria cylindrica	1.60	0.00	1.54	3.50	3.70	25.39
Leucothoe axillaris	0.35	1.76	1.40	1.87	3.36	28.75
Ilex coriacea	0.35	1.68	1.35	2.09	3.24	31.99
Vitis rotundifolia	2.67	1.31	1.31	2.11	3.13	35.12
Cliftonia monophylla	0.00	1.29	1.26	3.66	3.01	38.13
Persea palustris	1.57	0.60	1.24	1.39	2.98	41.11
Saururus cernuus	1.21	0.00	1.17	5.64	2.81	43.92
Lyonia lucida	0.85	1.22	1.01	1.28	2.43	46.35
Hydrocotyle sp.	1.29	0.35	1.01	1.92	2.43	48.78
Viburnum nudum	0.60	1.29	0.94	1.43	2.25	51.03
Toxicodendron vernix	1.21	0.50	0.94	1.47	2.25	53.29
Centella asiatica	1.73	0.93	0.84	1.26	2.02	55.31
Quercus nigra	0.96	0.25	0.79	1.43	1.89	57.20
Ilex cassine	0.79	0.25	0.77	1.09	1.85	59.05
Rubus pensilvanicus	2.05	1.62	0.75	1.45	1.79	60.84
Onoclea sensibilis	0.00	0.79	0.74	0.96	1.78	62.62
Smilax laurifolia	1.39	2.13	0.74	1.59	1.78	64.40
Lycopodim sp.	1.21	0.50	0.71	1.23	1.70	66.10
Ilex opaca	0.85	0.25	0.70	1.31	1.68	67.78
Sagitaria latifolia	0.68	0.00	0.63	0.91	1.52	69.30
Sphagnum Moss	2.20	2.15	0.60	1.62	1.44	70.73
Peltandra sp.	0.25	0.60	0.60	0.99	1.44	72.17
Leucothoe racemosa	0.00	0.60	0.59	0.93	1.43	73.60
Smilax glauca	0.60	0.25	0.59	0.99	1.41	75.01
Myrica cerifera	0.60	0.00	0.59	0.95	1.41	76.42
Chamaecyparis thyoides	0.00	0.60	0.58	0.93	1.40	77.81
Magnolia virginiana	2.90	2.37	0.56	1.34	1.35	79.17
Nyssa sylvatica var. biflora	2.01	2.49	0.56	1.39	1.33	80.50
Ilex vomitoria	0.25	0.50	0.49	0.97	1.17	81.67
Mikania scandens	0.50	0.00	0.48	0.97	1.15	82.82
Sambucus canadensis	0.25	0.50	0.48	0.97	1.15	83.97
Lygodium japonicum	0.25	0.50	0.48	0.97	1.15	85.11
Murdannia sp.	0.50	0.25	0.48	0.97	1.14	86.25
Osmunda regalis	1.66	1.62	0.47	1.30	1.12	87.37
Toxicodendron radicans	2.31	2.04	0.46	1.27	1.11	88.48
Liriodendron tulipifera	0.35	0.25	0.46	0.79	1.09	89.58
Acer rubrum	2.91	2.59	0.45	1.02	1.07	90.65

Table 6. Wetland Condition Index - Vegetation community composition percentages

Pace Water System, Inc. WWTP	Test Wetland	Control Wetland
% Tolerant Taxa	0.0	2.0
% Sensitive Taxa	2.4	2.0
% Exotic Taxa	7.1	6.1
Avg CC of Taxa	5.0	4.7
% Native Perennial Taxa	92.7	93.8
% Wetland Status Taxa	66.7	66.0

Figure 1

Non-metric multi-dimensional scaling plot

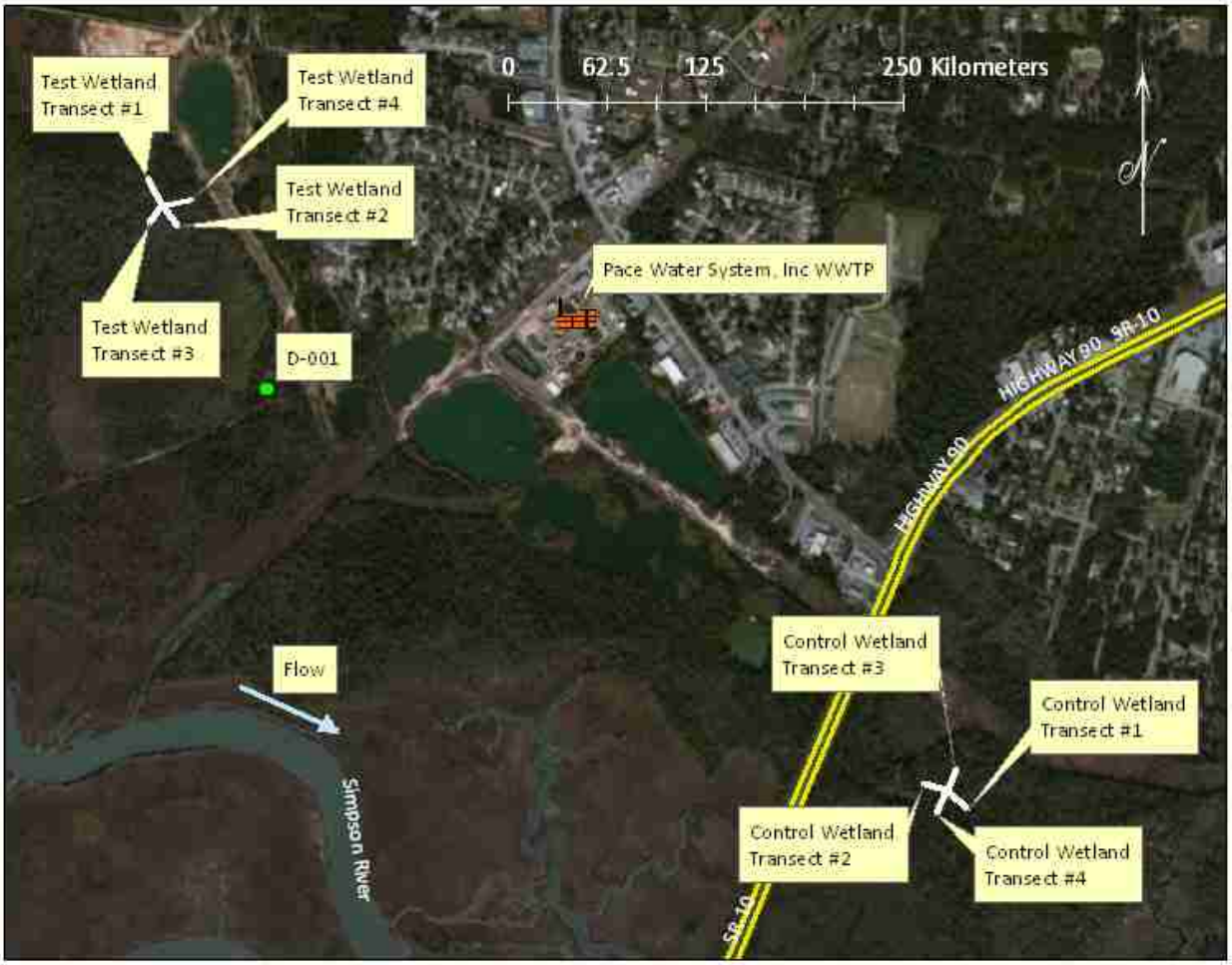


Appendix A

Pace Water System, Inc WWTP

Fifth Year Bioassessment Sampling Locations





Appendix B

Facility summary

State of Florida
Department of Environmental Protection
Facility Introduction & Summary

PART I: Information gathered prior to sampling event	
Prepared By: **Kim Allen**	**Contact Number:** **595-0553**
Facility Name (as it appears on permit): **Pace Water System, Inc. WWTF**	**Former Names:**
NPDES Permit Number: **FL0102202**	**Permit Expiration Date:** **9/7/2013**
Physical Address: **4401 Woodbine Road**	
District: **NWD**	**County:** **Santa Rosa**
Function of Facility: **Municipal Wastewater Treatment**	
Facility Type: **DW**	**Permitted Capacity (MGD):** **5 mgd**
Mean Flow for previous 12 months for all EXTERNAL outfalls listed in permit (list date range including months): **.719 mgd Annual Average (6/01/2011 through 7/30/2012)**	
1.15 mgd Annual Average (6/01/2011 through 7/31/2012)	
Description of type of Discharge: ☐ **Continuous** ☐ **Intermittent** ☐ **Seasonal** ☐ **Rainfall Dependent** ☒ **Other, please specify** Continuous flow from the plant but not continuous flow to the wetland, as the facility is also a reuse facility.	

Description of Permitted Outfall(s):

An existing 1.0 MGD annual average daily flow (AADF) permitted discharge D-001 to approximately 144 acres of the Pace Swamp wetlands. Effluent is discharged through galvanized diffusers that are distributed along 2,400 LF, onto rip-rap rocks dispersing the effluent into Pace swamp. Pace Swamp's water flows to the Simpson River (Class III fresh waters) a tributary to Escambia Bay. The point of discharge is located approximately at latitude 30° 35' 43" N, longitude 87° 11' 41" W. See attached map.

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

An existing 5 MGD, annual average daily flow. Headworks consisting of a rotating screen & press, grit removal system, grit pump, and grit classifier; Biological Treatment Basin consisting of two 3-stage biological nutrient removal basins; two clarifiers; two rotating stainless-steel mesh filters; a panel mounted chlorine feed system; two chlorine contact chambers, two aerobic digesters with floating mixers; return activated sludge pump station; waste activated sludge pump station; Scum Pump station; onsite duplex submersible pump station replace existing onsite pump station; and a 1000-KW Generator.

PART I: Continued

List current Effluent Limits of Outfall(s) to be Sampled: This should include any AO or CO limits the facility may be under
(Leave cell blank if not applicable)

I. RECLAIMED WATER AND 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 effluent from Outfall D-001 to wetlands. Such discharge shall be limited and monitored by the permittee as specified below and reported in accordance with condition I.D.10:

			Effluent Limitations				Monitoring Requirements			
Parameter	Units	Max/Min	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	Notes
Flow (to the Wetlands)	MGD	Maximum	1.0	Report	-	-	Continuous	Calculated	FLW-03	See Cond.I.A.4
BOD, Carbonaceous 5 day, 20C	MG/L	Maximum	10.0	12.5	15.0	20.0	Weekly	24-hour flow proportioned composite	EFF-02	
Solids, Total Suspended	MG/L	Maximum	10.0	12.5	15.0	20.0	Daily	24-hour flow proportioned composite	EFF-02	
pH	SU	Range	-	-	-	4.25 - 5.35	Continuous	Meter	EFF-02	See Cond.I.A.3
Coliform, Fecal	#/100 ML	Maximum	See Permit Condition I.A.5.				Daily	Grab	EFF-02	
Total Residual Chlorine (For Disinfection)	MG/L	Minimum	-	-	-	1.0	Continuous	Meter	EFA-01	See Cond.I.A.3, 6
Total Residual Chlorine (For Dechlorination)	MG/L	Maximum	-	-	-	0.01	Daily	Grab	EFD-01	
Nitrogen, Total	MG/L	Maximum	-	Report	-	-	Weekly	24-hour flow proportioned composite	EFF-02	
Nitrogen, Total	LBS/MONTH	Maximum	-	2671	-	-	Weekly	Calculated	CAL-01	
Phosphorus, Total (as P)	MG/L	Maximum	-	Report	-	-	Weekly	24-hour flow proportioned composite	EFF-02	
Phosphorus, Total (as P)	LBS/MONTH	Maximum	-	321	-	-	Weekly	Calculated	CAL-01	
Ammonia, Total as N	MG/L	Maximum	-	2.0	-	-	Weekly	24-hour flow proportioned composite	EFF-02	
Copper, Total Recoverable	UG/L	Maximum	-	-	-	See cond. I.A.8.	Monthly	24-hour flow proportioned composite	EFF-02	
Whole Effluent Toxicity (Chronic)	See Permit Condition I.A.7								EFD-01	
Zinc, Total Recoverable	UG/L	Maximum	-	-	-	See cond. I.A.9.	Monthly	24-hour flow proportioned composite	EFF-02	
Oxygen, Dissolved (DO)	MG/L	Minimum	-	-	-	6.0	Daily	Grab	EFD-01	
Hardness, Total (as CaCO3)	MG/L	Maximum	-	-	-	Report	Monthly	24-hour flow proportioned composite	EFF-02	

I. Treatment Wetland: During the period beginning on the issuance date and lasting through the expiration date of this permit, the permittee shall monitor water quality, sediment, and biota within and from the hydrologically unaltered treatment wetland(s). Wetland(s) monitoring shall be performed in accordance with the following:

Parameter	Units	Max/Min	Annual Average	Monitoring Frequency	Sample Type	Monitoring Location Site Number(s)	Notes
Stream Stage (Water Depth)	feet	Maximum	Report	Continuous	Stage Recorder	WEF-01	Used to determine flow
Nitrogen, Total as N	mg/L	Maximum	3.0	Monthly	Grab	WEF-01	
Unionized Ammonia as N	mg/L	Maximum	0.02	Monthly	Calculated	WEF-01	
Phosphorous, Total as P	mg/L	Maximum	0.2	Monthly	Grab	WEF-01	
Temperature, Water	deg C	Maximum	Report	Monthly	Field Thermometer	WEF-01, WEM-01, WEM 02 & WEM-03	48 hr down-dusk, max. of four hr intervals
Oxygen, Dissolved	mg/L	Minimum	Report	Monthly	Field Probe	WEF-01, WEM-01, WEM 02 & WEM-03	48 hr down-dusk, max. of four hr intervals
Specific Conductance	umhos/cm	Maximum	Report	Monthly	Field Probe	WEF-01, WEM-01, WEM 02 & WEM-03	
Color	Pt-Co	Maximum	Report	Monthly	Grab	WEF-01, WEM-01, WEM 02 & WEM-03	
Ortho-Phosphate	mg/L	Maximum	Report	Monthly	Grab	WEF-01, WEM-01, WEM 02 & WEM-03	
Phosphorous, Total as P	mg/L	Maximum	Report	Monthly	Grab	WEF-01, WEM-01, WEM 02 & WEM-03	
TKN as N	mg/L	Maximum	Report	Monthly	Grab	WEF-01, WEM-01, WEM 02 & WEM-03	
Ammonia, Total as N	mg/L	Maximum	Report	Monthly	Grab	WEF-01, WEM-01, WEM 02 & WEM-03	
$NO_3 + NO_2$ as N	mg/L	Maximum	Report	Monthly	Grab	WEF-01, WEM-01, WEM 02 & WEM-03	
Fecal Coliforms	#/100ml	Maximum	Report	Monthly	Grab	WEF-01, WEM-01, WEM 02 & WEM-03	
pH	su	Range	Report	Monthly	Field Probe	WEF-01, WEM-01, WEM 02 & WEM-03	
$CBOD_5$ 20 deg C	mg/L	Maximum	Report	Monthly	Grab	WEF-01, WEM-01, WEM 02 & WEM-03	
TSS	mg/L	Maximum	Report	Monthly	Grab	WEF-01, WEM-01, WEM 02 & WEM-03	
Sulfate, SO_4 as S	mg/L	Maximum	Report	Quarterly	Grab	WEF-01, WEM-01, WEM 02 & WEM-03	
Chlorophyll-A	mg/cu meter	Maximum	Report	Quarterly	Grab	WEF-01, WEM-01, WEM 02 & WEM-03	
Metals	mg/L	Maximum	Report	Semi-Annually	Grab	WEF-01, WEM-01, WEM 02 & WEM-03	Hg, Pb, Cd, Cu, Zn, , Fe, Ni, Ag
Sulfide as S	mg/L	Maximum	Report	Annually	Sediment	WEF-01, WEM-01, WEM 02 & WEM-03	
pH	su	Range	Report	Annually	Sediment	WEF-01, WEM-01, WEM 02 & WEM-03	
Phosphorous, Total as P	mg/L	Maximum	Report	Annually	Sediment	WEF-01, WEM-01, WEM 02 & WEM-03	
TKN as N	mg/L	Maximum	Report	Annually	Sediment	WEF-01, WEM-01, WEM 02 & WEM-03	
Ammonia, NH_3 as N	mg/L	Maximum	Report	Annually	Sediment	WEF-01, WEM-01, WEM 02 & WEM-03	
$NO_3 + NO_2$ as N	mg/L	Maximum	Report	Annually	Sediment	WEF-01, WEM-01, WEM 02 & WEM-03	
Mosquitoes	Yes/No	Maximum	Report	Monthly	Field	WEF-01, WEM-01, WEM 02 & WEM-03	April through November only.
Benthic Macroinvertebrates	Yes/No	Maximum	Report	Quarterly	Field	WEF-01, WEM-01, WEM 02 & WEM-03	

PART I: Continued

Receiving Waters:	Classification (indicate whether fresh or marine):
Pace Swamp Wetlands to the Simpson River	Class III Fresh

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

c. Sampling Requirements

(1) For each routine test or additional follow-up test conducted, a total of three flow proportional 24-hour composite samples of final effluent shall be collected 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 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.

d. 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%, 25%, 12.5%, and 6.25% final effluent.

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

(3) 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.

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

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 started no more than 30 days before the date of each routine or additional follow-up test conducted. The SRT-QA data shall be included in the reports for each companion routine or additional follow-up test required.

(2) If the mortality in the control (0% effluent) exceeds 20% for either species in any 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 11.11 (P. promelas). Repeat tests must be started within 21 days after the last day of the invalid test.

(3) If, during any test, 100% mortality occurs in the 100% 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) Additional follow-up tests shall be evaluated for acceptability based on the observed dose-response relationship as required by EPA-821-R-02-013, Section 10.2.6 and the evaluation 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:

(a) Routine and Additional Follow-up Test Results: If the NOEC is greater than 100% effluent, report NOEC > 100%. If the NOEC is less than or equal to 100% effluent, report the calculated NOEC for each test species.

(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 last day of the test.

(3) For additional follow-up tests, a single laboratory report shall be prepared according to EPA-821-R-02-013, Section 10, and mailed within 30 days after the last day of the second valid additional follow-up test.

(4) Data for invalid tests shall be included in the bioassay report for the repeat test.

Administrative or Consent Orders (date executed, specific requirements, interim limit dates-if applicable, etc.):

Consent Order (OGC File No. 08-1611-57-DW) was executed 9/4/08 for copper and zinc violations, as well as provided the facility time to comply with the final pH limits in the permit.

11. This Consent Order provides an interim limit of 6.0-8.5 S.U. for pH discharged to the treatment wetland at D-001. This interim limit shall remain in effect for a period of 5 years from the date of execution of this order, at which time the facility should be in full compliance with the permit's pH limit.

15. Within 36 months of the effective date of the Consent Order, the Respondent may petition for an Order establishing site specific alternative water quality criteria pursuant to Rule 62-302.800, Fla. Admin. Code. Upon EPA's approval pursuant to 40 C.F.R. § 131.5, the Department will revise the Respondent's National Pollutant Discharge Elimination System ("NPDES") permit to reflect the applicable site specific alternative criteria.

Facility Mixing Zone Details (if applicable):

List Permit Violations (DMR data) and plant upsets that occurred at the plant within the last year:

Date	Parameter and Units	Limit	Result

Describe previous FYI and WQBEL study:

A FYI3 was performed in 2004. The FYI3 concluded that the dechlorinated effluent samples collected from this facility on October 20, 22, and 24, 2003, did not show acute or chronic toxicity to either test species during the chronic screening bioassay tests. The levels of chlorine present in the samples prior to dechlorination were above levels reported to produce adverse effects to the test species used in this study. The effluent AGP result exceeded the "problem" threshold for fresh receiving waters. The effluent's total residual chlorine and copper concentrations exceeded Class III Freshwater Quality Criteria.

Describe previous or current Enforcement Actions (including WLs): See above.
Describe any violations or problems noted in previous inspection:
Discuss whether DMR trends within previous five years are improving or declining:
Additional Comments (this should include a trend of the Effluent, i.e. if the facility is now Reuse):

PART II: Sampling Event Information

Date(s) sample collected: **10/29/12**	**Sampler(s):** **Nathan Mulkey**
Temperature (Deg C): **22.55**	**pH (SU):** **6.08**
Dissolved Oxygen (mg/L): **8.15**	**Conductivity (umhos/cm):** **452**
Total Residual Chlorine (mg/L):	**Total Residual Chlorine - after Disinfection (mg/L):**
Method of Chlorination:	**Method of De-chlorination:**
Flow During Sample Collection for each outfall(MGD):	
Mean Flow for each outfall for previous 12 months based on sampling date (If samples are taken on more than one day, indicate Mean Flow for each day):	
Describe Discharge during Sampling Event: **☐ Continuous ☐ Intermittent ☐ Seasonal ☐ Rainfall Dependent ☒ Other, please specify**	

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

Appendix C

Explanation of measurements

(1) Quality Assurance and Quality Control

FDEP's quality assurance requirements for analytical laboratories and field activities are codified in Chapter 62-160, F.A.C., Quality Assurance (QA Rule) and in internal Standard Operating Procedures (FDEP SOPs). Methods for all analyses are on file at the FDEP Central Laboratory in Tallahassee and may be viewed on the web at http://www.floridadep.org/labs/sop/index.htm and/or http://www.dep.state.fl.us/water/sas/sop/sops.htm.

(2) Chemical Analyses of the Effluent

The effluent was analyzed for nutrients, metals, organic constituents (base, neutral, and acid extractables) and pesticides following FDEP SOPs. The results from these analyses were compared with Water Quality Criteria (62-302, F.A.C.) and facility permit limits. Exceedances of Water Quality Criteria may constitute violations of specific provisions of Chapter 62-302 (F.A.C.) and/ or facility permit limits.

(3) Toxicity Bioassays

Greater than 50% mortality in an acute toxicity test may constitute an exceedance of 62-302.500(1)a and/or a violation of facility permit limits. An inhibition concentration greater than 25% in a chronic test may constitute exceedances of 62-302.530(20), 62-302.530(61) and/or a violation of facility permit limits. A no observed effect concentration (NOEC) less than 100% effluent in a chronic test may constitute an exceedance of 62-302.530(61) and/or a violation of facility permit limits. Standard reference toxicant (SRT) tests are conducted monthly to ensure quality in toxicity testing.

(4) Bacteriological Testing

High levels of fecal coliform bacteria may constitute an exceedance of 62-302.530(6) and/or a violation of facility permit limits. Fecal coliform and enterococci results often are based on colony counts outside the acceptable range (B-qualifier). The dilutions performed on the sample did not yield results within the method acceptable range of 20- 60 colony forming units per plate. The B-qualifier does not affect data quality.

(5) Algal Growth Potential (AGP)

The algal growth potential (AGP) value is the peak growth of the alga within that 14-day period, recorded as mg dry weight/L. Raschke and Shultz (1987) found that an AGP above 5.0 mg dry weight/L represents a “problem” threshold for fresh receiving waters, implying nutrient enrichment. High AGP values may constitute exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C. and/or 62-302.530(47)(b), F.A.C..

The concentration of nutrients in a water sample may be used to calculate the expected yield of AGP under the assumption that other required nutrients (e.g. silicon, micronutrients) are present in excess (Miller *et al*. 1978). The expected amount of production is calculated as 38 times the total soluble inorganic nitrogen (nitrate and nitrite plus ammonia) under nitrogen limitation or 430 times the ortho-phosphate (OP) concentration under phosphorus limitation with an error of $\pm$ 20%. When the ratio of nitrogen to phosphorus (N: P) is less than 10:1, nitrogen limitation of algal production is likely. When the N: P ratio is 20:1 or greater, phosphorus limitation is likely (USEPA 2000). For ratios in-between, co-limitation may occur. Production of lower biomass than expected may be evidence of growth inhibition related to toxic compounds present in the water sample tested and may constitute an exceedance of 62-302.530(61), F.A.C.

(6) Vegetation Wetland Condition Index

The vegetation Wetland Condition Index (WCI) for isolated, forested wetlands is a biological assessment of wetland health conducted by sampling vascular plants along transects, identifying them to the species level, and calculating metric values based on attributes of the plant community that change predictably along an independent gradient of human disturbance. The index is calculated based on 6 metrics: percent tolerant indicator species, percent sensitive indicator species, percent exotic macrophyte species, average Coefficient of Conservatism (CC) score, percent native perennial species, and percent wetland status species. These metrics are calibrated for 4 ecoregions within the state including the Panhandle, North, Central, and South regions. The score is based on a 0-60 scale, with 60 representing high biological integrity. The scores can be compared to an average "minimally disturbed" score which was determined during the development of the index based on wetlands with a Landscape Development Intensity (LDI) value < 2.00. The LDI is calculated based on land use with higher scores being associated with areas that are more developed and lower scores being associated with areas that are less developed. This current index is based on the Florida Wetland Condition Index (FWCI) developed by Reiss and Brown (2005) to provide a quantitative measure of the biological integrity of a wetland system.

(7) Definition of Qualifiers

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

B - Results based on colony counts outside the acceptable range.

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

J - Estimated value

K - Actual value is known to be less than value given

L - Actual value is known to be greater than value given

N - Presumptive evidence of presence of material.

O - Sampled, but analysis lost or not performed.

Q - Sample held beyond normal holding time.

T - Value reported is less than the criterion of detection.

U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.

V - Analyte was detected in both sample and method blank.

X - Too few individuals to calculate SCI value.

Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate

Z - Colonies were too numerous to count (TNTC)

Appendix D

Chain of custody

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2012-10-29-15
FYI Pace Water System Sampling Inspection

Requester: Michelle Fish
Field Report Prepared By: N. Mallay
Collected By: Nathan Mallay
Send Final Report To: Toni Edwards
Sampling Agency: FDEP

Customer: NW-DIST
Project ID: FYI5
PMAS: 1143

Lab ID *	Location	Collection (comp begin or grab) Eastern	Composite end Eastern	Bottle Group(s)**
	Pace Water System	☒ Comp ☐ Grab Date 10/28/12 Time 0700 Central	Date 10/29/12 Time 0700 Central	
	Field ID: Effluent EFD-01	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L) 8.15	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C) 22.55	pH 6.08	Sample Depth ☐ m ☐ ft; ☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm) 452; NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments	A

Lab ID *	Location	Collection (comp begin or grab) Eastern	Composite end Eastern	Bottle Group(s)**
	Pace Water System	☐ Comp ☒ Grab Date 10/29/12 Time 0945 Central	Date Time Central	
	Field ID: Effluent EFD-01	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L) 8.15	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C) 22.55	pH 6.08	Sample Depth ☐ m ☐ ft; ☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm) 452; NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments 0700 NM	B

Lab ID *	Location	Collection (comp begin or grab) Eastern	Composite end Eastern	Bottle Group(s)**
	Pace Water System	☒ Comp ☐ Grab Date 10/28/12 Time [illegible] Central	Date 10/29/12 Time 0700 Central	
	Field ID: TOX	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 Biocassay B. Alexander 10-30-12 @ 1015	A

Lab ID *	Location	Collection (comp begin or grab) Eastern	Composite end Eastern	Bottle Group(s)**
	Pace Water System	☐ Comp ☐ Grab Date 10/29/12 Time 1000 Central	Date Time Central	
	Field ID: Field Blank	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	

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	10/29/12	Fed Ex	[signature]	10/30/12 0930				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Page 1 of 6

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2012-10-29-15
FYI Pace Water System Sampling Inspection

Requester: Michelle Fish
Field Report Prepared By: N. Milby
Collected By: Nathan Milby
Send Final Report To: Toni Edwards
Sampling Agency: FDEP

Customer: NW-DIST
Project ID: FYI5
PMAS: 1143

Lab ID *	Location	Comp / Grab	Collection (comp begin or grab) Eastern Central	Composite end Eastern Central	Bottle Group(s)**
	Pace Water System	☐ Comp ☑ Grab	Date 10/29/12 Time 1100	Date Time	
	Field ID: Test Wetland	Tot Res Chlorine (mg/L):	Diss Oxygen (mg/L): 8.20	Storet Station Number:	
	Matrix (include type e.g. Salt, Fresh, etc):	Temp (C): 19.04	pH: 7.53	Sample Depth: .15 ☑ m ☐ ft	Salinity (PPTh) ☑ Sp Conductance (umho/cm): 47
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments:		NPDES Number:

Lab ID *	Location	Comp / Grab	Collection (comp begin or grab) Eastern Central	Composite end Eastern Central	Bottle Group(s)**
	Pace Water System	☐ Comp ☑ Grab	Date 10/29/12 Time 1230	Date Time	
	Field ID: Central Wetland	Tot Res Chlorine (mg/L):	Diss Oxygen (mg/L): 8.70	Storet Station Number:	
	Matrix (include type e.g. Salt, Fresh, etc):	Temp (C): 16.65	pH: 5.27	Sample Depth: .15 ☑ m ☐ ft	Salinity (PPTh) ☑ Sp Conductance (umho/cm): 53
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments:		NPDES Number:

Lab ID *	Location	Comp / Grab	Collection (comp begin or grab) Eastern Central	Composite end Eastern Central	Bottle Group(s)**
		☐ Comp ☐ Grab	Date 10/29/12 Time 10:25	Date Time	F
	Field ID: Field Blk	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):
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments:		NPDES Number:

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

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
	10/29/12	FedEx	ATB	10/30/12 09:30				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Filled by Amzad Shaik. 10-30-12.

SUITE-F Foam cartons.

2012-10-29-15

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Request Number: RQ-~~2012-01-61-03~~

~~Choctawhatchee Bay~~ Pace Water Systems FYI

Event ID *

Requester: ~~Cheryl Gunn~~ Field Report Prepared By: N. Milky

Customer: NW-DIST

Project ID: ~~DISCRETIONARY~~ FYI

Collected By: Nathan Milky Send Final Report To ~~Cheryl Gunn~~

Sampling Agency: FDEP

PMAS: ~~1306~~

Lab ID *	Location	Comp / Grab	Collection (begin) Date Time	Eastern Central	Collection (end) Date Time	Eastern Central	Bottle Group(s)**
	Pace Water Systems	✓	10/30/12 0700	✓	10/31/12 0700	✓	A
	Field ID: TOX 2	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: Plants need to be sent to Nicole Wellendorf			

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
[signature]	10/31/12	Fed Ex					SK	11-1-12 9:20am

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

2012-10-29-15

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Request Number: RQ-[redacted]

Event ID *

[redacted] Pace Water Systems FIT

Requester: [redacted]

Field Report Prepared By: N. Malkay

Customer: NW-DIST

Collected By: Nathan Malkay

Send Final Report To [redacted]

Project ID: [redacted] FYI

Sampling Agency: FDEP

PMAS: [redacted]

Lab ID *	Location / Field ID / Matrix / Temp (C) / pH / Latitude / Longitude	Comp / Grab; Collection (begin) Date Time Eastern Central; Collection (end) Date Time Eastern Central; Tot Res Chlorine (mg/L); Diss Oxygen (mg/L); Storet Station Number; Sample Depth m ft; Salinity (PPTh); Sp Conductance (umho/cm); NPDES Number; Comments	Bottle Group(s)**
	Pace Water Systems TOX 3 Matrix: Salt, (Fresh), etc	☐ Comp ☐ Grab Collection (begin) Date 11/1/12 Time 0700 (Central) Collection (end) Date 11/2/12 Time 0700 (Central)	A

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[redacted]	11/2/12	Fed Ex	[redacted]	11-3-12 0900			John	1:20 pm 11/5/12

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

2 coolers
white – 2 Jugs 0.7°C
Grey – 1 Jug (half full) 1.1°C

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2012-12-03-20
Repeat C. dubia chronic bioassay

Requester: Joseph M. Faircloth
Field Report Prepared By: N. Mulkey

Customer: NW-DIST
Project ID: FYI3
PMAS:

Collected By: Nathan Mulkey
Sampling Agency: FDEP
Send Final Report To: Nathan Mulkey

Lab ID *	Location			☑ Comp ☐ Grab	Collection (comp begin or grab) Eastern Central	Composite end Eastern Central	Bottle Group(s)**
	Field ID: TOX1			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 (comp begin or grab) Eastern Central	Composite end 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 (comp begin or grab) Eastern Central	Composite end 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 (comp begin or grab) Eastern Central	Composite end 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			

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	12/3/12	FedEx					[signature]	12-4-12 / 9:50

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

2 bottles M. Faircloth 12-4-12 1006

12-03-20

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2012-[redacted]

[redacted]

Requester: [redacted]

Field Report Prepared By: N. Mulkey

Customer: NW-DIST

Project ID: [redacted] FXI

PMAS: [redacted]

Collected By: Nathan Mulkey

Sampling Agency: FDEP

Send Final Report To: [redacted]

Lab ID *	Location			☑ Comp ☐ Grab	Collection (comp begin or grab) Eastern Date	Time	Central	Composite end Eastern Date	Time	Central	Bottle Group(s)**
	Field ID: TOX 2			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 (comp begin or grab) Eastern Date	Time	Central	Composite end Eastern Date	Time	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 (comp begin or grab) Eastern Date	Time	Central	Composite end Eastern Date	Time	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 (comp begin or grab) Eastern Date	Time	Central	Composite end Eastern Date	Time	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							

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[redacted]	12512	Fed Ex					MC	12-6-12 10:30

) biomass @ 1102 12.6.12 B. Hamilton

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

12-03-20

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2012-~~11-00-14~~
~~GREENU~~

Requester: ~~Cheryl Burch~~

Field Report Prepared By: N. Mulkey

Customer: NW-DIST
Project ID: ~~DISCRETIONARY~~ FYI
PMAS: ~~1295~~

Collected By: Nathan Mulkey

Sampling Agency: FDEP

Send Final Report To: ~~Cheryl Burch~~

Lab ID *	Location			☑ Comp ☐ Grab	Collection (comp begin or grab) Eastern Date 12/1/12 Time 0700 Central	Composite end Eastern Date 12/1/12 Time 0700 Central	Bottle Group(s)**
	Field ID: JOX3			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 (comp begin or grab) Eastern Date Time Central	Composite end Eastern Date Time 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 (comp begin or grab) Eastern Date Time Central	Composite end Eastern Date Time 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 (comp begin or grab) Eastern Date Time Central	Composite end Eastern Date Time 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			

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	12/1/12	Fed Ex	M. Funderburk	12-8-12 0900				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

1 cooler
3 bottles
1.3 °C

Appendix E

Physical/chemical and Wetland Condition Index (WCI) field sheets

Department of Environmental Protection

Water Quality Report Form

		Water Collection Depth: ■0.15m(0.5') ☐Other:		General Bottles Triple Rinsed ■
Agency 21FLPNS	Station	Date 10/29/12	Time of Grab Sample 0945	■ CST ☐ EST

Water (check as appropriate)		Soils/Sediment		Tissue		Collection Mode			
Surface Water ☐	Equip Blank ☐	Terrestrial	☐	Fish	☐	by Foot ■	☐	by Boat
Ground Water ☐	Field Blank ☐	Freshwater Sed	☐	Shellfish	☐	Wading ☐	☐	Canoe
Waste Water ☑	Trip Blank ☐	Marine Sed	☐	Other	☐	On Shore ☐	☐	Gas Motor
Other:	Duplicate ■	Sludge	☐					

Parameter Suite	Parameter(s)/Method	Preservation	Acid Lot/Exp	Check pH	# Bottles
Preserved Nutrients	☑TKN ☑TP ☑NO2NO3 ☑NH3 ☐TOC ☐Other:	☑Ice ☑H2SO4 2ml		☑ <2 pH	
Metals	☑W-ICP ☐W-FIAS ☐W-ICPMS ☐W-ICP-Tr	☑HNO3 1ml		☑ <2 pH	
Filtered Nutrients	☑PO4 ☑Field Filtered .45 um filter	☑Ice			
All Other Samples unless otherwise noted	☐Other:	■Ice			

Biological Sample Collected: Macroinvertebrates ☐ Phytoplankton ☐ Periphyton ☐ AGP ☑

Meter ID Num:	**Equipmt Used:** Sample Container ☑ Pole ☑ Syringe ☑ Van Dorn ☐ Other ☐	**Equipmt ID Num:**	☐ Field Cleaned

Remarks: Module number: 1306

☐ <2 pH

7AM-7PM composite

Blank-1000

9:45

LOCATION

Pace Eastbound

Lat: N 30.54564 Long: W 87.18225

Parameter	Unit	Code	Field Value	Parameter	Unit	Code	Lab Request
Field Identity	Number	29	EFD-01	Conductivity Lab	UMHO	95	
Temp. Water	°C	10	22.55	pH Lab	Std. Unit	403	
Temp. Air	°C	20		Turbidity, HACH	NTU	76	
Precipitation (24hr)	Inches	45		Color	PT-CO	80	
Cloud Cover	Percent	32		BOD, 5 Day	mg/L	310	
Wind Velocity	MPH	35		NFLT Residue	mg/L	530	
Wind Dir. From	Degrees	36		N-NH3, Total	mg/L	610	
Tide Stage	Code	67		Un-Ionized NH3	mg/L	619	
Water Depth, Max	Meters	82903		N-TKN	mg/L	625	
Secchi	Meters	78		N-NO2 +NO3	mg/L	630	
Meter Sample Depth	Meters	98	.15	Phos-Total	mg/L	665	
Conductivity Field	UMHO	94	452	Enterococcus	#/100mL	31649	
Salinity	PPTH	480	0.22	Total Coliform	#/100mL	31501	
DO Probe	mg/L	299	8.15	Fecal Coliform	#/100mL	31616	
DO % Saturation	Percent	301	94.4	Chlorophyll A	UG/L	32210	
pH Field	Std. Unit	400	6.08	Chlorophyll A	Corrected	32211	

Sample Taken By: NM	Report Verified By:
Report Prepared By: NL	( ) CHANGE Date Submitted

	Water Collection Depth: ☐0.15m(0.5') ☐Other:	General Bottles Triple Rinsed ☐

DEP NWD form, 10-25-2006 version

Department of Environmental Protection

Water Quality Report Form

		Water Collection Depth: ☑0.15m(0.5') ☐Other:		General Bottles Triple Rinsed ☑	
Agency 21FLPNS	**Station**	**Date** 10/29/12	Time of Grab Sample 1100	☑ CST ☐ EST	

Water (check as appropriate)		**Soils/Sediment**		**Tissue**		**Collection Mode**	
Surface Water ☑	Equip Blank ☐	Terrestrial	☐	Fish	☐	by Foot ☑	☐ by Boat
Ground Water ☐	Field Blank ☐	Freshwater Sed	☐	Shellfish	☐	Wading ☑	☐ Canoe
Waste Water ☐	Trip Blank ☐	Marine Sed	☐	Other	☐	On Shore ☐	☐ Gas Motor
Other:	Duplicate ☐	Sludge	☐				

Parameter Suite	**Parameter(s)/Method**	**Preservation**	**Acid Lot/Exp**	**Check pH**	**# Bottles**
Preserved Nutrients	☑TKN ☑TP ☑NO2NO3 ☑NH3 ☑TOC ☐Other:	☑Ice ☑H2SO4 2ml		☑ <2 pH	
Metals	☑W-ICP ☐W-FIAS ☐W-ICPMS ☐W-ICP-Tr	☑HNO3 1ml		☑ <2 pH	
Filtered Nutrients	☑PO4 ☐Field Filtered .45 um filter	☑Ice			
All Other Samples unless otherwise noted	☐Other:	☐Ice			

Biological Sample Collected: Macroinvertebrates ☐ Phytoplankton ☐ Periphyton ☐ AGP ☐

Meter ID Num:	**Equipmt Used:** Sample Container ☐ Pole ☐ Syringe ☐ Van Dorn ☐ Other ☐	**Equipmt ID Num:**	☐ Field Cleaned

Remarks: Module number: 1306

Good flow

LOCATION

Pace Test

Lat: N 30.59835 Long: W 87.19084

Parameter	**Unit**	**Code**	**Field Value**	**Parameter**	**Unit**	**Code**	**Lab Request**
Field Identity	Number	29	Test	Conductivity Lab	UMHO	95	
Temp. Water	°C	10	19.04	pH Lab	Std. Unit	403	
Temp. Air	°C	20		Turbidity, HACH	NTU	76	
Precipitation (24hr)	Inches	45		Color	PT-CO	80	
Cloud Cover	Percent	32		BOD, 5 Day	mg/L	310	
Wind Velocity	MPH	35		NFLT Residue	mg/L	530	
Wind Dir. From	Degrees	36		N-NH3, Total	mg/L	610	
Tide Stage	Code	67		Un-Ionized NH3	mg/L	619	
Water Depth, Max	Meters	82903		N-TKN	mg/L	625	
Secchi	Meters	78		N-NO2 +NO3	mg/L	630	
Meter Sample Depth	Meters	98	.15	Phos-Total	mg/L	665	
Conductivity Field	UMHO	94	47	Enterococcus	#/100mL	31649	
Salinity	PPTH	480	0.02	Total Coliform	#/100mL	31501	
DO Probe	mg/L	299	8.20	Fecal Coliform	#/100mL	31616	
DO % Saturation	Percent	301	88.1	Chlorophyll A	UG/L	32210	
pH Field	Std. Unit	400	7.[illegible]3	Chlorophyll A	Corrected	32211	

Sample Taken By: NM	Report Verified By:
Report Prepared By: NM	( ) CHANGE Date Submitted

DEP NWD form, 10-25-2006 version

Department of Environmental Protection

Water Quality Report Form

		Water Collection Depth: ☑0.15m(0.5') ☐Other:		General Bottles Triple Rinsed ☑	
Agency 21FLPNS	Station	Date 10/29/12	Time of Grab Sample 1230	☑ CST ☐ EST	

Water (check as appropriate)		Soils/Sediment		Tissue		Collection Mode			
Surface Water ☑	Equip Blank ☐	Terrestrial	☐	Fish	☐	by Foot ☑	☐	by Boat	
Ground Water ☐	Field Blank ☐	Freshwater Sed	☐	Shellfish	☐	Wading ☑	☐	Canoe	
Waste Water ☐	Trip Blank ☐	Marine Sed	☐	Other	☐	On Shore ☐	☐	Gas Motor	
Other:	Duplicate ☐	Sludge	☐						

Parameter Suite	Parameter(s)/Method	Preservation	Acid Lot/Exp	Check pH	# Bottles
Preserved Nutrients	☑TKN ☐TP ☐NO2NO3 ☐NH3 ☐TOC ☐Other:	☑Ice ☑H2SO4 2ml		☑ ≤2 pH	
Metals	☑W-ICP ☐W-FIAS ☐W-ICPMS ☐W-ICP-Tr	☑HNO3 1ml		☑ <2 pH	
Filtered Nutrients	☐PO4 ☑Field Filtered .45 um filter	☑Ice			
All Other Samples unless otherwise noted	☐Other:	☐Ice			

Biological Sample Collected: Macroinvertebrates ☐ Phytoplankton ☐ Periphyton ☐ AGP ☑

Meter ID Num:	Equipmt Used: Sample Container ☑ Pole ☐ Syringe ☑ Van Dorn ☐ Other ☐	Equipmt ID Num:	☐ Field Cleaned

Remarks: Module number: 1306

no flow standing water control wetland Pace

LOCATION

Pace Water System [redacted] Control wetland

Lat: N 30.58813 Long: W 87.17342

Parameter	Unit	Code	Field Value	Parameter	Unit	Code	Lab Request
Field Identity control	Number	29	~~FB001~~ control	Conductivity Lab	UMHO	95	
Temp. Water	°C	10	16.65	pH Lab	Std. Unit	403	
Temp. Air	°C	20		Turbidity, HACH	NTU	76	
Precipitation (24hr)	Inches	45		Color	PT-CO	80	
Cloud Cover	Percent	32		BOD, 5 Day	mg/L	310	
Wind Velocity	MPH	35		NFLT Residue	mg/L	530	
Wind Dir. From	Degrees	36		N-NH3, Total	mg/L	610	
Tide Stage	Code	67		Un-Ionized NH3	mg/L	619	
Water Depth, Max	Meters	82903		N-TKN	mg/L	625	
Secchi	Meters	78		N-NO2 +NO3	mg/L	630	
Meter Sample Depth	Meters	98	0.15	Phos-Total	mg/L	665	
Conductivity Field	UMHO	94	53	Enterococcus	#/100mL	31649	
Salinity	PPTH	480	0.02	Total Coliform	#/100mL	31501	
DO Probe	mg/L	299	0.70	Fecal Coliform	#/100mL	31616	
DO % Saturation	Percent	301	7.0	Chlorophyll A	UG/L	32210	
pH Field	Std. Unit	400	5.27	Chlorophyll A	Corrected	32211	
Sample Taken By:			VM	Report Verified By:			
Report Prepared By:			VM	( ) CHANGE		Date Submitted	

DEP NWD form, 10-25-2006 version

ØM = 30.58742
Long. 87.17395

Form FD 9000-33 **FDEP Vegetation Wetland Condition Index (DEP SOP FS 7330)** Revised 10-11-11

Wetland: PACE CONTROL WETLAND | County: SANTA ROSA | Date: 10/3/2012 | Page of

Project: PACE WATER SYSTEMS | Lat/Long- Start: 30.58742 | Lat/Long- Start: 30.58742 x 87.17395

Analyst: FBUTERA | Lat/Long- End: | Lat/Long- End: 30.58756 x 87.17448

(Species level required, Collect specimen if needed for positive identification)

Species	Transect: 1 0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	Specimen collected (check)	Transect: 2 0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	Specimen collected (check)
MAGNOLIA VIRGINIANA	D	I	C	\	I	D	I	I	I	D		D			D	C		I	D		C	
NYSSA SYLVATICA VAR BIFLORA	I								I			I							I	I		
Ligustrum SINENSE	I						I	I														
WOODWARDIA areolata	I	I		I	I	I				I		I	I	I	I	I	I	I	I	I	I	
Rhododendron VISCOSUM	I	I		C	I		I		I			I	D	C	L						I	
CENTELLA ASIATICA	I		I		I							I	I	I								
Hypericum SP	I										✓											
POISON IVY	I		I			I				I		I	I	I	I	I	I	I		I	I	
ACER rubrum	I	D	I		D	I	D	I	I	I		I	I	C	I	C	C	D	I	D	C	
UNK SEDGE 2	I		I	I	I	I				I	✓	I										
Smilax 3 (TEST)	I													I	I							
ITEA VIRGINICA	I	I	I	C	I	I	I	I		I		I		I	I	I		I				
Rubus	I		I	I	I	I	I	I				I										
Sphagnum MOSS	I	I	I	I	I		I	I	I	I		I	I	I	I	I	I				I	
ILEX OPACA	I									I												
Centella asiatica	I		I		I							I										
Smilax I (TEST)	I														I				I			
OSMUNDA REGALIS		I		I		I			I			I							I			
Smilax 4 (WALTERI)							I					I			I		I			I		
UNKNOWN HERB 2			I																			
Rhynchospora Cyperaceae			I								✓											
VITIS SP (ROTUNDIFOLIA)			C	I	I	I	I	D	D	I			I	I		I	C	I				
SAURUS CERNUS			I						I		✓			I								
Persea PALUSTRIS				I	I	I	I	I			✓		I		I	I	I	I	I		I	
OSMUNDA CINNAMON				I	I	I			I	I					I				I	I	I	
MIKANIA SCANDENS					I																	
SAGITTARIA LATIFOLIA					I			I	I													
UNK. IVY (TEST)					I															I		
DICANTHELIUM SCAB					I																	
SACCIOLEPIS STRIATA					I																	
HYDROCOTYLE SP					I							I										
UNK. ALLIGATOR LIKE (TAS)					I																	
JAP. Climbing Fern						I																

SDM = 30.58716 87.17351

ØM 30.58742 x 87.17395

100' 30.58756 x 87.17448

Wetland Condition Index Vegetation Transect Survey Data Sheet FD 9000-33 (10-11-11)

Wetland: PACE CONTROL | County: S. R | Date: 10-31-12 | Page 1 of 2

Project: PACE WATER SYSTEMS | Lat/Long- Start: | Lat/Long- End:

Analyst: F. RUTTAN, R. ABAD | Lat/Long- Start: | Lat/Long- End:

(Species level required, Collect specimen if needed for positive identification)

Species	Transect: 1 0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	Specimen collected (check)	Transect: 2 0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	Specimen collected (check)
POISON SUMAC						4	1	1												1	1	
Boehmeria cylindrica								1		1		1				1	1					
Ilex CORIACEA								1	1							1						
Lycopodium									1			1								1		
Quercus nigra									1	1											1	
LYONIA LUCIDA																						
UNK SEDGE III		1	1	1	1	1		1				1						1				✓
Labiatae Like												1	1									✓
UNK. ERICACEAE Vaccinium Nitidum												1										✓
Ilex cassine												1	1				1					✓
LYONIA LUCIDA												1	1	1								✓

Leaves to three and lanceolate

Wetland Condition Index Vegetation Transect Survey Data Sheet FD 9000-33 (10-11-11)

Wetland: PACE Control | County: SANTA ROSA | Date: 10-31-2012 | Page 1 of

Project: PACE WATER SYSTEMS | Lat/Long- Start: 30.58742 | Lat/Long- Start: 30.58742 -87.173

Analyst: FBurbin, R ABAD | Lat/Long- End: BOTTOM | Lat/Long- End: 87.1

(Species level required, Collect specimen if needed for positive identification)

Species	Transect: 3 0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	Specimen collected (check)	Transect: 4 0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	Specimen collected (check)
NYSSA SYLVATICA B FLORA																						
Magnolia virginiana																						
Poison IVY																						
Lyonia lucida																						
Unk. Sedge 2																						
WOODWARDIA AREOLATA																						
Centella ASIATICA																						
Vitis																						
Rubus																						
Itea VIRGINICA																						
Boehmeria cylindrica																						
Sphagnum MOSS																						
Smilax sp. 1																						
Bidens ~~SAMBUCUS~~											✓											
~~CARNATION~~ Fern																						
SEDGE III (Cyperaceae)																						
HYDROCOTYLE SP																						
Smilax #4																						
Rhododendron VISCOSUM																						
Ilex OPACA																						
Acer rubrum																						
Quercus nigra																						
ARUNDINARIA gigantea																						
Anis Floridanum																						
SAGITTARIA LATIFOLIA																						
Unk. Alligator Like																						
TRIADENUM																						
Saururus cernuus																						
~~COLLINSONIA CANADENSIS~~																						
Myrica cerifera																						
Lycopodium																						
Persea palustris																						
Ilex VOMIT																						

MYR CERIFERA

T3 ~~Lat Dup.~~ 30.58742 ~~Long Dup.~~ 87.17395

LAT 30.58792 50 Long 87.17377

30.58701 50M 87.17417 #4

Form FD 9000-33 **FDEP Vegetation Wetland Condition Index (DEP SOP FS 7330)** Revised 10-11-11

Wetland: PACE CONTROL County: ~~ESCAMBIA~~ SANTA ROSA R Date: Page of

Project: PACE WATER System Lat/Long- Start:

Analyst: F BULLA R ABAD Lat/Long- End:

(Species level required, Collect specimen if needed for positive identification)

Transect: 3

Species	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	Specimen collected (check)
Osmunda regalis								1			
Unk Grass #2									1		✓
Liriodendron									1	1	
Poison Sumac											
Mikania scandens											
Ilex cassine							1	1			
Unk. Vine									+	✓	
Magi grand									+	+	

Transect: 4

Species	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	Specimen collected (check)
Osmunda regalis	1	1		1	1				1		
Unk Grass #2											
Liriodendron											
Poison Sumac				1	1		1	1			
Mikania scandens						+	1				
Ilex cassine											
Unk. Vine										1	✓
Magi grand										1	

Wetland Condition Index Vegetation Transect Survey Data Sheet FD 9000-33 (10-11-11)

Wetland: TEST WETLAND | County: SANTA ROSA | Date: 10-29-12 | Page 1 of 2

Project: PACE WATER SYSTEM | Lat/Long- Start: | Lat/Long- End:

Analyst: FRUTOSA | Lat/Long- Start: | Lat/Long- End:

(Species level required, Collect specimen if needed for positive identification)

Species	Transect: 1 0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	Specimen collected (check)	Transect: 2 0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	Specimen collected (check)
LIGUSTRUM SINESE																						
SMILAX L																						
WOODWARDIA AREOLATA																						
POLYSTICHUM ACROSTICHOIDES																						
LEUCOTHOE RACEMOSA AXILLARIS																						
UNK FERN																						
ILEX CORIACEA																						
ACER RUBRUM																						
MAGNOLIA VIRGINIANA																						
LEUCOTHOE AXILLARIS																						
RED BAY PERSEA BORBONIA																						
UNKNOWN 0-5 M SHRUBS																						
SPHAGNUM MOSS																						ITEM 1
BLACKBERRY (RUBUS)																						
ANIS																						
NYSSA SYLVATICA BIFLORA																						
ILEX OPACA																						
SAP CLIMBING FERN																						
RHODODENDRON																						
OSMUNDA CINNAMOMEA																						
CENTELLA ASIATICA																						
ALLIGATOR WEED																						
HYDROCOTYLE																						
OSMUNDA REGALIS																						
ONOCLEA SENSIBILIS																						
CLIFTONIA MONOPHYLLA																						
SMILAX 2																						
ATL. WHITE CEDAR																						
LYONIA LUCIDA																						
UNK VINE 35-40																						
UNK. HERB 40-45																						
MUSCADINE																						
PELTANDRA VIRGINICA RED BAY																						

Form FD 9000-33 **FDEP Vegetation Wetland Condition Index (DEP SOP FS 7330)** Revised 10-11-11

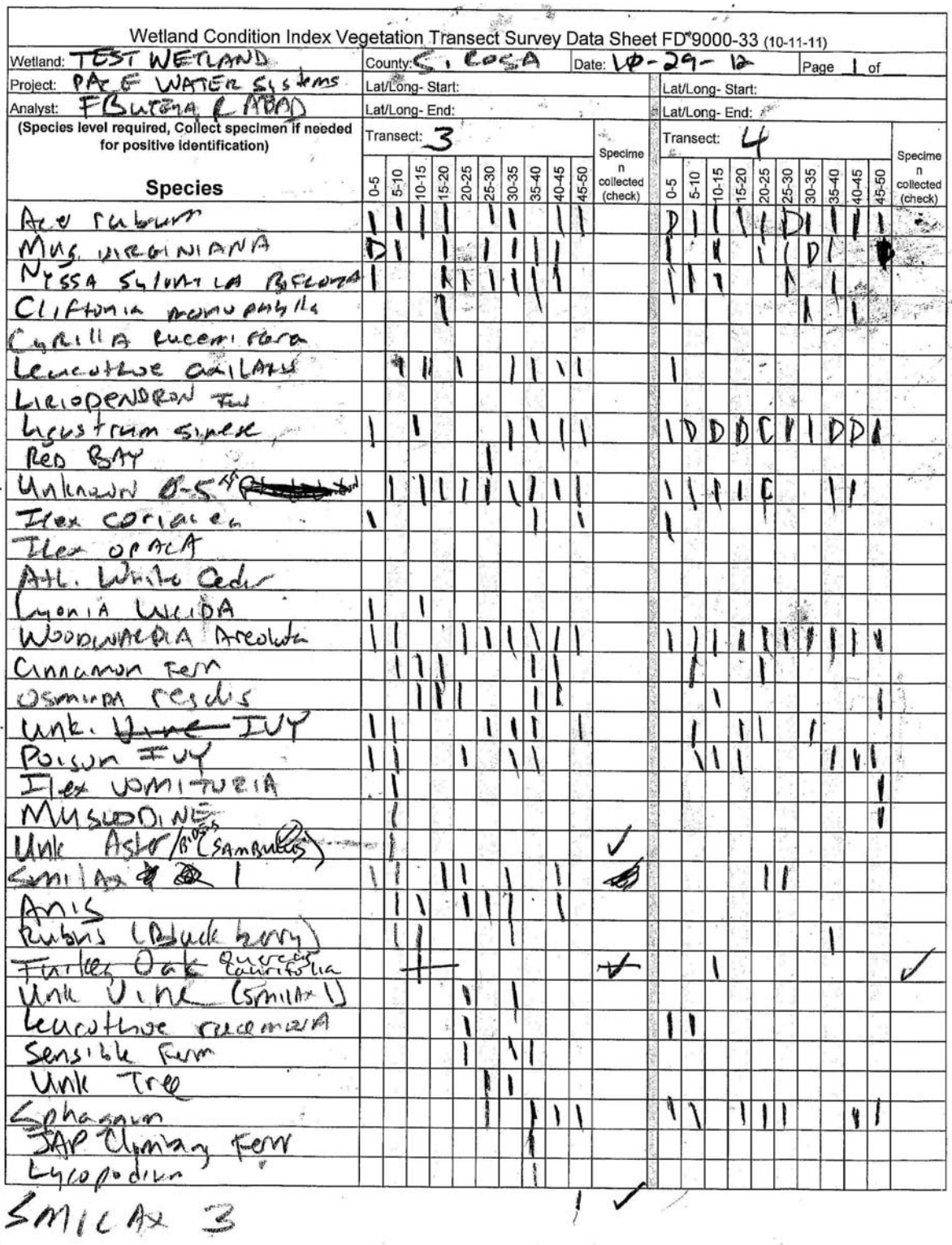
Wetland: TEST WETLAND | County: S. R | Date: 10-29-12 | Page 2 of 2

Project: PACE WATER SYSTEMS | Lat/Long- Start: | Lat/Long- Start:

Analyst: F. SILVEIRA, R. ARAD | Lat/Long- End: | Lat/Long- End:

(Species level required, Collect specimen if needed for positive identification)

Species	Transect: 1										Specimen collected (check)	Transect: 2										Specimen collected (check)
	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	
POLSON SUMAC								1											1			
LYCOPODIUM								1														
UNK. SUMAC						+											1					✓



Wetland Condition Index Vegetation Transect Survey Data Sheet FD*9000-33 (10-11-11)

Wetland: TEST WETLAND | County: S. ROSA | Date: 10-29-12 | Page 1 of

Project: PAE WATER Systems | Lat/Long- Start: | Lat/Long- End:

Analyst: FBUTERA & ABAD | Lat/Long- Start: | Lat/Long- End:

(Species level required, Collect specimen if needed for positive identification)

Species	Transect: 3 0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	Specimen collected (check)	Transect: 4 0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	Specimen collected (check)
Acer rubrum																						
Mag. virginiana																						
Nyssa sylvatica Biflora																						
Clethra alnifolia																						
Cyrilla racemiflora																						
Leucothoe axillaris																						
Liriodendron Tul																						
Ligustrum sinense																						
Red Bay																						
Unknown 0-5 [illegible]																						
Ilex coriacea																						
Ilex opaca																						
Atl. White Cedar																						
Lyonia lucida																						
Woodwardia areolata																						
Cinnamon Fern																						
Osmunda regalis																						
Unk. [illegible] IVY																						
Poison IVY																						
Ilex vomitoria																						
Muscadine																						
Unk Aster/Boltonia (Sambucus)											✓											
Smilax [illegible]																						
Anis																						
Rubus (Blackberry)																						
Turkey Oak Quercus laurifolia											✓											✓
Unk Vine (Smilax)																						
Leucothoe racemosa																						
Sensible Fern																						
Unk Tree																						
Sphagnum																						
SAP Climbing Fern																						
Lycopodium																						

SMILAX 3

Form FD 9000-33 **FDEP Vegetation Wetland Condition Index (DEP SOP FS 7330)** Revised 10-11-11

Wetland: TEST WETLAND | County: S. R | Date: 10-29-12 | Page 2 of 2

Project: PAGE WATER SYSTEMS | Lat/Long- Start: | Lat/Long- Start:

Analyst: EBUTERA RABAD | Lat/Long- End: | Lat/Long- End:

(Species level required, Collect specimen if needed for positive identification)

Species	Transect: ~~2~~ 3 0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	Specimen collected (check)	Transect: 4 0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	Specimen collected (check)
Quercus lyrata		+									✓		1									✓
~~SMILAX~~												+										
~~Peltandra~~												1										
Smilax												1		1				1				✓
Peltandra virginica												1				1						
Centella asiatica																1			1	1		
Flex CASINE				+	+											1						✓
Juncus ~~GRASS~~ SEDGE					+	+											1	1	1	1		✓
Viola GRASS																				1		✓

Appendix F

Chemical analysis of effluent and receiving water

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/29/2012 10:45	Effluent	AGP/LN	Algal Growth Potential	384		mg DryWt/L	0.3	0.9
10/29/2012 8:00	Effluent	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	1	IQ	mg/L	0.2	2
10/29/2012 10:45	Effluent	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.4	U	ug/L	0.4	1.2
10/29/2012 10:45	Effluent	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	0.55	U	ug/L	0.55	1.7
10/29/2012 10:45	Effluent	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	1.2	I	mg/L	0.2	2
10/29/2012 10:45	Effluent	Overflow	Fecal Coliforms-Membrane Filter	1	B	cfu/100 mL	1	1
10/29/2012 8:00	Effluent	Toxicology	Bioassay-Chron-Def-FW-C.dubia, IC25	No Result	O	IC25		
10/29/2012 8:00	Effluent	Toxicology	Bioassay-Chron-Def-FW-Fish, IC25	100	L	IC25		
10/29/2012 8:00	Effluent	Toxicology	Bioassay-Chron-Def-FW-C.dubia, NOEC	No Result	O	NOEC		
10/29/2012 8:00	Effluent	Toxicology	Bioassay-Chron-Def-FW-Fish, NOEC	100		NOEC		
10/29/2012 10:45	Effluent	Metals	Iron	43	I	ug/L	30	120
10/29/2012 10:45	Effluent	Metals	Mercury	0.12	U	ug/L	0.12	0.5
10/29/2012 10:45	Effluent	Metals	Arsenic	0.25	U	ug/L	0.25	1
10/29/2012 10:45	Effluent	Metals	Cadmium	0.072	I	ug/L	0.05	0.2
10/29/2012 10:45	Effluent	Metals	Nickel	2.09		ug/L	0.25	1
10/29/2012 8:00	Effluent	Metals	Hardness	92.9		mg/L	0.4	1.6
10/29/2012 10:45	Effluent	Metals	Copper	4.11		ug/L	0.5	1
10/29/2012 10:45	Effluent	Metals	Sodium	45.5		mg/L	0.5	2
10/29/2012 10:45	Effluent	Metals	Aluminum	8.6	I	ug/L	5	20
10/29/2012 10:45	Effluent	Metals	Magnesium	2.69		mg/L	0.04	0.16
10/29/2012 8:00	Effluent	Metals	Copper	4.57		ug/L	0.5	1
10/29/2012 10:45	Effluent	Metals	Silver	0.025	U	ug/L	0.025	0.1
10/29/2012 10:45	Effluent	Metals	Lead	0.2	U	ug/L	0.2	0.8
10/29/2012 10:45	Effluent	Metals	Calcium	31.8		mg/L	0.075	0.3
10/29/2012 8:00	Effluent	Metals	Zinc	64		ug/L	5	20
10/29/2012 10:45	Effluent	Metals	Selenium	0.2	U	ug/L	0.2	0.8
10/29/2012 10:45	Effluent	Metals	Chromium	0.3	U	ug/L	0.3	1.2
10/29/2012 10:45	Effluent	Metals	Zinc	70		ug/L	5	20
10/29/2012 10:45	Effluent	Nutrients	Ammonia-N	0.035		mg N/L	0.01	0.02
10/29/2012 10:45	Effluent	Nutrients	Chloride	54		mg Cl/L	0.4	1
10/29/2012 10:45	Effluent	Nutrients	Alkalinity	48		mg CaCO3/L	0.65	2.5
10/29/2012 10:45	Effluent	Nutrients	Organic Carbon	4.4		mg C/L	0.4	0.8
10/29/2012 10:45	Effluent	Nutrients	Total-P	3.1		mg P/L	0.025	0.25
10/29/2012 10:45	Effluent	Nutrients	NO2NO3-N	9		mg N/L	0.08	0.2
10/29/2012 8:00	Effluent	Nutrients	Total-P	3.6		mg P/L	0.025	0.25
10/29/2012 10:45	Effluent	Nutrients	O-Phosphate-P	3		mg P/L	0.08	0.2
10/29/2012 8:00	Effluent	Nutrients	Ammonia-N	0.031		mg N/L	0.01	0.02

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/29/2012 10:45	Effluent	Nutrients	Fluoride	0.035	U	mg F/L	0.035	0.1
10/29/2012 10:45	Effluent	Nutrients	Color (true)	4.3	I	PCU	2.5	6
10/29/2012 10:45	Effluent	Nutrients	Turbidity	0.75		NTU	0.1	0.1
10/29/2012 10:45	Effluent	Nutrients	Sulfide	0.05	U	mg S/L	0.05	0.2
10/29/2012 10:45	Effluent	Nutrients	Kjeldahl Nitrogen	0.75		mg N/L	0.08	0.2
10/29/2012 8:00	Effluent	Nutrients	TSS	2	U	mg/L	2	10
10/29/2012 10:45	Effluent	Nutrients	Sulfate	31		mg SO4/L	0.4	1
10/29/2012 8:00	Effluent	Nutrients	NO2NO3-N	9.3		mg N/L	0.08	0.2
10/29/2012 10:45	Effluent	Nutrients	TSS	2	I	mg/L	2	10
10/29/2012 8:00	Effluent	Nutrients	Kjeldahl Nitrogen	0.73		mg N/L	0.08	0.2
10/29/2012 10:45	Effluent	Pesticides	Atrazine	0.05	U	ug/L	0.05	0.2
10/29/2012 10:45	Effluent	Pesticides	Metolachlor	0.3	U	ug/L	0.3	1.2
10/29/2012 10:45	Effluent	Pesticides	Chlorpyrifos Ethyl	0.05	U	ug/L	0.05	0.2
10/29/2012 10:45	Effluent	Pesticides	Hexazinone	0.15	U	ug/L	0.15	0.6
10/29/2012 10:45	Effluent	Pesticides	Bromacil	0.2	U	ug/L	0.2	0.8
10/29/2012 10:45	Effluent	Pesticides	Fenamiphos	0.15	U	ug/L	0.15	0.6
10/29/2012 10:45	Effluent	Pesticides	Norflurazon	0.15	U	ug/L	0.15	0.6
10/29/2012 10:45	Effluent	Pesticides	Mevinphos	0.05	U	ug/L	0.05	0.2
10/29/2012 10:45	Effluent	Pesticides	Azinphos Methyl	0.1	U	ug/L	0.1	0.4
10/29/2012 10:45	Effluent	Pesticides	Parathion Ethyl	0.1	U	ug/L	0.1	0.4
10/29/2012 10:45	Effluent	Pesticides	Alachlor	0.3	U	ug/L	0.3	1.2
10/29/2012 10:45	Effluent	Pesticides	Butylate	0.1	U	ug/L	0.1	0.4
10/29/2012 10:45	Effluent	Pesticides	Chlorpyrifos Methyl	0.05	U	ug/L	0.05	0.2
10/29/2012 10:45	Effluent	Pesticides	Ethoprop	0.025	U	ug/L	0.025	0.1
10/29/2012 10:45	Effluent	Pesticides	Malathion	0.05	U	ug/L	0.05	0.2
10/29/2012 10:45	Effluent	Pesticides	Metribuzin	0.1	U	ug/L	0.1	0.4
10/29/2012 10:45	Effluent	Pesticides	Diazinon	0.05	U	ug/L	0.05	0.2
10/29/2012 10:45	Effluent	Pesticides	Fonofos	0.05	U	ug/L	0.05	0.2
10/29/2012 10:45	Effluent	Pesticides	Metalaxyl	0.2	U	ug/L	0.2	0.8
10/29/2012 10:45	Effluent	Pesticides	Ethion	0.05	U	ug/L	0.05	0.2
10/29/2012 10:45	Effluent	Pesticides	Ametryn	0.05	U	ug/L	0.05	0.2
10/29/2012 10:45	Effluent	Pesticides	Phorate	0.025	U	ug/L	0.025	0.1
10/29/2012 10:45	Effluent	Pesticides	Sucralose	31		ug/L	0.2	1
10/29/2012 10:45	Effluent	Pesticides	Prometryn	0.1	U	ug/L	0.1	0.4
10/29/2012 10:45	Effluent	Pesticides	Parathion Methyl	0.05	U	ug/L	0.05	0.2
10/29/2012 10:45	Effluent	Pesticides	Naled	0.2	U	ug/L	0.2	0.8
10/29/2012 10:45	Effluent	Pesticides	Simazine	0.22		ug/L	0.05	0.2
10/29/2012 10:45	Effluent	Priority Organic Pollutants	4-Nitrophenol	14	U	ug/L	14	58
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Chrysene	0.19	U	ug/L	0.19	0.77
10/29/2012 10:45	Effluent	Priority Organic Pollutants	N-Nitrosodimethylamine	1.9	U	ug/L	1.9	7.7

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/29/2012 10:45	Effluent	Priority Organic Pollutants	2,4-Dichlorophenol	0.96	U	ug/L	0.96	3.8
10/29/2012 10:45	Effluent	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	2.9	UJ	ug/L	2.9	12
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Acenaphthylene	0.19	U	ug/L	0.19	0.77
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Di-n-butyl phthalate	4.8	U	ug/L	4.8	19
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Hexachloroethane	2.9	U	ug/L	2.9	12
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Isophorone	0.96	U	ug/L	0.96	3.8
10/29/2012 10:45	Effluent	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.96	U	ug/L	0.96	3.8
10/29/2012 10:45	Effluent	Priority Organic Pollutants	2-Chlorophenol	0.96	U	ug/L	0.96	3.8
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Diethyl phthalate	0.96	U	ug/L	0.96	3.8
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Phenol	0.96	U	ug/L	0.96	3.8
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Pyrene	0.19	U	ug/L	0.19	0.77
10/29/2012 10:45	Effluent	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.96	U	ug/L	0.96	3.8
10/29/2012 10:45	Effluent	Priority Organic Pollutants	2,4-Dimethylphenol	9.6	U	ug/L	9.6	38
10/29/2012 10:45	Effluent	Priority Organic Pollutants	2-Chloronaphthalene	0.96	U	ug/L	0.96	3.8
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Acenaphthene	0.19	U	ug/L	0.19	0.77
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Benzo(b)fluoranthene	0.19	U	ug/L	0.19	0.77
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Benzo(k)fluoranthene	0.19	U	ug/L	0.19	0.77
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.19	U	ug/L	0.19	0.77
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Naphthalene	0.19	U	ug/L	0.19	0.77
10/29/2012 10:45	Effluent	Priority Organic Pollutants	2,4-Dinitrophenol	14	U	ug/L	14	58
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Anthracene	0.19	U	ug/L	0.19	0.77
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Benzo(a)anthracene	0.19	U	ug/L	0.19	0.77
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.19	U	ug/L	0.19	0.77
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Hexachlorocyclopentadiene	2.9	U	ug/L	2.9	12
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Pentachlorophenol	2.9	UJ	ug/L	2.9	12
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Phenanthrene	0.19	U	ug/L	0.19	0.77
10/29/2012 10:45	Effluent	Priority Organic Pollutants	3,3'-Dichlorobenzidine	38	U	ug/L	38	150
10/29/2012 10:45	Effluent	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	1.9	U	ug/L	1.9	7.7
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Benzidine	96	U	ug/L	96	380
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Butyl benzyl phthalate	4.8	U	ug/L	4.8	19
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Di-n-octyl phthalate	0.96	U	ug/L	0.96	3.8
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Fluorene	0.19	U	ug/L	0.19	0.77
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Hexachlorobenzene	0.96	U	ug/L	0.96	3.8
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.19	U	ug/L	0.19	0.77
10/29/2012 10:45	Effluent	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	2.9	U	ug/L	2.9	12
10/29/2012 10:45	Effluent	Priority Organic Pollutants	2-Nitrophenol	0.96	U	ug/L	0.96	3.8
10/29/2012 10:45	Effluent	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.96	U	ug/L	0.96	3.8
10/29/2012 10:45	Effluent	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.96	U	ug/L	0.96	3.8
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Benzo(a)pyrene	0.19	U	ug/L	0.19	0.77
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.96	U	ug/L	0.96	3.8

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	2.9	U	ug/L	2.9	12
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	14	U	ug/L	14	58
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Dimethyl phthalate	9.6	U	ug/L	9.6	38
10/29/2012 10:45	Effluent	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	1.9	U	ug/L	1.9	7.7
10/29/2012 10:45	Effluent	Priority Organic Pollutants	2,4-Dinitrotoluene	0.96	U	ug/L	0.96	3.8
10/29/2012 10:45	Effluent	Priority Organic Pollutants	2,6-Dinitrotoluene	0.96	U	ug/L	0.96	3.8
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.96	U	ug/L	0.96	3.8
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Fluoranthene	0.19	U	ug/L	0.19	0.77
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Hexachlorobutadiene	2.9	U	ug/L	2.9	12
10/29/2012 10:45	Effluent	Priority Organic Pollutants	Nitrobenzene	1.9	U	ug/L	1.9	7.7
10/29/2012 10:45	Effluent	Field Parameter	Dissolved Oxygen	8.15		mg/L		
10/29/2012 10:45	Effluent	Field Parameter	pH	6.08				
10/29/2012 10:45	Effluent	Field Parameter	Temperature	22.55		C		
10/29/2012 10:45	Effluent	Field Parameter	Specific Conductance	452		umhos/cm		
12/3/2012 8:00	Effluent	Toxicology	Bioassay-Chron-Def-FW-C.dubia, NOEC	50		NOEC		
12/3/2012 8:00	Effluent	Toxicology	Bioassay-Chron-Def-FW-C.dubia, IC25	63.3		IC25		
10/29/2012 12:00	Test Wetland	AGP/LN	Algal Growth Potential	8.3		mg DryWt/L	0.3	0.9
10/29/2012 12:00	Test Wetland	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	0.49	I	mg/L	0.2	2
10/29/2012 12:00	Test Wetland	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	1.9		ug/L	0.55	1.7
10/29/2012 12:00	Test Wetland	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.4	U	ug/L	0.4	1.2
10/29/2012 12:00	Test Wetland	Overflow	Fecal Coliforms-Membrane Filter	460		cfu/100 mL	1	1
10/29/2012 12:00	Test Wetland	Metals	Copper	0.5	U	ug/L	0.5	1
10/29/2012 12:00	Test Wetland	Metals	Arsenic	0.52	I	ug/L	0.25	1
10/29/2012 12:00	Test Wetland	Metals	Lead	0.2	U	ug/L	0.2	0.8
10/29/2012 12:00	Test Wetland	Metals	Hardness	8.7		mg/L	0.4	1.6
10/29/2012 12:00	Test Wetland	Metals	Calcium	1.11		mg/L	0.075	0.3
10/29/2012 12:00	Test Wetland	Metals	Mercury	0.12	U	ug/L	0.12	0.5
10/29/2012 12:00	Test Wetland	Metals	Sodium	3.8		mg/L	0.5	2
10/29/2012 12:00	Test Wetland	Metals	Aluminum	61		ug/L	5	20
10/29/2012 12:00	Test Wetland	Metals	Chromium	0.3	U	ug/L	0.3	1.2
10/29/2012 12:00	Test Wetland	Metals	Cadmium	0.05	U	ug/L	0.05	0.2
10/29/2012 12:00	Test Wetland	Metals	Silver	0.025	U	ug/L	0.025	0.1
10/29/2012 12:00	Test Wetland	Metals	Magnesium	1.44		mg/L	0.04	0.16
10/29/2012 12:00	Test Wetland	Metals	Nickel	0.25	U	ug/L	0.25	1
10/29/2012 12:00	Test Wetland	Metals	Zinc	6.6	I	ug/L	5	20
10/29/2012 12:00	Test Wetland	Metals	Iron	350		ug/L	30	120
10/29/2012 12:00	Test Wetland	Metals	Selenium	0.2	U	ug/L	0.2	0.8
10/29/2012 12:00	Test Wetland	Nutrients	Organic Carbon	1.5		mg C/L	0.4	0.8
10/29/2012 12:00	Test Wetland	Nutrients	Sulfate	0.5	I	mg SO4/L	0.2	0.5
10/29/2012 12:00	Test Wetland	Nutrients	Kjeldahl Nitrogen	0.2		mg N/L	0.08	0.2

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/29/2012 12:00	Test Wetland	Nutrients	Ammonia-N	0.04		mg N/L	0.01	0.02
10/29/2012 12:00	Test Wetland	Nutrients	Alkalinity	4.9		mg CaCO3/L	0.65	2.5
10/29/2012 12:00	Test Wetland	Nutrients	Sulfide	0.05	U	mg S/L	0.05	0.2
10/29/2012 12:00	Test Wetland	Nutrients	Total-P	0.008		mg P/L	0.002	0.005
10/29/2012 12:00	Test Wetland	Nutrients	Chloride	7		mg Cl/L	0.2	0.5
10/29/2012 12:00	Test Wetland	Nutrients	Turbidity	1.2		NTU	0.1	0.1
10/29/2012 12:00	Test Wetland	Nutrients	TSS	4	I	mg/L	2	10
10/29/2012 12:00	Test Wetland	Nutrients	O-Phosphate-P	0.004	U	mg P/L	0.004	0.01
10/29/2012 12:00	Test Wetland	Nutrients	NO2NO3-N	0.32		mg N/L	0.004	0.01
10/29/2012 12:00	Test Wetland	Nutrients	Fluoride	0.035	U	mg F/L	0.035	0.1
10/29/2012 12:00	Test Wetland	Nutrients	Color (true)	2.8	I	PCU	2.5	6
10/29/2012 12:00	Test Wetland	Pesticides	Sucralose	0.3		ug/L	0.01	0.052
10/29/2012 12:00	Test Wetland	Field Parameter	Sample Depth	0.15		m		
10/29/2012 12:00	Test Wetland	Field Parameter	Dissolved Oxygen	8.2		mg/L		
10/29/2012 12:00	Test Wetland	Field Parameter	Specific Conductance	47		umhos/cm		
10/29/2012 12:00	Test Wetland	Field Parameter	pH	7.53				
10/29/2012 12:00	Test Wetland	Field Parameter	Temperature	19.04		C		
10/29/2012 13:30	Control Wetland	AGP/LN	Algal Growth Potential	0.76		mg DryWt/L	0.3	0.9
10/29/2012 13:30	Control Wetland	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	1	I	ug/L	0.55	1.7
10/29/2012 13:30	Control Wetland	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	0.67	I	mg/L	0.2	2
10/29/2012 13:30	Control Wetland	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.4	U	ug/L	0.4	1.2
10/29/2012 13:30	Control Wetland	Overflow	Fecal Coliforms-Membrane Filter	1	B	cfu/100 mL	1	1
10/29/2012 13:30	Control Wetland	Metals	Calcium	1.9	A	mg/L	0.075	0.3
10/29/2012 13:30	Control Wetland	Metals	Silver	0.025	U	ug/L	0.025	0.1
10/29/2012 13:30	Control Wetland	Metals	Cadmium	0.05	U	ug/L	0.05	0.2
10/29/2012 13:30	Control Wetland	Metals	Mercury	0.12	U	ug/L	0.12	0.5
10/29/2012 13:30	Control Wetland	Metals	Lead	0.2	U	ug/L	0.2	0.8
10/29/2012 13:30	Control Wetland	Metals	Chromium	0.3	U	ug/L	0.3	1.2
10/29/2012 13:30	Control Wetland	Metals	Arsenic	0.58	I	ug/L	0.25	1
10/29/2012 13:30	Control Wetland	Metals	Selenium	0.2	U	ug/L	0.2	0.8
10/29/2012 13:30	Control Wetland	Metals	Zinc	8	I	ug/L	5	20
10/29/2012 13:30	Control Wetland	Metals	Magnesium	0.88	A	mg/L	0.04	0.16
10/29/2012 13:30	Control Wetland	Metals	Nickel	0.37	I	ug/L	0.25	1
10/29/2012 13:30	Control Wetland	Metals	Copper	0.5	U	ug/L	0.5	1
10/29/2012 13:30	Control Wetland	Metals	Aluminum	94	A	ug/L	5	20
10/29/2012 13:30	Control Wetland	Metals	Sodium	4.6	A	mg/L	0.5	2
10/29/2012 13:30	Control Wetland	Metals	Iron	2510	A	ug/L	30	120
10/29/2012 13:30	Control Wetland	Metals	Hardness	8.4	A	mg/L	0.4	1.6
10/29/2012 13:30	Control Wetland	Nutrients	Sulfate	0.74		mg SO4/L	0.2	0.5
10/29/2012 13:30	Control Wetland	Nutrients	Alkalinity	3.5		mg CaCO3/L	0.65	2.5

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/29/2012 13:30	Control Wetland	Nutrients	Turbidity	2.9		NTU	0.1	0.1
10/29/2012 13:30	Control Wetland	Nutrients	Sulfide	0.05	U	mg S/L	0.05	0.2
10/29/2012 13:30	Control Wetland	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
10/29/2012 13:30	Control Wetland	Nutrients	O-Phosphate-P	0.007	I	mg P/L	0.004	0.01
10/29/2012 13:30	Control Wetland	Nutrients	Ammonia-N	0.018	I	mg N/L	0.01	0.02
10/29/2012 13:30	Control Wetland	Nutrients	Kjeldahl Nitrogen	0.38		mg N/L	0.08	0.2
10/29/2012 13:30	Control Wetland	Nutrients	Chloride	8.6		mg Cl/L	0.2	0.5
10/29/2012 13:30	Control Wetland	Nutrients	TSS	8	I	mg/L	2	10
10/29/2012 13:30	Control Wetland	Nutrients	Total-P	0.01		mg P/L	0.002	0.005
10/29/2012 13:30	Control Wetland	Nutrients	Fluoride	0.035	U	mg F/L	0.035	0.1
10/29/2012 13:30	Control Wetland	Nutrients	Organic Carbon	5.6		mg C/L	0.4	0.8
10/29/2012 13:30	Control Wetland	Nutrients	Color (true)	75		PCU	2.5	6
10/29/2012 13:30	Control Wetland	Pesticides	Sucralose	0.021	U	ug/L	0.021	0.1
10/29/2012 13:30	Control Wetland	Field Parameter	Sample Depth	0.15		m		
10/29/2012 13:30	Control Wetland	Field Parameter	Specific Conductance	53		umhos/cm		
10/29/2012 13:30	Control Wetland	Field Parameter	Temperature	16.65		C		
10/29/2012 13:30	Control Wetland	Field Parameter	Dissolved Oxygen	0.7		mg/L		
10/29/2012 13:30	Control Wetland	Field Parameter	pH	5.27				
10/29/2012 11:25	Field Blank	Metals	Hardness	0.4	U	mg/L	0.4	1.6
10/29/2012 11:00	Field Blank	Metals	Magnesium	0.04	U	mg/L	0.04	0.16
10/29/2012 11:00	Field Blank	Metals	Selenium	0.2	U	ug/L	0.2	0.8
10/29/2012 11:00	Field Blank	Metals	Chromium	0.3	U	ug/L	0.3	1.2
10/29/2012 11:00	Field Blank	Metals	Lead	0.2	U	ug/L	0.2	0.8
10/29/2012 11:00	Field Blank	Metals	Cadmium	0.05	U	ug/L	0.05	0.2
10/29/2012 11:00	Field Blank	Metals	Iron	30	U	ug/L	30	120
10/29/2012 11:00	Field Blank	Metals	Arsenic	0.25	U	ug/L	0.25	1
10/29/2012 11:25	Field Blank	Metals	Copper	0.5	U	ug/L	0.5	1
10/29/2012 11:00	Field Blank	Metals	Silver	0.025	U	ug/L	0.025	0.1
10/29/2012 11:00	Field Blank	Metals	Nickel	0.25	U	ug/L	0.25	1
10/29/2012 11:00	Field Blank	Metals	Sodium	0.5	U	mg/L	0.5	2
10/29/2012 11:00	Field Blank	Metals	Calcium	0.075	U	mg/L	0.075	0.3
10/29/2012 11:00	Field Blank	Metals	Copper	0.5	U	ug/L	0.5	1
10/29/2012 11:00	Field Blank	Metals	Aluminum	5	U	ug/L	5	20
10/29/2012 11:00	Field Blank	Metals	Zinc	5	U	ug/L	5	20
10/29/2012 11:25	Field Blank	Metals	Zinc	5	U	ug/L	5	20
10/29/2012 11:00	Field Blank	Metals	Mercury	0.12	U	ug/L	0.12	0.5
10/29/2012 11:00	Field Blank	Nutrients	Organic Carbon	0.4	U	mg C/L	0.4	0.8
10/29/2012 11:25	Field Blank	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
10/29/2012 11:00	Field Blank	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
10/29/2012 11:00	Field Blank	Nutrients	Color (true)	2.5	U	PCU	2.5	6

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/29/2012 11:00	Field Blank	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
10/29/2012 11:00	Field Blank	Nutrients	Alkalinity	0.65	U	mg CaCO3/L	0.65	2.5
10/29/2012 11:25	Field Blank	Nutrients	Kjeldahl Nitrogen	0.08	U	mg N/L	0.08	0.2
10/29/2012 11:00	Field Blank	Nutrients	Fluoride	0.035	U	mg F/L	0.035	0.1
10/29/2012 11:00	Field Blank	Nutrients	O-Phosphate-P	0.004	U	mg P/L	0.004	0.01
10/29/2012 11:25	Field Blank	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
10/29/2012 11:00	Field Blank	Nutrients	Sulfide	0.05	U	mg S/L	0.05	0.2
10/29/2012 11:00	Field Blank	Nutrients	Total-P	0.002	U	mg P/L	0.002	0.005
10/29/2012 11:00	Field Blank	Nutrients	Sulfate	0.2	U	mg SO4/L	0.2	0.5
10/29/2012 11:00	Field Blank	Nutrients	Chloride	0.2	U	mg Cl/L	0.2	0.5
10/29/2012 11:00	Field Blank	Nutrients	Turbidity	0.1	U	NTU	0.1	0.1
10/29/2012 11:25	Field Blank	Nutrients	Total-P	0.002	U	mg P/L	0.002	0.005
10/29/2012 11:25	Field Blank	Nutrients	TSS	2	U	mg/L	2	10
10/29/2012 11:00	Field Blank	Nutrients	Kjeldahl Nitrogen	0.08	U	mg N/L	0.08	0.2
10/29/2012 11:00	Field Blank	Pesticides	Bromacil	0.24	U	ug/L	0.24	0.96
10/29/2012 11:00	Field Blank	Pesticides	Chlorpyrifos Ethyl	0.06	U	ug/L	0.06	0.24
10/29/2012 11:00	Field Blank	Pesticides	Hexazinone	0.18	U	ug/L	0.18	0.72
10/29/2012 11:00	Field Blank	Pesticides	Parathion Ethyl	0.12	U	ug/L	0.12	0.48
10/29/2012 11:00	Field Blank	Pesticides	Sucralose	0.0096	U	ug/L	0.0096	0.048
10/29/2012 11:00	Field Blank	Pesticides	Alachlor	0.36	U	ug/L	0.36	1.4
10/29/2012 11:00	Field Blank	Pesticides	Butylate	0.12	U	ug/L	0.12	0.48
10/29/2012 11:00	Field Blank	Pesticides	Simazine	0.06	U	ug/L	0.06	0.24
10/29/2012 11:00	Field Blank	Pesticides	Metalaxyl	0.24	U	ug/L	0.24	0.96
10/29/2012 11:00	Field Blank	Pesticides	Mevinphos	0.06	U	ug/L	0.06	0.24
10/29/2012 11:00	Field Blank	Pesticides	Naled	0.24	U	ug/L	0.24	0.96
10/29/2012 11:00	Field Blank	Pesticides	Ametryn	0.06	U	ug/L	0.06	0.24
10/29/2012 11:00	Field Blank	Pesticides	Atrazine	0.06	U	ug/L	0.06	0.24
10/29/2012 11:00	Field Blank	Pesticides	Chlorpyrifos Methyl	0.06	U	ug/L	0.06	0.24
10/29/2012 11:00	Field Blank	Pesticides	Ethoprop	0.03	U	ug/L	0.03	0.12
10/29/2012 11:00	Field Blank	Pesticides	Metribuzin	0.12	U	ug/L	0.12	0.48
10/29/2012 11:00	Field Blank	Pesticides	Parathion Methyl	0.06	U	ug/L	0.06	0.24
10/29/2012 11:00	Field Blank	Pesticides	Fonofos	0.06	U	ug/L	0.06	0.24
10/29/2012 11:00	Field Blank	Pesticides	Malathion	0.06	U	ug/L	0.06	0.24
10/29/2012 11:00	Field Blank	Pesticides	Metolachlor	0.36	U	ug/L	0.36	1.4
10/29/2012 11:00	Field Blank	Pesticides	Norflurazon	0.18	U	ug/L	0.18	0.72
10/29/2012 11:00	Field Blank	Pesticides	Phorate	0.03	U	ug/L	0.03	0.12
10/29/2012 11:00	Field Blank	Pesticides	Azinphos Methyl	0.12	U	ug/L	0.12	0.48
10/29/2012 11:00	Field Blank	Pesticides	Prometryn	0.12	U	ug/L	0.12	0.48
10/29/2012 11:00	Field Blank	Pesticides	Diazinon	0.06	U	ug/L	0.06	0.24
10/29/2012 11:00	Field Blank	Pesticides	Ethion	0.06	U	ug/L	0.06	0.24

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/29/2012 11:00	Field Blank	Pesticides	Fenamiphos	0.18	U	ug/L	0.18	0.72
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	2,4-Dimethylphenol	9.9	U	ug/L	9.9	40
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Phenol	0.99	U	ug/L	0.99	4
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	4-Nitrophenol	15	U	ug/L	15	59
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Fluorene	0.2	U	ug/L	0.2	0.79
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	2	U	ug/L	2	7.9
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Acenaphthene	0.2	U	ug/L	0.2	0.79
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Anthracene	0.2	U	ug/L	0.2	0.79
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Benzo(k)fluoranthene	0.2	U	ug/L	0.2	0.79
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Chrysene	0.2	U	ug/L	0.2	0.79
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Naphthalene	0.2	U	ug/L	0.2	0.79
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	2,4-Dinitrophenol	15	U	ug/L	15	59
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	2-Chlorophenol	0.99	U	ug/L	0.99	4
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Benzo(a)anthracene	0.2	U	ug/L	0.2	0.79
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Benzo(a)pyrene	0.2	U	ug/L	0.2	0.79
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Benzo(b)fluoranthene	0.2	U	ug/L	0.2	0.79
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Di-n-butyl phthalate	5	U	ug/L	5	20
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Fluoranthene	0.2	U	ug/L	0.2	0.79
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Hexachlorobenzene	0.99	U	ug/L	0.99	4
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	2	U	ug/L	2	7.9
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	N-Nitrosodimethylamine	2	U	ug/L	2	7.9
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.99	U	ug/L	0.99	4
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.99	U	ug/L	0.99	4
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	2-Nitrophenol	0.99	U	ug/L	0.99	4
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.99	U	ug/L	0.99	4
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Acenaphthylene	0.2	U	ug/L	0.2	0.79
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.99	U	ug/L	0.99	4
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Diethyl phthalate	0.99	U	ug/L	0.99	4
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	2,4-Dichlorophenol	0.99	U	ug/L	0.99	4
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	2,4-Dinitrotoluene	0.99	U	ug/L	0.99	4
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Hexachlorobutadiene	3	U	ug/L	3	12
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Hexachloroethane	3	U	ug/L	3	12
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Isophorone	0.99	U	ug/L	0.99	4
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Pyrene	0.2	U	ug/L	0.2	0.79
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.99	U	ug/L	0.99	4
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	3	U	ug/L	3	12
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.2	U	ug/L	0.2	0.79
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	3	U	ug/L	3	12
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Nitrobenzene	2	U	ug/L	2	7.9
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Phenanthrene	0.2	U	ug/L	0.2	0.79

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units	MDL	PQL
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	3,3'-Dichlorobenzidine	40	U	ug/L	40	160
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Butyl benzyl phthalate	5	U	ug/L	5	20
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Hexachlorocyclopentadiene	3	U	ug/L	3	12
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.2	U	ug/L	0.2	0.79
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Pentachlorophenol	3	U	ug/L	3	12
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	2,6-Dinitrotoluene	0.99	U	ug/L	0.99	4
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	3	U	ug/L	3	12
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Benzidine	99	U	ug/L	99	400
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.2	U	ug/L	0.2	0.79
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.99	U	ug/L	0.99	4
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	15	U	ug/L	15	59
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Di-n-octyl phthalate	0.99	U	ug/L	0.99	4
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	Dimethyl phthalate	9.9	U	ug/L	9.9	40
10/29/2012 11:00	Field Blank	Priority Organic Pollutants	2-Chloronaphthalene	0.99	U	ug/L	0.99	4

Appendix G

Toxicological results

FDEP Biology Laboratory - Chronic Definitive Bench Sheet

Ceriodaphnia dubia

Facility: Pace Water System WWTP
Address: Hwy 197a Pace
County: Santa Rosa Zip 32571
NPDES Permit #: FL 0102202
Contact/District: Nathan Mulkey / Northwest

LIMS entry: 11-16-12 MF Verified: BA 11.16.12

Diluent/ Batch: ~~20% DMW~~ SDMHW 10-25-12A / Test Days Used: 0-5
~~20% DMW~~ SDMHW MF 10-25-12B Test Days Used: 6-7

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

Organism: *Ceriodaphnia dubia*
Organism Batch #: 10-30-12
Organism age : 24 hours
Feeding: Prior to Test and Daily
Food: ☐ YCT ☑ *P. subcapitata*
Food Batch: 9-10-12 6-7-12
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-2012-10-30-39	1464753	10/29/12 0800	10/30/12 1015
Test Day 2	2	TLH-2012-11-01-01	1465059	10/31/12 0800	11/1-12 1000
Test Day 4	3	TLH-2012-11-05-12	1465486	11/02/12 0800	11-3-12 0900

Batch #	10-25-12A	10-25-12B	NA	NA	NA			
Water Quality Parameters	SDMHW ~~20% DMW~~	20% DMW	Sample 1	Sample 2	Sample 3	Other:	Measured By:	Verified by:
Field Total Residual Cl_2 (mg/L):	NA	NA	Not measured	Not measured	Not measured		—	MF
Lab Total Residual Cl_2 (mg/L):	<0.03	<0.03	<0.03	<0.03	<0.03		MF	BA
Alkalinity (mg/L as $CaCO_3$):	69	78	60	50	37		MF/HW	BA
Hardness (mg/L as $CaCO_3$):	90	93	87	78	85		MF/HW	BA
Total Ammonia (mg/L as N):	<0.017	<0.017	0.026	<0.017	0.026		MF	BA
Conductivity: (umhos) mmhos:	314	312	477	438	451		MF	BA
Salinity (ppth):								

Test Incubated in: Incubator #: 2

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:
Incubator # 2 min. 24.1 max. 26.5 mean —
Room B246 min. 23.3 max. 25.3 mean —
Test min. ____ max. ____ mean ____

Loaded by: MF

Test Replicates	Loaded from culture vial
1	A10
2	A23
3	B7
4	B10
5	B14
6	B15
7	B20
8	B21
9	B27
10	B29

Results	No Result
Control % CV:	
Dunnetts PMSD:	
Reproduction NOEC:	
Reproduction LOEC:	
Survival NOEC:	
Survival LOEC:	
ICP_{20}:	
ICP_{25}:	

Investigators' signatures
Marshall Faircloth
Brent Walker

Liz Miller
REVIEWER

Comments: Invalidated due to possible control water problem - See NCR4319. MF 12-5-12
Repeated 12/7/12

Test Page 1 of 6 PAGE 67 revised 07/15/08 MF

FDEP Biology Laboratory - Chronic Definitive Bench Sheet

Ceriodaphnia dubia Survival and Reproduction

SOP TA07_05

Facility: Pace Water Systems WWTP

LIMS Sample #: 1464753 for lab sample #1

Start Date: 10-30-12 Time: 1210

End Date: 11-7-12 Time: 1200

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												10	
	2	0	0	0	0	0	0	0	3	0	0	3	10	
	3	0	0	0	0	0	0	0	0	0	0		10	
	4	0	0	0	0	0	0	0	0	0	0		10	
	5	2	X0	0	0	3	0	0	0	0	2	7	9	
	6		1	0	0	0	0	6	4	X0	8		8	
	7	MO	0	0	5	11	10	4	0	0	8		8	
	8	0	1	8	9	0	0	0	10	1	2		8	
	Total	12	0	8	14	14	10	10	17	0	18		8	

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												10	
	2	0	0	0	0	0	0	0	0	0	0		10	
	3	0	0	0	0	0	0	0	0	0	0		10	
	4	0	0	0	0	0	X0	0	0	0	2		9	
	5	0	0	0	1	0	1	0	4	0	0		9	
	6	0	0	0	0	0	1	0	15	2	0		9	
	7	6	0	2	0	0	0	0	3	3	0		9	
	8	0	0	0	0	0	1	0	0	3	0		9	
	Total	6	0	2	1	0	0	0	8	9	2			

Organisms loaded by: MF

Day	Counted/ verified by:	Concentrations prepared by:
0	BA/~~MF~~	MF
1	MF	MF
2	MF	MF
3	MF	MF
4	MF	MF
5	MF	MF
6	MF	MF
7	MF	MF
8	MF	—

Concentration	Mean neonates /adult	% survival
Control		
6.25%		
12.50%		
25%		
50%		
100%		

Test acceptability		
Mean control reproduction 15/female	yes	no
3rd brood in 80% of surviving females	yes	no
Control survival ≥ 80%:	yes	no

Comments: 5 = split brood

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

Test Page 2 of 6

PAGE 4 of 8

FDEP Biology Laboratory - Chronic Definitive Bench Sheet

Ceriodaphnia dubia Survival and Reproduction

SOP TA07_05

Facility: Pace Water Systems WWTP

LIMS Sample #: 1464753 for lab sample #1

Start Date: 10-30-12 Time: 1210

End Date: 11-7-12 Time: 1200

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		10	
	3	0	0	0	0	0	0	0	0	0	0		10	
	4	X0	0	0	0	0	0	0	0	0	0		9	
	5	|	0	0	0	0	X0	0	X0	0	0		7	
	6	|	0	X0	0	0	|	X0	|	1	3		5	
	7	|	0	|	0	0	|	|	|	X	2	4	
	8	|	0	|	0	0	|	|	|	|	8	4	
	Total													

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		10	
	3	0	0	0	0	0	0	0	0	0	0		10	
	4	0	X0	X0	0	0	0	0	0	0	0		8	
	5	X	0	0	0	X0	3	0	0	0	0		6	
	6	|	0	0	X0	|	2	0	X0	0	4		4	
	7	|	|	|	|	|	7	0	|	X	3		3	
	8	|	|	|	|	|	0	0	|	|	7			
	Total													

69

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		10	
	3	0	0	0	0	0	0	0	0	0	0		10	
	4	X	0	0	0	0	0	0	0	0	2		9	
	5	|	X0	0	0	0	0	X	X	0	3		6	
	6	|	0	X	0	0	0	|	|	0	0		5	
	7	|	|	|	0	0	0	|	|	0	0		5	
	8	|	|	|	0	0	0	|	|	0	4		5	
	Total													

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		10	
	3	0	0	0	0	0	0	0	3	0	0		10	
	4	0	0	0	X0	0	0	0	0	0	0		9	
	5	X0	0	0	|	X	0	X	X	0	1		5	
	6	|	0	0	|	|	X	0	0	0	X0		3	
	7	|	3	0	|	|	|	|	|	0	|		3	
	8	|	4	2	|	|	|	|	|	|	|		3	
	Total	0	7	2	0	0	0	0	3		1			

Comments: (S) = split brood.

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

FDEP Biology Laboratory - Chronic Definitive Bench Sheet

Ceriodaphnia dubia Parameters

Facility: Pace Water Systems WWTP SOP TA07_05

LIMS Sample #: 146753 for lab sample 1

Circle µmhos-cm or mmhos-cm

Test Day ↓		Concentration	New Sample					Old Sample				
			Test Replicate	pH (su)	Temp (°C)	DO (mg/L)	Conductivity (µmhos/cm) (mmhos/cm)	Test Replicate	pH (su)	Temp (°C)	DO (mg/L)	Conductivity (µmhos/cm) (mmhos/cm)
Day 0	sample	Control	M	7.7	24.8	8.1	314					
	1	6.25%	M	7.7	24.5	8.2	330					
	1	12.5%	M	7.7	24.5	8.1	338					
	1	25%	M	7.7	25.1	8.1	357					
	1	50%	M	7.7	25.3	8.0	395					
	1	100%	M	7.7	25.5	7.7	477					
	Measured by:			MF	MF	MF	MF					
	Recorded by:			MF	MF	MF	MF					
Day 1	sample:	Control	M	7.8	25.0	8.0	297	M	7.9	25.4	8.2	333
	1	6.25%	M	7.9	25.4	8.1	311	M	7.9	25.6	8.3	340
	1	12.5%	M	7.9	25.5	8.1	321	M	7.8	25.5	8.3	353
	1	25%	M	7.8	25.4	8.2	340	M	7.8	24.9	8.1	397
	1	50%	M	7.8	25.1	8.1	373	M	7.8	24.6	8.1	444
	1	100%	M	7.7	25.1	8.0	450	M	7.7	24.1	8.1	540
	Measured by:			MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:			MF	MF	MF	MF		MF	MF	MF	MF
Day 2	sample:	Control	M	8.0 7.7 MF	25.3	MF 7.9	304	M	7.8	24.6	7.8	340
	2	6.25%	M	8.0	24.8	8.0	317	M	7.8	24.6	8.1	351
	2	12.5%	M	8.0	24.9	7.9	326	M	7.9	25.1	8.1	348
	2	25%	M	8.0	24.9	7.8	343	M	7.8	25.3	8.1	368
	2	50%	M	7.9	24.9	7.7	372	M	7.8	25.4	8.1	409
	2	100%	M	7.6	24.9	7.7	438	M	7.7	24.9	8.1	520
	Measured by:			MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:			MF	MF	MF	MF		MF	MF	MF	MF
Day 3	sample:	Control	M	7.9	24.2	7.9	317	M	7.9	24.7	7.8	325
	2	6.25%	M	7.9	25.7	7.9	332	M	7.9	24.9	7.9	340
	2	12.5%	M	7.9	25.7	7.9	344	M	7.9	25.0	7.9	352
	2	25%	M	7.9	25.7	7.9	359	M	7.9	24.9	8.0	366
	2	50%	M	7.9	25.6	7.9	390	M	7.9	24.7	8.0	401
	2	100%	M	7.8	25.5	7.9	451	M	7.8	24.6	8.3	462
	Measured by:			MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:			MF	MF	MF	MF		MF	MF	MF	MF

Comments:

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

FDEP Biology Laboratory - Chronic Definitive Bench Sheet

Ceriodaphnia dubia Parameters

Facility: PACE Water Systems WWTP SOP TA07_05

LIMS Sample #: 1464753 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 4	sample:	Control	M	7.7	25.5	7.8	313	M	7.8	24.5	8.1	333
	3	6.25%	M	7.8	24.8	7.9	322	M	7.8	24.5	8.2	355
	3	12.5%	M	7.8	24.6	7.9	332	M	7.8	24.4	8.2	368
	3	25%	M	7.8	24.4	7.8	345	M	7.9	24.8	8.2	354
	3	50%	M	7.8	24.4	7.9	377	M	7.9	24.6	8.2	385
	3	100%	M	7.7	24.2	7.9	451	M	7.8	24.5	8.2	480
	Measured by:			MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:			MF	MF	MF	MF		MF	MF	MF	MF
Day 5	sample:	Control	M	7.8	25.3	7.7	307	M	7.9	25.0	7.9	324
	3	6.25%	M	7.8	25.3	7.8	317	M	7.9	25.0	7.9	338
	3	12.5%	M	7.8	25.2	7.8	325	M	7.9	24.9	7.9	362
	3	25%	M	7.8	24.9	7.7	339	M	7.8	25.0	7.9	394
	3	50%	M	7.8	24.8	7.7	374	M	7.8	24.9	7.9	376
	3	100%	M	7.7	24.5	7.7	445	M	7.8	25.0	7.8	471
	Measured by:			MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:			MF	MF	MF	MF		MF	MF	MF	MF
Day 6	sample:	Control	M	8.0	25.3	8.0	312	M	7.9	24.5	8.2	334
	3	6.25%	M	8.0	25.4	8.0	319	M	7.8	24.3	8.3	355
	3	12.5%	M	8.0	25.3	7.9	328	M	7.9	23.9	8.3	387
	3	25%	M	8.0	25.1	7.8	345	M	7.9	24.1	8.3	372
	3	50%	M	7.9	24.8	7.8	380	M	7.9	23.8	8.3	413
	3	100%	M	7.8	24.4	7.9	454	M	7.8	24.7	8.4	490
	Measured by:			MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:			MF	MF	MF	MF		MF	MF	MF	MF
Day 7	sample:	Control	M	8.1	24.5	7.7	326	M	7.9	24.3	7.6	340
	3	6.25%	M	8.1	24.6	7.8	330	M	8.0	24.5	7.7	338
	3	12.5%	M	8.1	24.6	7.8	337	M	8.0	24.7	7.7	348
	3	25%	M	8.1	24.8	7.7	352	M	7.9	24.5	7.7	368
	3	50%	M	8.0	25.0	7.7	387	M	8.0	24.5	7.7	390
	3	100%	M	7.8	25.5	7.6	458	M	7.8	24.2	7.7	485
	Measured by:			MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:			MF	MF	MF	MF		MF	MF	MF	MF

Comments:

DAY 8 old Parameters

Reps		pH	Temp	DO	Cond
CTL	A	8.0	24.8	7.8	340
6.25%	A	7.9	24.8	8.1	348
12.5%	M	8.0	24.9	8.3	362
25%	F	8.0	25.0	8.2	402
50%	b	7.9	24.7	8.2	407
100%	B	7.7	24.8	8.4	487

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

Test ID: Pace Water Systems WWTP Dates: Oct 30 – Nov. 7, 2012

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)

entered by M. Faircloth 11-7-12

V 1.1 9/21/10 MF/jd

74

FDEP Biology Laboratory - Chronic Definitive Bench Sheet

Ceriodaphnia dubia

Facility: Pace Water System WWTP
Address: Hwy 197a Pace
County: Santa Rosa ZIP 32571
NPDES Permit #: FL 0102202
Contact/District: Nathan Mulky/NorthwesT

LIMS entry: 12-14-12 MF verified: BA 12.19.12

Diluent/ Batch: SDMHW
~~20% DMW~~ / 11-16-12 Test Days Used: 0-4
20% DMW / 12-6-12 Test Days Used: 5 not to be used for test not reviewed MF

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

Organism: *Ceriodaphnia dubia*
Organism Batch #: 12-4-12
Organism age : <24 hours
Feeding: Prior to Test and Daily
Food: ☐ YCT ☐ *P. subcapitata*
Food Batch: 11-14-12 10-31-12
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-2012-12-04-04	1471026	12-3-12 0800	12-4-12 1006
Test Day 2	2	TLH-2012-12-06-23	1471742	12-5-12 0800	12-6-12 1100
Test Day 4	3	TLH-2012-12-10-03	1472173	12-7-12 0800	12-8-12 0900

Batch #	11-16-12	12-6-12	NA	NA	NA			
Water Quality Parameters	SDMHW ~~20% DMW~~	SDMHW ~~20% DMW~~	Sample 1	Sample 2	Sample 3	Other:	Measured By:	Verified by:
Field Total Residual Cl_2 (mg/L):	NA	NA	Not measured				—	MF
Lab Total Residual Cl_2 (mg/L):	<0.03	<0.03	<0.03	<0.03	<0.03		HW	MF
Alkalinity (mg/L as $CaCO_3$):	81	73	46	40	43		HW	MF
Hardness (mg/L as $CaCO_3$):	92	86	80	90	86		HW	MF
Total Ammonia (mg/L as N):	<0.017	<0.017	0.045	0.046	0.021		MF	BA
Conductivity: (µmhos) mmhos:	316	321	459	445	449		MF/HW	BA/MF
Salinity (ppth):	—	—	—	—	—			

Test Incubated in: Incubator #: 2

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:
Incubator # 2 min. 25.3 max. 26.5 mean —
Room B246 min. 25.0 max. 25.3 mean —
Test min. ____ max. ____ mean ____

Loaded by: MF

Test Replicates	Loaded from culture vial
1	A17
2	A18
3	A29
4	A3
5	B4
6	B9
7	B10
8	B28
9	B1
10	B20

Results	
Control % CV:	26.6%
Dunnetts PMSD:	31.6%
Reproduction NOEC:	50%
Reproduction LOEC:	100%
Survival NOEC:	100%
Survival LOEC:	>100%
ICP_{20}:	57.4%
ICP_{25}:	73.3%

Investigators' signatures
Marshall Faircloth
Amy Fisher
Hans Webb

REVIEWER

Comments: Test Terminated on Day 5 due to controls meeting test Termination criteria MF 1-10-13

FDEP Biology Laboratory - Chronic Definitive Bench Sheet

Ceriodaphnia dubia Survival and Reproduction

SOP TA07_05

Facility: Pace Water Systems WWTP

LIMS Sample #: 147026 for lab sample #1

Start Date: 12-4-12 Time: 1130

End Date: 12-9-12 Time: ~~1200~~ 1100 MF

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												10	
	2	0	0	0	0	0	0	0	0	0	0	0	10	0
	3	3	3	3	4	4	2	3	2	4		31	10	3.1
	4	7	~~10~~	~~7~~	~~10~~	7	7	7	9	10	5	79	10	7.9
	5	0	0	10	9	12	10	10	10	11	3	75	10	7.5
	6													
	7													
	8													
	Total	10	13	20	22	23	21	19	22	23	12	185	10	18.5

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												10	
	2	0	0	0	0	0	0	0	0	0	0	0	10	0
	3	2	2	4	3	2	3	3	4	3	1	27	10	2.7
	4	9	8	8	7	9	10	9	9	10	7	86	10	8.6
	5	0	0	0	10	14	12	9	10	10	14	79	10	7.9
	6													
	7													
	8													
	Total	11	10	12	20	25	25	21	23	23	22	192	10	19.2

Organisms loaded by: MF

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

Concentration	Mean neonates /adult	% survival
Control	18.5	100 %
6.25%	19.2	100 %
12.50%	19.3	100 %
25%	~~18.8~~	100 %
50%	16.4	100 %
100%	8.3	100 %

Test acceptability

Mean control reproduction 15/female	(yes) no
3rd brood in 60% of surviving females	(yes) no
Control survival ≥ 80%:	(yes) no

Comments: DAY 4 ETC wrote Rep 1 neonates from 6.25/12.5/25% in upper - ~~voided~~ corrected MF

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

Test Page 2 of 6

PAGE 74

FDEP Biology Laboratory - Chronic Definitive Bench Sheet

Ceriodaphnia dubia Survival and Reproduction

SOP TA07_05

Facility: Pace Water Systems WWTP

LIMS Sample #: 147026 for lab sample #1

Start Date: 12-4-12 Time: 1130

End Date: 12-9-12 Time: 1100

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	0	3	4	4	4	4	2	2	3	2	28	10	2.8
	4	5	10	8	9	9	8	6	7	9	9	80	10	8.0
	5	11	0	12	9	10	10	10	11	0	12	85	10	8.5
	6													
	7													
	8							mf						
	Total	16	13	24	22	23	22	21	20	12	23	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
25%	0*												10	
	1												10	
	2	0	0	0	0	0	0	0	0	0	0	0	10	0
	3	0	3	4	3	4	4	3	2	3	4	30	10	3.0
	4	3	0	9	11	9	9	8	9	10	11	79	10	7.9
	5	10	0	0	9	12	12	11	11	6	11	82	10	8.2
	6													
	7													
	8													
	Total	13	3	13	23	25	25	22	22	19	25	191	10	19.1

SL

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	0	2	3	4	2	4	0	4	2	4	25	10	2.5
	4	0	8	7	7	7	9	7	9	4	7	65	10	6.5
	5	5	12	22	8	12	0	12	12	0	13	74	10	7.4
	6													
	7													
	8													
	Total	5	22	10	19	21	13	19	25	6	24	164	10	16.4

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	9	9	10	0.9
	3	0	3	2	4	4	0	4	1	3	0	21	10	2.1
	4	0	3	6	5	6	0	7	6	8	4	46	10	4.6
	5	6	0	0	0	18	1	0	0	0	0	7	10	0.7
	6													
	7													
	8													
	Total	6	6	8	9	11	1	11	7	11	13	83	10	8.3

Comments: (5) - split brood mf 12-4-12

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

FDEP Biology Laboratory - Chronic Definitive Bench Sheet

Ceriodaphnia dubia Parameters

Facility: Pace Water Systems WWTP SOP TA07_05

LIMS Sample #: 1471026 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	7.9	24.1	8.0	316					
	1	6.25%	M	7.7	24.6	8.0	331					
	1	12.5%	M	7.7	24.7	7.9	337					
	1	25%	M	7.6	24.8	7.9	354					
	1	50%	M	7.6	25.0	7.9	385					
	1	100%	M	7.5	25.6	8.1	459					
	Measured by:			MF	MF	MF	MF					
	Recorded by:			MF	MF	MF	MF					
Day 1	sample:	Control	M	7.9	24.9	7.8	320	M	7.8	25.3	8.1	347
	1	6.25%	M	7.8	24.9	7.8	328	M	7.9	25.2	8.0	361
	1	12.5%	M	7.8	24.9	7.8	336	M	7.9	25.4	8.1	352
	1	25%	M	7.8	24.8	7.8	351	M	7.9	25.5	8.1	371
	1	50%	M	7.8	24.8	7.9	381	M	7.9	25.7	8.1	402
	1	100%	M	7.7	25.2	8.0	453	M	7.8	25.1	8.2	507
	Measured by:			MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:			MF	MF	MF	MF		MF	MF	MF	MF
Day 2	sample:	Control	M	8.1	24.6	8.2	312	M	8.0	25.3	8.1	344
	2	6.25%	M	8.1	24.9	8.3	323	M	8.0	25.5	8.2	349
	2	12.5%	M	8.0	24.9	8.0	328	M	8.0	25.9	8.3	354
	2	25%	M	8.0	25.1	8.0	345	M	8.0	25.8	8.3	371
	2	50%	M	8.0	25.4	8.1	375	M	8.0	25.9	8.3	402
	2	100%	M	7.9	25.6	8.1	445	M	7.9	26.0	8.3	474
	Measured by:			MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:			MF	MF	MF	MF		MF	MF	MF	MF
Day 3	sample:	Control	M	7.8	24.5	8.4	320	M	7.8	25.8	8.1	336
	2	6.25%	M	7.8	24.8	8.4	328	M	7.8	25.9	8.1	347
	2	12.5%	M	7.8	24.7	8.4	337	M	7.8	26.0	8.1	352
	2	25%	M	7.8	24.7	8.4	351	M	7.8	26.1	8.1	369
	2	50%	M	7.8	24.6	8.4	384	M	7.8	26.1	8.1	401
	2	100%	M	7.7	24.6	8.4	454	M	7.7	25.7	8.0	483
	Measured by:			MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:			MF	MF	MF	MF		MF	MF	MF	MF

Comments:

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

FDEP Biology Laboratory - Chronic Definitive Bench Sheet

Ceriodaphnia dubia Parameters

Facility: Pace Water Systems WWTP SOP TA07_05

LIMS Sample #: 1471026 for lab sample 1

Circle µmhos-cm or mmhos-cm

Test Day		Concentration	New Sample: Test Replicate	New Sample: pH (su)	New Sample: Temp (°C)	New Sample: DO (mg/L)	New Sample: Conductivity (µmhos/cm) (mmhos/cm)	Old Sample: Test Replicate	Old Sample: pH (su)	Old Sample: Temp (°C)	Old Sample: DO (mg/L)	Old Sample: Conductivity (µmhos/cm) (mmhos/cm)
Day 4 ←	sample:	Control	M	7.8	24.0	8.0	314	M	7.8	25.6	8.1	332
	3	6.25%	M	7.8	24.0	8.0	317	M	7.8	25.8	8.1	343
	3	12.5%	M	7.8	24.1	8.0	331	M	7.8	26.0	8.0	350
	3	25%	M	7.8	24.2	8.1	355	M	7.8	26.1	8.0	367
	3	50%	M	7.7	24.2	8.1	382	M	7.9	26.0	8.0	402
	3	100%	M	7.7	24.2	8.0	449	M	7.8	25.9	8.0	476
	Measured by:			MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:			MF	MF	MF	MF		MF	MF	MF	MF
Day 5	sample:	Control	M	8.0	~~24.2~~	7.6	314	M	7.9	25.8	7.9	328
	3	6.25%	M	8.0	25.0	7.9	321	M	7.9	26.0	8.0	338
	3	12.5%	M	7.9	25.0	7.9	329	M	7.9	26.3	8.0	344
	3	25%	M	7.9	25.1	7.9	346	M	7.9	26.3	8.0	363
	3	50%	M	7.9	25.1	7.9	381	M	7.9	26.1	8.0	393
	3	100%	M	7.8	25.4	7.8	451	M	7.8	25.8	7.9	493
	Measured by:			MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:			MF	MF	MF	MF		MF	MF	MF	MF
Day 6	sample:	Control	M					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:											
	Recorded by:											
Day 7	sample:	Control	M					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:											
	Recorded by:											

Comments:

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

Test ID: Pace Water System WWTP C. dubia Dates: 12-4-12 — 12-9-12

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)

entered 12-9-12 M. Faircloth

V 1.1 9/21/10 MF/jd

SL

FDEP Biology Laboratory - Chronic Bioassay Bench Sheet

Pimphales promelas or Menidia beryllina

Facility: Pace Water Systems WWTP
Address: Hwy 197 n Pace
County: Santa Rosa Zip 32571
NPDES Permit #: FL 0102202
Contact/District: Nathan Mulkey / Northwest

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: 10.30.12 Time: 1330
End Date: ~~11-5-12~~ 11-6-12 Time: 0900

Diluent/ Batch:
MHW / 10-25-12 Test Days Used: D-4
MHW / 11-3-12 Test Days Used: 5-6
ASW / _____ Test Days Used: _____
ASW / _____ Test Days Used: _____

Organism age: 1 days P. Promelas Batch # 10-30-12
Feeding Prior to Test and Daily
Artemia Lot #: 08812
Chamber size: 1000 ml
Test volume: 500 ml

Artemia Batch #	Day 3	Day 4	Day 5	Day 6
Day 0	142-12	145-12	146-12	147-12
Day 1	143-12	146-12	147-12	148-12
Day 2	144-12	147-12	148-12	

Sample Received	Lab Sample #	LIMS Job #	LIMS Sample #	Collection Date/Time	Received Date/Time
Test Day 0	1	TLH-2012-10-30-39	1464753	10/29/12 0800	10/30/12 1015
Test Day 2	2	TLH-2012-11-01-01	1465059	10/31/12 0800	11-1-12 1015
Test Day 4	3	TLH-2012-11-05-12	1465486	11-2-12 0800	11-3-12 0900

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 #:	1	2	3	1	2	3	1	2	3	1	2	3
Sample:	Not measured	Not measured	Not measured	<0.03	<0.03	<0.03	60	50	37	87	78	85
Diluent/Control:				<0.03			67	~~78~~ 77	~~85~~ 84	86	85	
Method:				Hach	Hach	Hach	Hach	Hach	Hach	Hach	Hach	Hach
Measured by:				MF/MF	MF	MF	MF/MF	MF	MF	MF/MF	MF	MF
Verified by:	MF	MF	MF				/MF			/MF	MF	

	Conductivity (circle one) (umhos-cm) (mmhos-cm)			Ammonia (mg/L)			Salinity (ppth)		
Lab Sample#:	1	2	3	1	2	3	1	2	3
Sample:	489	473	481	0.026	<0.017	0.826	—	—	—
Diluent/Control:	302	313	—	<0.017	<0.017	—	—	—	—
Method:	Mettler	Mettler	Mettler	Denver	Denver	Denver	Mettler	Mettler	Mettler
Measured by:	BA	BA	MF	MF	MF	MF			
Verified by:	MF	MF							

Statistics	
Growth NOEC:	100%
Growth LOEC:	>100%
Growth IC_{20}:	>100%
Growth: IC_{25}:	>100%
Ctl % CV:	3.06%
Dunnetts PMSD:	14.5%
Survival NOEC:	100%
Survival LOEC:	>100%

Light Intensity : 50 - 100 ft. candles
Photoperiod : 16 light 8 dark
Temperature Range °C:
Incubator # 3 min. 23.2 max 26.3 mean —
Water bath # ____ min. ____ max. ____ mean ____
Room B24F min. 23.2 max. 25.3 mean —

Sample Validation:
Instructions: Check yes or no. Fill in temperatures.
Temperature: Shipped ≤ 6°C ☑ Yes ☐ No
If Hand Delivered:Cooling ☐ Yes ☐ No (received ____ °C collected ____ °C)
Holding Time: ≤ 36 Hours ☑ Yes ☐ No
(Composite-end of collection; grab-when collected;
4 in 24 - time last sample collected)

Lims Data Entry: 11-10-12 MF Data Entry Verification: 11-12 BK

Investigators' signatures

	Initials/BA
Pace Analytical	
Marshall Faircloth	MF
Hans Wolfe	HW
REVIEWER	

Comments:

revised 01/24/12 MF

Chronic Bioassay Survival Benchsheet

Facility: Pace Water Systems WWTP

LIMS Sample Number: 1464753
(for Lab Sample # 1)

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

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

		TEST DAY							
Concentration	Replicate	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
Sample 6.25 %	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 BA	10	10
Sample 12.5 %	A	10	10	10	10	10	10	10	10
	B	10	10	10	9 10	9	9	9	9
	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	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 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	10	10
Sample 100 %	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 %	A	10							
	B	10							
	C	10							
	D	10							
Loaded by: BA	Checked by:		BA	BA	HW	BA	BA	BA	BA
Verified by: MF									

Comments:

Chronic Bioassay Parameters Benchsheet

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

Sample Source: Pace Water Systems WWTP
LIMS Sample #: 1464753 (for Lab sample #1)

Start Date: 10.30.17 End Date: 11-6-17
Start Time: 1370 End Time: 900

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	sample:	Control	A	7.4	24.0	7.6	302									
	1	6.25%	A	7.4	24.0	7.5	313									
	1	12.5%	A	7.4	24.0	7.4	322									
	1	25%	A	7.5	24.0	7.5	346									
	1	50%	A	7.5	24.0	7.6	393									
	1	100%	A	7.5	24.0	7.8	489									
	1		A													
	Measured by:			BA	BA	BA	BA									
	Recorded by:			BA	BA	BA	BA									
			Rep	pH	Temp	DO	Conductivity	Salinity		Rep	pH	Temp	DO	Conductivity	Salinity	
Day 1	sample:	Control	B	7.2	24.8	7.6	310			B	7.0	24.0	7.2	305		
	1	6.25%	B	7.3	25.2	7.2	322			B	7.0	24.0	7.3	320		
	1	12.5%	B	7.3	24.5	7.0	325			B	7.1	24.5	7.5	327		
	1	25%	B	7.3	24.6	7.0	347			B	7.1	24.0	7.6	348		
	1	50%	B	7.3	24.3	7.1	385			B	7.1	24.0	7.8	387		
	1	100%	B	7.3	24.5	7.1	466			B	7.1	24.0	7.7	474		
	1		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 2	sample:	Control	C	7.1	25.4	6.8	309			C	7.2	25.1	6.3	301		
	2	6.25%	C	7.2	25.3	6.4	322			C	7.2	24.6	6.5	310		
	2	12.5%	C	7.2	25.3	6.4	332			C	7.2	24.3	6.8	322		
	2	25%	C	7.2	25.6	6.5	349			C	7.2	24.3	7.0	338		
	2	50%	C	7.2	25.4	6.6	380 390			C	7.2	24.0	7.0	374		
	2	100%	C	7.2	25.1	6.6	470			C	7.2	24.0	7.2	450		
	2		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 3	sample:	Control	D	7.3	24.4	6.9	317			D	7.6	24.1	8.0	335		
	2	6.25%	D	7.3	24.2	6.1	322			D	7.6	24.1	8.0	313		
	2	12.5%	D	7.3	24.1	6.5	330			D	7.6	24.2	8.0	345		
	2	25%	D	7.3	24.4	6.6	352			D	7.6	24.4	8.0	386		
	2	50%	D	7.2	24.1	6.4	386			D	7.5	24.4	7.9	383		
	2	100%	D	7.2	24.1	6.4	457			D	7.4	25.0	7.7	468		
	2		D							D						
	Measured by:			BA	BA	BA	BA				HW	HW	HW	HW		
	Recorded by:			BA	BA	BA	BA				HW	HW	HW	HW		

Comments:

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

Chronic Bioassay Parameters Benchsheet

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

Sample Source: Pace Water Systems WWTP Start Date: 10-30-12 End Date: 11-6-12

LIMS Sample #: 1464753 (for Lab sample #1) Start Time: 1330 End Time: 0900

conc = concentration rep = replicate

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 4	sample:	Control	A	7.4	24.1	6.5	306		A	7.2	24.9	7.1	304	
	3	6.25%	A	7.4	24.2	6.4	317		A	7.2	24.8	7.2	311	
	3	12.5%	A	7.4	24.1	6.5	330		A	7.2	24.8	6.9	322	
	3	25%	A	7.5	24.1	6.4	346		A	7.2	24.7	7.0	341	
	3	50%	A	7.4	24.0	6.4	379		A	7.2	24.6	7.1	377	
	3	100%	A	7.4	24.1	6.4	447		A	7.2	24.6	7.1	448	
	3		A						A					
	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 5	sample:	Control	B	7.3	25.2	6.1	313		B	7.2	25.2	6.1	310	
	3	6.25%	B	7.3	24.7	6.0	325		B	7.2	24.7	6.0	324	
	3	12.5%	B	7.3	24.5	6.0	330		B	7.2	24.5	6.1	330	
	3	25%	B	7.3	24.4	6.0	351		B	7.3	24.6	6.4	351	
	3	50%	B	7.3	24.3	6.0	386		B	7.3	24.3	6.4	385	
	3	100%	B	7.3	24.3	6.0	456		B	7.3	24.3	6.4	466	
	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	7.3	25.4	6.8	314		C	7.5	24.2	7.3	311	
	3	6.25%	C	7.3	24.9	6.1	322		C	7.5	24.1	7.2	325	
	3	12.5%	C	7.3	25.3	6.2	337		C	7.4	24.0	7.1	333	
	3	25%	C	7.3	24.9	6.4	351		C	7.5	24.0	7.1	352	
	3	50%	C	7.3	24.4	6.5	390		C	7.4	24.1	7.2	389	
	3	100%	C	7.3	24.9	6.5	467		C	7.4	24.1	7.2	472	
	3		C						C					
	Measured by:			BA	BA	BA	BA			MF	MF	MF	MF	
	Recorded by:			BA	BA	BA	BA			MF	MF	MF	MF	
		(A)	~~Rep~~	~~pH~~	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 7	sample:	Control	7.2	D	25.5	5.7	307		D					
	3	6.25%	7.1	D	25.9	5.8	325		D					
	3	12.5%	7.2	D	25.6	6.0	328		D					
	3	25%	7.2	D	24.6	6.1	351		D					
	3	50%	7.2	D	24.5	6.3	385		D					
	3	100%	7.2	D	24.9	6.2	472		D					
	3								D					
	Measured by:			BA	BA	BA	BA							
	Recorded by:			BA	BA	BA	BA							

Comments: (A) pH and Rep column switched. Jm for BA

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

Page 60

Chronic Bioassay Weighing Benchsheet

Facility: Pace Water Systems

LIMS Sample Number: M647.53

(for Lab Sample # 1)

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

			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 # Fish	Mean wt. mg	
Control	A	1	0.01922	0.02518	0.00596	10	0.596	
	B	2	0.02034	0.02645	0.00611	10	0.611	0.6150
	C	3	0.01906	0.02547	0.00641	10	0.641	
	D	4	0.01935	0.02547	0.00612	10	0.612	
sample 6.25%	A	5	0.02002	0.02753	0.00751	10	0.751	
	B	6	0.01934	0.02753	0.00819	10	0.819	0.7698
	C	7	0.01932	0.02698	0.00766	10	0.766	
	D	8	0.01823	0.02566	0.00743	10	0.743	
sample 12.5%	A	9	0.01973	0.02694	0.00721	10	0.721	
	B	10	0.01920	0.02609	0.00689	10	0.689	0.7065
	C	11	0.01990	0.02746	0.00756	10	0.756	
	D	12	0.01874	0.02534	0.00660	10	0.660	
sample 25%	A	13	0.01952	0.02658	0.00706	10	0.706	
	B	14	0.01920	0.02610	0.00690	10	0.690	0.6630
	C	15	0.01942	0.02608	0.00666	10	0.666	
	D	16	0.01895	0.02485	0.00590	10	0.590	
sample 50%	A	17	0.01989	0.02728	0.00739	10	0.739	
	B	18	0.01929	0.02627	0.00698	10	0.698	0.6908
	C	19	0.01849	0.02554	0.00705	10	0.705	
	D	20	0.01930	0.02551	0.00621	10	0.621	
sample 100%	A	21	0.02008	0.02760	0.00752	10	0.752	
	B	22	0.01796	0.02694	0.00898	10	0.898	0.7688
	C	23	0.01907	0.02600	0.00693	10	0.693	
	D	24	0.01843	0.02575	0.00737	10	0.732	
sample %	A					10		
	B					10		
	C					10		
	D					10		
	Weighed by initials:		BB	BA	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.

Chronic Bioassay Weighing Benchsheet

Quality Control

Facility: Pace Water System

LIMS Sample Number: 146753
(for Lab Sample # 1)

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

BA

Drying Oven ID:	ER-034000
Temperature °C:	100
Hours:	8

Tare weighed by: BA
Final weighed by: BA

Tare Weighing Date: 11.5.12 Final Weighing Date: 11.13.12

				Measured Value (g)		S-weight Value (g)
Tare Pan 1 after Pan 5 (g)	0.01922	@	0.01923	S-weights	0.01001	@ 0.01000
Tare Pan 1 after Pan 10 (g)	0.01924	@	0.01922	at tare	0.05002	@ 0.05000
Tare Pan 1 after Pan 15 (g)	0.01923	@	0.01922	S-weights	0.02000	@ 0.02000
Tare Pan 1 after Pan 20 (g)	0.01922	@	0.01922	at final	0.05004	@ 0.05000
Tare Pan 1 after Pan 25 (g)	0.01923	@	~~BA 0.01922~~	0.01922		
Tare Pan 1 after Pan 30 (g)	0.01922	@	0.01922	Balance: Ohaus 250D Ser# 1125481084		
Tare Pan 1 after Pan 35 (g)	0.01924	@	0.01922	S-Weights: BIO-S-Weights-01		
Tare Pan 1 after Pan 40 (g)	0.01923	@	0.01922			
Tare Pan 1 after Pan 45 (g)		@				
Tare Pan 1 after Pan 48 (g)		@				
Final Pan 1 after Pan 5 (g)	0.02516	@	0.02518			
Final Pan 1 after Pan 10 (g)	0.02518	@	0.02518			
Final Pan 1 after Pan 15 (g)	0.02518	@	0.02518			
Final Pan 1 after Pan 20 (g)	0.02514	@	0.02518			
Final Pan 1 after Pan 25 (g)	0.02519	@	0.02518			
Final Pan 1 after Pan 30 (g)	0.02515	@	0.02518			
Final Pan 1 after Pan 35 (g)	0.02520	@	0.02518			
Final Pan 1 after Pan 40 (g)	0.02519	@	0.02518			
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

Page 62

Test ID: Pace Water System WWTP Dates: October 30, 2012 – November 6, 2012

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)

entered by M. Faircloth 11-13-12

V 1.1 9/21/10 MF/jd

Page 63

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Shipping Date: 10/29/12

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	300	<24HRS	FM 120328-1B1S	25	7.6	30
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

Ceriodaphnia Survival and Reproduction Test-Reproduction										
Start Date:	12/4/2012 11:30	Test ID:	pacecd1212			Sample ID:		Pace WWTP C. dubia repeat Dec. 2012		
End Date:	12/9/2012 11:00	Lab ID:	DEP TOXLAB-FDEP Biology T			Sample Type:		EFF1-POTW		
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002			Test Species:		CD-Ceriodaphnia dubia		
Comments:	Ceriodaphnia dubia chronic bioassay repeat for Pace Water Systems WWTP									

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	10.000	13.000	20.000	22.000	23.000	21.000	19.000	22.000	23.000	12.000
6.25	11.000	10.000	12.000	20.000	25.000	25.000	21.000	23.000	23.000	22.000
12.5	16.000	13.000	24.000	22.000	23.000	22.000	18.000	20.000	12.000	23.000
25	13.000	3.000	13.000	23.000	25.000	25.000	22.000	22.000	19.000	25.000
50	5.000	22.000	10.000	19.000	21.000	13.000	19.000	25.000	6.000	24.000
100	6.000	6.000	8.000	9.000	11.000	1.000	11.000	7.000	11.000	13.000

			Transform: Untransformed					Rank	1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	
D-Control	18.500	1.0000	18.500	10.000	23.000	26.634	10			
6.25	19.200	1.0378	19.200	10.000	25.000	30.646	10	113.00	75.00	
12.5	19.300	1.0432	19.300	12.000	24.000	22.525	10	111.50	75.00	
25	19.000	1.0270	19.000	3.000	25.000	38.034	10	116.50	75.00	
50	16.400	0.8865	16.400	5.000	25.000	44.918	10	97.50	75.00	
*100	8.300	0.4486	8.300	1.000	13.000	42.140	10	60.50	75.00	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.01)	1.51178	1.035	-0.8455	-0.0598
Bartlett's Test indicates equal variances (p = 0.22)	6.96471	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	50	100	70.7107	2
Treatments vs D-Control				

Ceriodaphnia Survival and Reproduction Test-Reproduction										
Start Date:	12/4/2012 11:30	Test ID:	pacecd1212			Sample ID:	Pace WWTP C. dubia repeat Dec. 2012			
End Date:	12/9/2012 11:00	Lab ID:	DEP TOXLAB-FDEP Biology T			Sample Type:	EFF1-POTW			
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002			Test Species:	CD-Ceriodaphnia dubia			
Comments:	Ceriodaphnia dubia chronic bioassay repeat for Pace Water Systems WWTP									

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	10.000	13.000	20.000	22.000	23.000	21.000	19.000	22.000	23.000	12.000
6.25	11.000	10.000	12.000	20.000	25.000	25.000	21.000	23.000	23.000	22.000
12.5	16.000	13.000	24.000	22.000	23.000	22.000	18.000	20.000	12.000	23.000
25	13.000	3.000	13.000	23.000	25.000	25.000	22.000	22.000	19.000	25.000
50	5.000	22.000	10.000	19.000	21.000	13.000	19.000	25.000	6.000	24.000
100	6.000	6.000	8.000	9.000	11.000	1.000	11.000	7.000	11.000	13.000

			Transform: Untransformed					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	18.500	1.0000	18.500	10.000	23.000	26.634	10	19.000	1.0000
6.25	19.200	1.0378	19.200	10.000	25.000	30.646	10	19.000	1.0000
12.5	19.300	1.0432	19.300	12.000	24.000	22.525	10	19.000	1.0000
25	19.000	1.0270	19.000	3.000	25.000	38.034	10	19.000	1.0000
50	16.400	0.8865	16.400	5.000	25.000	44.918	10	16.400	0.8632
100	8.300	0.4486	8.300	1.000	13.000	42.140	10	8.300	0.4368

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.01)	1.51178	1.035	-0.8455	-0.0598
Bartlett's Test indicates equal variances (p = 0.22)	6.96471	15.0863		

Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL		Skew
IC05	34.135	15.544	2.684	54.668	0.0418
IC10	43.269	14.984	5.368	59.337	-0.3872
IC15	51.543	12.519	21.996	64.005	-0.5612
IC20	57.407	10.908	32.341	68.680	-0.6370
IC25	63.272	10.117	39.279	73.862	-0.7306
IC40	80.864	8.769	52.798	90.143	-1.3109
IC50	92.593				

Appendix H

Standard reference toxicant data

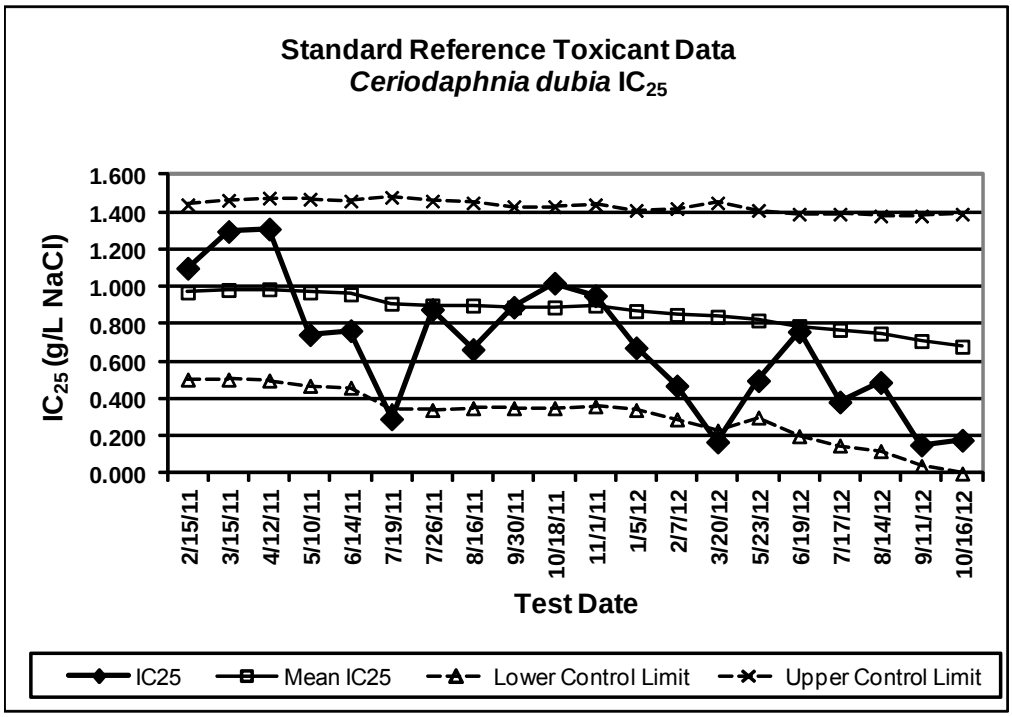
Florida Department of Environmental Protection
Bureau of Laboratories

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

Date	IC25	Mean IC25	Std Dev	Lower Control Limit	Upper Control Limit
2/15/11	1.100	0.97	0.23	0.50	1.44
3/15/11	1.297	0.98	0.24	0.50	1.46
4/12/11	1.310	0.99	0.24	0.50	1.48
5/10/11	0.744	0.97	0.25	0.47	1.47
6/14/11	0.765	0.96	0.25	0.46	1.46
7/19/11	0.293	0.91	0.28	0.34	1.48
7/26/11	0.879	0.90	0.28	0.34	1.46
8/16/11	0.665	0.90	0.27	0.35	1.45
9/30/11	0.891	0.89	0.27	0.35	1.43
10/18/11	1.020	0.89	0.27	0.35	1.43
11/1/11	0.953	0.90	0.27	0.36	1.44
1/5/12	0.674	0.87	0.27	0.34	1.41
2/7/12	0.470	0.85	0.28	0.29	1.42
3/20/12	0.169	0.84	0.31	0.23	1.45
5/23/12	0.498	0.82	0.32	0.30	1.41
6/19/12	0.760	0.79	0.30	0.20	1.39
7/17/12	0.383	0.77	0.31	0.15	1.39
8/14/12	0.489	0.75	0.31	0.12	1.38
9/11/12	0.153	0.71	0.33	0.04	1.38
10/16/12	0.179	0.68	0.35	0.00	1.39

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

EPA 75th Percentile %CV for Reproduction **45%**
Last 20 - Lab %CV Reproduction 51.8%



FDEP Biology Laboratory - Chronic SRT Bench Sheet

Ceriodaphnia dubia

Diluent/ Batch: ~~20% DMW~~ SDMHW / 12-25-12A Test Days Used: 0-4
SDMHW ~~20% DMW~~ / 12-25-12B Test Days Used: 5-7
Toxicant/ Batch: NaCl / 3.75g/L 12-30-12

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

Organism: *Ceriodaphnia dubia*
Organism Batch #/ Age: (0-31-12) / <24 hr.
Feeding: Prior to Test and Daily
Food: ☑ YCT ☑ *P. subcapitata*
Food Batch: 9-10-12 6-7-12
Chamber size: 30 mL
Test Volume: 20 mL

Start Date: 12-31-12 Time: 1310
End Date: 1-8-13 Time: 1300

Batch:	12-25-12A				
Water Quality Parameters	20% SDMHW	20% SDMHW	Other	Measured by:	Verified by:
Lab Total Residual Cl_2 (mg/L):	28.03			MF	
Alkalinity (mg/L as $CaCO_3$):	69			MF/MW	
Hardness (mg/L as $CaCO_3$):	90			MF/MW	
Total Ammonia (mg/L as N):	<0.07			MF	
Conductivity (µmhos-cm) mmhos-cm :	316			MF	

Results	
Control % CV:	
Dunnetts PMSD:	
Reproduction NOEC:	
Reproduction LOEC:	
Survival NOEC:	
Survival LOEC:	
ICP_{20}:	
ICP_{25}:	

Loaded by: MF

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

Test Replicate	Loaded from culture vial
1	B4
2	B3
3	B6
4	B7
5	B8
6	B29
7	A9
8	B23
9	A22
10	B26

Comments:
Invalidated due to lack of control reproduction by TAT Day 8. MF 11-22-12

Investigators' signatures
Marshall Faircloth
Bruce Abolya
Mary Wolfe

REVIEWER

Test Incubated in: Incubator # 2
Light Intensity : 50 - 100 ft candles
Photoperiod : 16 light 8 dark
Temperature Range °C:
Incubator # 2 min. 24.4 max. 26.4 mean
Room B246 2 min. 24.5 max. 25.3 mean
Test min. max. mean

Test Page 1 of 6

PAGE 73

10/30/12 BA

Ceriodaphnia dubia Survival and Reproduction

Start Date: 10-31-12 Time: 1310 Loaded by: MF
End Date: 11-8-12 Time: 1300 Verified by: DA

g/L

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		10	
	3	0	0	0	0	0	0	0	0	0	0		10	
	4	0	0	0	0	0	0	0	0	0	X0		9	
	5	#0	X0	0	0	0	0	0	0	0	|		8	
	6	0	0	0	5	5	8	0	2	0	|		8	
	7	0	|	2	0	10	0	0	4	3	|		8	
	8	0	|	0	2	0	0	3	0	5	|		8	
	Total	0	0	2	7	15	8	3	6	8	0			
0.2	0												10	
	1												10	
	2	0	0	0	0	0	0	0	0	0	0		10	
	3	0	0	0	0	0	0	0	0	0	0		10	
	4	0	0	0	1	3	3	0	0	0	X0		9	
	5	0	0	0	0	0	0	0	0	0	|		9	
	6	0	0	0	0	6	8	5	0	0	|		9	
	7	0	0	2	8	10	10	0	0	0	|		9	
	8	0	0	0	0	0	0	0	0	0	|		9	
	Total	0	0	2	9	10	21	5	0	0	|			
0.4	0												10	
	1												10	
	2	0	0	0	0	0	0	0	0	0	0		10	
	3	0	0	0	0	0	0	0	0	0	0		10	
	4	0	0	0	0	0	2	2	2	0	X0		9	
	5	0	0	0	0	0	0	0	0	2	|		9	
	6	0	X0	0	0	6	7	X	0	0	|		7	
	7	4	|	0	3	6	8 mf	|	X	4	|		6	
	8	0	|	0	0	0	10	|	|	0	|			
	Total	4	0	0	3	12	17 mf	2	2	6	0			

Comments: (5) split

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
0.8	0												10	
	1												10	
	2	0	0	0	0	0	0	0	0	0	0		10	
	3	0	0	0	0	0	0	0	0	0	0		10	
	4	0	0	3	0	0	0	0	2	0	0		10	
	5	0	0	0	0	0	0	0	0	0	2		10	
	6	0	0	5	3	2	6	4	4	3	0		10	
	7	0	4	2	4	2	7	X2	3	4	0		9	
	8	0	0	3	0	0	0	1	0	0	0		9	
	Total							6						
1.6	0												10	
	1												10	
	2	X0	0	0	0	0	0	0	0	0	0		9	
	3	0	X	0	0	0	0	0	0	0	0		8	
	4	|	|	0	X	0	0	0	0	0	0		7	
	5	|	|	0	|	2	3	0	0	0	1		7	
	6	|	|	0	|	X	0	X	2	2	2		5	
	7	|	|	0	|	|	0	|	0	0	0		5	
	8	|	|	0	|	|	0	|	0	0	0		5	
	Total	|	|		|	2								
3.2	0												10	
	1	X	X	X	X		X	X	X	X	X		9	
	2	|	|	|	|	X0	|	|	|	|	|		0	
	3	|	|	|	|	|	|	|	|	|	|			
	4	|	|	|	|	|	|	|	|	|	|			
	5	|	|	|	|	|	|	|	|	|	|			
	6	|	|	|	|	|	|	|	|	|	|			
	7	|	|	|	|	|	|	|	|	|	|			
	8	|	|	|	|	|	|	|	|	|	|			
	Total													

Comments:

FDEP Biology Laboratory - Chronic SRT Bench Sheet

Ceriodaphnia dubia Parameters

Test Day 7/L		New Sample				Conductivity (µmhos/cm)	Old Sample				Conductivity (µmhos/cm)
↓	Conc.	Replicate	pH (su)	Temp (°C)	DO (mg/L)	(mmhos/cm)	Replicate	pH (su)	Temp (°C)	DO (mg/L)	(mmhos/cm)
Day 0	Control	M	7.7	24.3	8.2	316					
	0.2	M	7.7	24.4	8.2	697					
	0.4	M	7.7	24.4	8.2	1056					
	0.8	M	7.7	24.5	8.2	1733					
	1.6	M	7.7	24.5	8.1	3130					
	3.2	M	7.7	24.4	8.1	5980					
	Measured by:		MF	MF	MF	MF					
	Recorded by:		MF	MF	MF	MF					
Day 1	Control	M	7.9	25.7	7.9	319	A	7.9	25.0	8.4	334
	0.2	M	7.9	25.6	8.1	711	A	7.9	25.4	8.4	725
	0.4	M	7.9	25.6	8.1	1086	A	7.9	25.1	8.3	1112
	0.8	M	7.9	25.5	8.1	1794	A	7.9	25.0	8.5	1841
	1.6	M	7.9	25.4	8.2	3190	A	7.9	24.8	8.6	3340
	3.2	M	7.9	25.4	8.3	5950	A	7.9	25.0	8.5	6050
	Measured by:		MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:		MF	MF	MF	MF		MF	MF	MF	MF
Day 2	Control	M	7.9	24.3	7.9	301	A	8.0	24.9	7.9	342
	0.2	M	7.9	25.3	7.8	~~1035~~ 780	A	8.0	25.3	8.0	738
	0.4	M	8.0	25.2	7.9	~~1359~~	A	7.9	25.5	8.1	1109
	0.8	M	7.9	25.2	7.9	~~2359~~	A	7.9	25.6	8.2	1718
	1.6	M	7.9	25.5	7.9	~~3870~~	A	7.9	25.4	8.4	3200
	3.2	M	7.9	25.7	7.9	5830	E	8.0	24.7	8.4	5950
	Measured by:		MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:		MF	MF	MF	MF		MF	MF	MF	MF
Day 3	Control	M	7.9	25.5	8.0	314	A	8.0	25.3	8.0	331
	0.2	M	7.9	25.6	8.0	687	A	7.9	25.9	7.9	800
	0.4	M	7.9	25.9	8.0	1035	A	8.0	25.8	7.9	1097
	0.8	M	7.9	25.9	8.0	1731	A	7.9	25.8	8.0	1825
	1.6	M	7.9	25.8	8.0	3120	C	7.9	25.8	8.0	3190
		M									
	Measured by:		MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:		MF	MF	MF	MF		MF	MF	MF	MF

Comments:

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

FDEP Biology Laboratory - Chronic SRT Bench Sheet

Ceriodaphnia dubia Parameters

Test Day	Conc. %	New Sample Replicate	New Sample pH (su)	New Sample Temp (°C)	New Sample DO (mg/L)	New Sample Conductivity (µmhos/cm) (mmhos/cm)	Old Sample Replicate	Old Sample pH (su)	Old Sample Temp (°C)	Old Sample DO (mg/L)	Old Sample Conductivity (µmhos/cm) (mmhos/cm)
Day 4	Control	M	7.9	25.4	7.9	314	A	8.0	24.2	8.0	330
	0.2	M	7.9	25.6	8.0	688	A	8.0	24.3	8.1	731
	0.4	M	7.9	25.6	8.0	1045	A	8.0	24.5	8.0	1062
	0.8	M	7.9	25.5	7.9	1764	A	8.0	24.5	8.0	1793
	1.6	M	7.9	25.4	7.8	3080	C	7.9	24.6	8.0	3200
		M									
	Measured by:		MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:		MF	MF	MF	MF		MF	MF	MF	MF
Day 5	Control	M	7.9	25.3	8.1	320	A	8.0	24.2	8.2	335
	0.2	M	7.9	25.3	8.3	668	A	7.9	24.2	8.3	718
	0.4	M	7.9	25.3	8.3	1025	A	7.9	24.2	8.2	1078
	0.8	M	7.9	25.4	8.3	1713	A	7.9	24.1	8.3	1865
	1.6	M	7.9	25.5	8.3	3060	C	7.9	24.0	8.2	3260
		M									
	Measured by:		MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:		MF	MF	MF	MF		MF	MF	MF	MF
Day 6	Control	M	7.9	24.9	8.1	319	A	8.1	24.6	8.2	332
	0.2	M	7.9	24.8	8.2	680	A	8.0	24.5	8.2	710
	0.4	M	7.9	25.0	8.2	1030	A	8.0	25.0	8.1	1070
	0.8	M	7.8	25.2	8.2	1725	A	8.0	25.1	8.1	1856
	1.6	M	7.9	25.5	8.1	3075	C	8.0	25.4	8.1	3210
		M		25.6							
	Measured by:		MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:		MF	MF	MF	MF		MF	MF	MF	MF
Day 7	Control	M	8.0	24.3	7.8	325	A	8.0	26.1	7.8	335
	0.2	M	8.0	24.7	7.7	700	A	8.0	26.0	7.9	718
	0.4	M	8.0	24.6	7.7	1110	A	7.9	26.2	7.9	1097
	0.8	M	7.9	24.7	7.7	1820	A	8.0	26.3	7.9	1799
	1.6	M	8.0	24.5	7.7	MF 2480	C	8.0	26.3	7.9	3200
		M		MF MF							
	Measured by:		MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:		MF	MF	MF	MF		MF	MF	MF	MF
Day 8	Control	M					A	8.2	25.6	7.8	331
	0.2	M					A	8.2	25.5	8.0	884
	0.4	M					A	8.2	25.3	8.0	1085
	0.8	M					A	8.1	25.1	8.0	1980
	MF 1.6	M					C	8.2	25.0	7.7	3100
		M									
	Measured by:							MF	MF	MF	MF
	Recorded by:							MF	MF	MF	MF

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

Test ID: C. dubia SRT Dates: 10/31/12 — 11/8/12

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)

entered by M. Faircloth 11-15-12

V 1.1 9/21/10 MF/jd

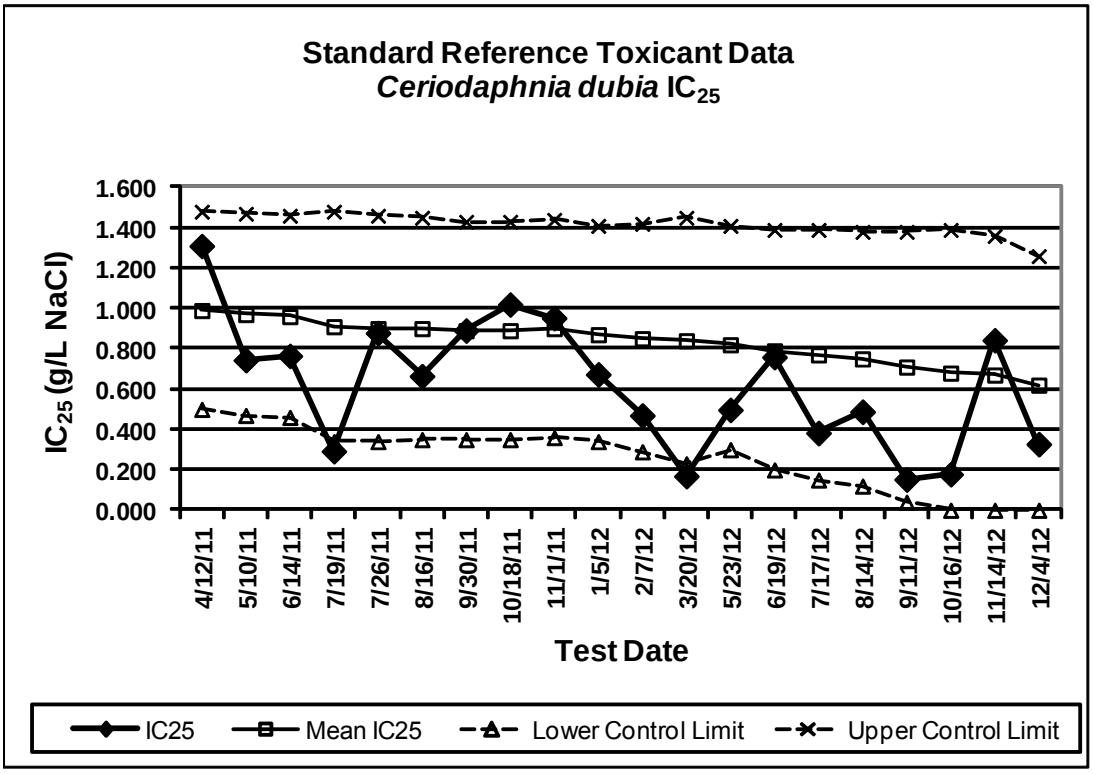
Florida Department of Environmental Protection
Bureau of Laboratories

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

Date	IC25	Mean IC25	Std Dev	Lower Control Limit	Upper Control Limit
4/12/11	1.310	0.99	0.24	0.50	1.48
5/10/11	0.744	0.97	0.25	0.47	1.47
6/14/11	0.765	0.96	0.25	0.46	1.46
7/19/11	0.293	0.91	0.28	0.34	1.48
7/26/11	0.879	0.90	0.28	0.34	1.46
8/16/11	0.665	0.90	0.27	0.35	1.45
9/30/11	0.891	0.89	0.27	0.35	1.43
10/18/11	1.020	0.89	0.27	0.35	1.43
11/1/11	0.953	0.90	0.27	0.36	1.44
1/5/12	0.674	0.87	0.27	0.34	1.41
2/7/12	0.470	0.85	0.28	0.29	1.42
3/20/12	0.169	0.84	0.31	0.23	1.45
5/23/12	0.498	0.82	0.32	0.30	1.41
6/19/12	0.760	0.79	0.30	0.20	1.39
7/17/12	0.383	0.77	0.31	0.15	1.39
8/14/12	0.489	0.75	0.31	0.12	1.38
9/11/12	0.153	0.71	0.33	0.04	1.38
10/16/12	0.179	0.68	0.35	0.00	1.39
11/14/12	0.843	0.67	0.34	0.00	1.36
12/4/12	0.328	0.62	0.28	0.00	1.26

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

EPA 75th Percentile %CV for Reproduction **45%**
Last 20 - Lab %CV Reproduction 50.9%



FDEP Biology Laboratory - Chronic SRT Bench Sheet

Ceriodaphnia dubia

Diluent/ Batch: ~~20% DMW~~ SDMHW / 11-16-12 Test Days Used: 0-5

~~20% DMW~~ / _____ Test Days Used: _____

Toxicant/ Batch: NaCl / 12-3-12 6.2 g/L

SOP # : TA 07_05

EPA-821-R-02-013 Method 1002.0

Organism: *Ceriodaphnia dubia*

Organism Batch #/ Age: 2nd 12-4-12 / <24 hr.

Feeding: Prior to Test and Daily

Food: ☑ YCT ☑ *P. subcapitata*

Food Batch: 11-4-12 10-31-12

Chamber size: 30 mL

Test Volume: 20 mL

Start Date: 12-04-12 Time: 0930

End Date: 12-10-12 Time: 0945

Batch:	11-16-12				
Water Quality Parameters	~~MF~~ ~~20%~~ SDMHW	~~MF~~ ~~20%~~ SDMHW	Other	Measured by:	Verified by:
Lab Total Residual Cl_2 (mg/L):	<0.03			HW	MF
Alkalinity (mg/L as $CaCO_3$):	81			HW	MF
Hardness (mg/L as $CaCO_3$):	92			HW	MF
Total Ammonia (mg/L as N):	<0.017			MF	HW
Conductivity (~~µmhos-cm~~ mmhos-cm :	313			MF	HW

Loaded by: MF

Day	Concentrations prepared by	Counted by
0	MF	HW
1	MF	MF
2	MF	MF
3	MF	MF
4	MF	MF
5	MF	MF
6	—	MF
7		
8		

Test Replicate	Loaded from culture vial
1	A3
2	A5
3	A6
4	A9
5	A12
6	A13
7	A17
8	A18
9	A29
10	B2

Results

Control % CV:	7.3%
Dunnetts PMSD:	21.1%
Reproduction NOEC:	<0.4 ~~ppt~~ g/L
Reproduction LOEC:	0.4 g/L
Survival NOEC:	1.6 g/L
Survival LOEC:	3.2 g/L
IC_{P20}:	0.263
IC_{P25}:	0.328

Comments:

Investigators' signatures

Marshall Faircloth

Hans Wells

_____

_____

_____

_____

REVIEWER

Test Incubated in: Incubator: # 2

Light Intensity : 50 - 100 ft. candles

Photoperiod : 16 light 8 dark

Temperature Range °C:

Incubator # 2 min. 25.5 max. 26.5 mean —

Room B246 ___ min. 25.0 max. 25.3 mean —

Test min.____ max.____ mean____

Ceriodaphnia dubia Survival and Reproduction

Start Date: 12-4-12 Time: 0930 Loaded by: MF
End Date: 12-10-12 Time: 0945 Verified by: HW

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	0
	3	4	3	4	3	4	2	3	4	4	4	35	10	3.5
	4	8	7	8	6	9	8	8	9	9	8	80	10	8.0
	5	0	0	0	0	0	0	0	0	10	9	19	10	1.9
	6	10	10	11	13	12	15	10	10	0	0	91	10	9.1
	7													
	8													
	Total	22	20	23	22	25	25	21	23	23	21	225	10	22.5
0.4 ~~0.59~~ ppth MF	0												10	
	1												10	
	2	0	0	0	0	0	0	0	0	0	0	0	10	0
	3	2	2	4	3	3	2	3	0	3	0	22	10	2.2
	4	~~72hr~~ 6	6	7	8	7	4	8	1	9	0	57	10	5.7
	5	0	0	0	0	0	0	0	0	0	0	0	10	0
	6	9	9	10	8	10	7	8	0	8	5	74	10	7.4
	7													
	8													
	Total	18	17	21	19	20	13	19	1	20	5	153	10	15.3
MF 0.8 ~~0.89~~ ppth	0												10	
	1												10	
	2	0	0	0	0	0	0	0	0	0	0	0	10	0
	3	3	3	3	3	3	3	3	X4	3	3	31	9	3.1
	4	8	7	0	6	7	0	8	|	5	8	49	9	4.9
	5	0	0	3	0	0	0	0	|	0	0	3	9	0.3
	6	8	11	8	9	7	8	10	|	10	6	77	9	7.7
	7								|					
	8								|					
	Total	19	21	14	18	17	11	21	4	18	17	160	9	16.0

Comments:

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
1.6 ~~1.3~~ ppth MF	0												10	
	1												10	
	2	0	0	0	0	0	0	0	0	0	0	0	10	0
	3	3	2	0	2	3	3	1	3	3	3	23	10	2.3
	4	1	0	X0	0	4	4	5	3	5	5	28	9	2.8
	5	③1	0	|	0	0	0	0	0	0	0	0	9	0
	6	2	3	|	3	5	7	4	5	5	5	39	9	3.9
	7			|										
	8			|										
	Total	7	5	0	5	12	14	10	11	13	13	90	9	9.0
3.2 ~~2.0~~ ppth MF	0												10	
	1												10	
	2	X	X	X	X	X	X	X	X	X	X	0	0	0
	3													
	4													
	5													
	6													
	7													
	8													
	Total											0	0	0
6.4 ~~5.0~~ ppth MF	0												10	
	1	X	X	X	X	X	X	X	X	X	X	0	0	0
	2													
	3													
	4													
	5													
	6													
	7													
	8													
	Total											0	0	0

Comments: ⑤= split brood,

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 ← December 4, 2012	Control	M	8.2	24.2	7.9	313					
	~~0.69~~ 0.59 ppth	M	8.1	24.3	7.9	~~1007~~ 1008 MF					
	~~0.89~~ 0.89 ppth	M	8.1	24.2	7.8	~~1067~~ 1804 MF					
	~~1.3~~ 1.3 ppth	M	8.1	24.0	7.8	~~1804~~ 3200 MF					
	~~2.0~~ 3.2 ppth	M	8.1	24.1	7.8	~~3205~~ 5960					
	~~3.0~~ 6.4 ppth	M	8.1	24.0	7.8	11670					
	Measured by:		MF	MF	MF	MF					
	Recorded by:		MF	MF	MF	MF					
Day 1	Control	M	7.8	24.9	7.8	322	A	7.9	25.7	7.7	341
	~~0.59~~ 0.59 ppth	M	7.7	24.8	7.8	1111	A	7.8	25.8	7.7	1153
	~~0.89~~ 0.89 ppth	M	7.8	24.6	7.8	1846	A	7.8	25.9	7.8	1946
	~~1.3~~ 1.3 ppth	M	7.7	24.4	7.7	3270	A	7.8	25.9	7.8	3460
	~~2.0~~ 3.2 ppth	M	7.7	25.1	7.6	6040	A	7.8	25.8	7.7	6310
	~~3.0~~ 6.4 ppth	M	—	~~25.1~~ MF	—	—	A	7.8	26.0	7.6	11830
	Measured by:		MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:		MF	MF	MF	MF		MF	MF	MF	MF
Day 2	Control	M	8.2	24.6	8.1	310	A	8.2	25.8	8.1	331
	~~0.59~~ 0.59 ppth	M	8.1	24.7	8.2	1056	A	8.1	25.8	8.1	1120
	~~0.89~~ 0.89 ppth	M	8.0	24.9	8.1	1784	A	8.0	25.6	8.0	1876
	~~1.3~~ 1.3 ppth	M	8.0	24.7	8.0	3170	A	8.0	25.5	7.9	3280
	~~2.0~~ 3.2 ppth	M	—	—	—	—	A	8.0	25.4	7.9	6120
	3.0 ppth	M									
	Measured by:		MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:		MF	MF	MF	MF		MF	MF	MF	MF
Day 3	Control	M	7.6	24.6	8.1	316	A	7.7	25.2	8.4	345
	~~0.59~~ 0.59 ppth	M	7.6	24.9	8.2	1086	A	7.7	25.5	8.4	1121
	~~0.89~~ 0.89 ppth	M	7.6	24.9	8.2	1786	A	7.7	25.6	8.3	1860
	~~1.3~~ 1.3 ppth	M	7.6	24.9	8.1	3230	A	7.7	25.5	8.4	~~3850~~ 3850 MF
	2.0 ppth	M					A				
	3.0 ppth	M					A				
	Measured by:		MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:		MF	MF	MF	MF		MF	MF	MF	MF

Comments:

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

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	7.8	24.2	7.9	306	A	7.7	25.8	7.9	325
	0.59 ppth	M	7.7	24.3	7.9	1037	A	7.7	25.7	8.0	1119
	0.89 ppth	M	7.7	24.1	7.9	1754	A	7.7	25.6	8.0	1830
	1.3ppth	M	7.7	24.2	7.9	3220	A	7.7	25.4	8.0	3280
	2.0 ppth	M									
	3.0 ppth	M									
	Measured by:		MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:		MF	MF	MF	MF		MF	MF	MF	MF
Day 5	Control	M	8.0	24.7	7.7	310	A	8.0	25.4	7.9	318
	0.59 ppth	M	8.0	24.8	7.7	1054	A	7.9	25.6	7.9	1091
	0.89 ppth	M	7.9	24.8	7.7	1741	A	7.9	25.7	7.8	1789
	1.3ppth	M	7.9	24.7	7.7	3190	A	7.9	25.9	7.7	3150
	2.0 ppth	M					A				
	3.0 ppth	M									
	Measured by:		MF	MF	MF	MF		MF	MF	MF	MF
	Recorded by:		MF	MF	MF	MF		MF	MF	MF	MF
Day 6	Control	M					A	7.9	24.9	7.7	313
	0.59 ppth	M					A	7.9	25.0	7.7	1078
	0.89 ppth	M					A	7.8	25.2	7.7	1786
	1.3ppth	M					A	7.8	25.2	7.8	3260
	2.0 ppth	M									
	3.0 ppth	M									
	Measured by:							MF	MF	MF	MF
	Recorded by:							MF	MF	MF	MF
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:										

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

C. dubia Chronic Set BIOASSAY INSTRUMENT ID Dec. 4 – 10, 2012

METER / DEVICE	ID	SOP	Parameter	Method
YSI Model 58 Dissolved Oxygen Meter	90H018262	TA06_04	Dissolved Oxygen	SM 4500 O G
YSI DO Probe	5750 SN 05J1720	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
Themometer	BIOLAB #1 BIOLAB #2 BIOLAB #3 BIOLAB #4 BIOLAB #5	TA06_05	Temperature	SM-2530B modified DEP SOP-001/01 FT1400
Traceable Thermometer	EC#1-SN101686412 EC #2-SN221295527 EC#3-SN240116020 EC#4-SN80361795 EC#5-SN61990624	TA06_05	Temperature	#5 SM-2530B modified DEP SOP-001/01 FT1400
Hach Pocket Colorimeter II #1	05110C042029	TA06_22	Total Residual Chlorine	EPA 330.5 SM 4500 CL G
Hach Pocket Colorimeter II #2	05050C026378	TA06_22	Total Residual Chlorine	EPA 330.5 SM 4500 CL G
Alkalinity (Hach Kit)	No SN	TA06_08	Alkalinity	SM 2320 B
Hardness (Hach Kit)	No SN	TA06_09	Hardness	SM 2340 C
OHAUS Balance 250D	1125481084	TA06_21 TA06_27	Weight	-
S-Weights	BIO-S-WEIGHTS-01	NA	Balance check	-

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

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

Entered By: M. Faircloth 1-3-13

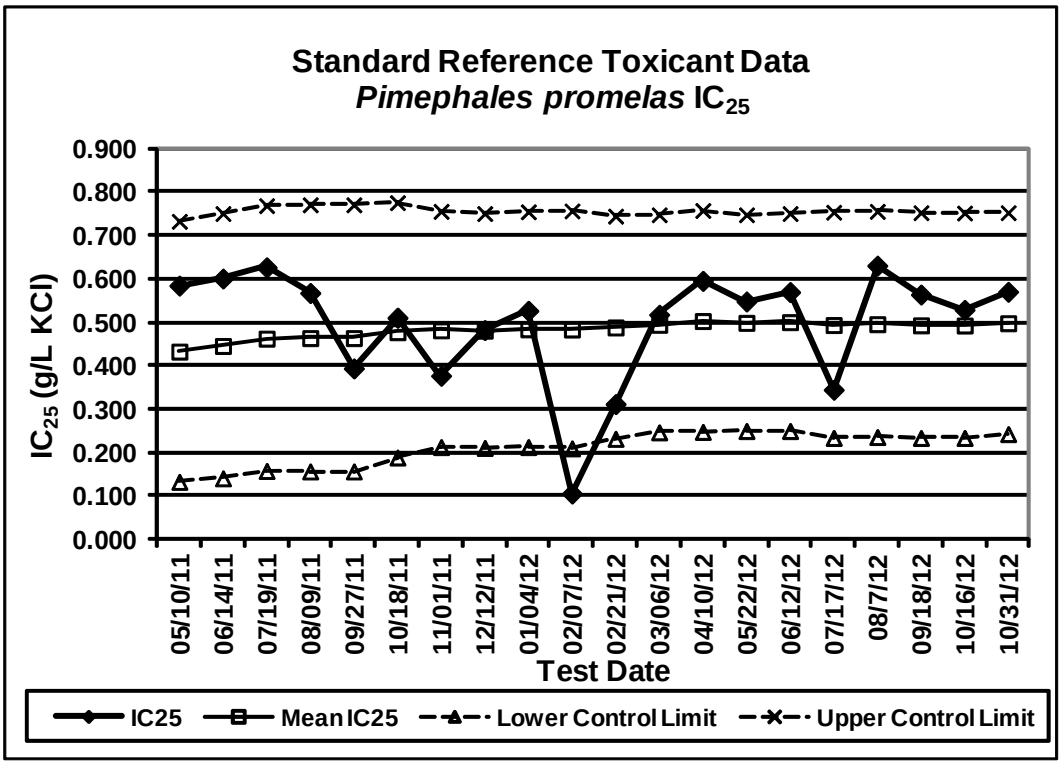
V 1.1 9/21/10 MF/jd

Page 6 of 6

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	IC25	Mean IC25	Std Dev	Lower Control Limit	Upper Control Limit
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
12/12/11	0.483	0.481	0.14	0.211	0.751
01/04/12	0.527	0.484	0.14	0.213	0.755
02/07/12	0.106	0.484	0.14	0.210	0.757
02/21/12	0.312	0.489	0.13	0.232	0.745
03/06/12	0.518	0.495	0.13	0.247	0.748
04/10/12	0.596	0.503	0.13	0.248	0.758
05/22/12	0.548	0.499	0.12	0.250	0.748
06/12/12	0.570	0.501	0.12	0.250	0.751
07/17/12	0.345	0.494	0.13	0.234	0.754
08/7/12	0.631	0.496	0.13	0.236	0.756
09/18/12	0.564	0.493	0.13	0.234	0.753
10/16/12	0.529	0.493	0.13	0.234	0.752
10/31/12	0.571	0.498	0.13	0.243	0.753

Means are from the last 20 SRTs.
Lower Confidence Limit = mean - 2 * Std Dev EPA 75th %CV: 38%
Upper Confidence Limit = mean + 2 * Std Dev lab % CV: 26.2%



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: MHW 10-23-12 Test Days Used: 0-6 (MF)

Diluent/ Batch: _____ Test Days Used: _____

Toxicant/ Batch # : KCL 10-30-12

Artemia Lot # : 08812

Start Date: 10-31-12 Time: 13:30

End Date: 11-7-12 (MF 11-6-12) Time: 1000

Organism Batch #/ Age: 1031-12/1day

Artemia Batch #					
Day 0	143-12	Day 2	145-12	Day 5	148-12
Day1	144-12	Day 3	146-12	Day 6	149-12
		Day 4	147-12		

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 (fr MHW 10-25-12)	Diluent (or other)	Method	Measured by	Verified by
Total Residual Cl_2 (mg/L):	<0.03		HACH	MF	BA
Alkalinity (mg/L as $CaCO_3$):	67 (MF)		HACH	HW	MF
Hardness (mg/L as $CaCO_3$):	86		HACH	HW	MF
Total Ammonia (mg/L as N):	<0.017		DENVER	MF	BA
Conductivity (umhos-cm) mmhos-cm:	306		METTLER	BA	MF

Statistics	
Growth NOEC:	0.5 g/L
Growth LOEC:	1.0 g/L
Growth IC_{20}:	0.5125 g/L
Growth IC_{25}:	0.5707 g/L
Ctrl % CV:	8.33 %
Dunnetts PMSD:	17.9 %
Survival NOEC:	0.5 g/L
Survival LOEC:	1 g/L

Light Intensity : 50 - 100 ft. candles

Photoperiod : 16 light 8 dark

Test incubated in : Temperature Range °C:

Incubator # 3 min. 24.5 max. 26.3

Water bath # ____ min. _____ max. _____

Room B246 min. 24.5 max. 25.3

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

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

Investigators' signatures

Bruce Nevin

Marshall Faircloth

Hans Watts

_____

_____

_____

REVIEWER

Comments:

revised 8/6/12 JD

FDEP Biology Laboratory - Chronic SRT Benchsheet

Pimephales promelas or Menidia beryllina Survival

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

Concentration: ~~ug/L~~ g/L (circle one) MF

Concentration	Replicate	Chamber	TEST DAY 0	1	2	3	4	5	6	7
Control	A	D1	10	10	10	10	10	10	10	10
	B	D2	10	10	10	10	10	10	10	10
	C	D3	10	10	9 1D	9	8 1D	8	8	8
	D	D4	10	10	10	10	10	10	10	10
0.125	A	D5	10	9 1D	9	9	9	9	9	9
	B	D6	10	10	10	10	10	10	10	10
	C	D7	10	10	10	10	10	10	10	10
	D	D8	10	10	10	10	9 1D 10 BA	10	9 1D	8 1D
0.25 ~~0.125~~ BA	A	D9	10	10	10	10	10	10	10	10
	B	D10	10	10	10	10	10	10	10	10
	C	D11	10	10	10	10	10	10	10	10
	D	D12	10	10	10	10	10	10	10	10
0.5 ~~0.25~~ BA	A	D13	10	6 4D	6	6	6	6	6	6
	B	D14	10	8 2D	8	7 1D	7	7	7	7
	C	D15	10	10	10	10	10	10	10	10
	D	D16	10	8 2D	8	8	8	8	8	8
1.0 ~~0.5~~ BA	A	D17	10	2 8D	0 2D	—	—			
	B	D18	10	3 7D	3	1 2D	0 1D			
	C	D19	10	0 10D	—	—				
	D	D20	10	3 7D	1 2D	0 1D	—			
2.0 ~~1.0~~ BA	A	D21	10	0 10D						
	B	D22	10	0 10D						
	C	D23	10	0 10D						
	D	D24	10	0 10D						
BA ~~2.0~~	A		10							
	B		10							
	C		10							
	D		10							
Loaded by (0 hr): BA		Checked by:		BA	BA	BA	BA	BA	BA	BA
Verified by (0 hr): MF										
Concentrations prepared by:			BA	BA	BA	BA	BA	BA	BA	

Comments:

revised 7/16/08 MF

Chronic SRT Parameters Benchsheet

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

Start Date: 10.31.12 End Date: 11-7-12

Start Time: 1330 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	Control	A	7.4	24.0	7.6	306							
	0.125	A	7.4	24.0	7.7	586							
	0.25	A	7.4	24.0	7.8	789							
	0.5	A	7.5	24.0	7.9	1274							
	1.0	A	7.5	24.0	7.9	2250							
	2.0	A	7.6	24.0	7.8	4030							
		A											
	Measured by		BA	BA	BA	BA							
	Recorded by		BA	BA	BA	BA							
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 1	Control	B	7.4	24.4	7.5	311		B	7.3	24.0	7.2	307	
	0.125	B	7.4	24.5	7.7	589		B	7.3	24.0	7.1	571	
	0.25	B	7.4	24.3	7.7	797		B	7.3	24.0	7.3	778	
	0.5	B	7.4	24.3	7.7	1286		B	7.4	24.0	7.0	1277	
	1.0	B	7.5	24.3	7.7	2230		B	7.4	24.0	7.3	2200	
	2.0	B	7.6	24.3	7.7	4100		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 2	Control	C	7.4	24.0	7.0	317		C	7.5	24.3	7.9	323	
	0.125	C	7.4	24.0	6.9	570		C	7.6	24.3	7.9	568	
	0.25	C	7.4	24.0	7.0	786		C	7.6	24.2	7.9	804	
	0.5	C	7.5	24.0	7.2	1284		C	7.7	24.2	7.8	1304	
	1.0	C	7.5	24.0	7.3	2220		C	7.7	24.3	7.8	2250	
		C						C					
		C						C					
	Measured by		BA	BA	BA	BA			HW	HW	HW	HW	
	Recorded by		BA	BA	BA	BA			HW	HW	HW	HW	
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 3	Control	D	7.4	24.4	6.6	306		D	7.3	24.4	7.1	305	
	0.125	D	7.4	24.3	6.4	556		D	7.2	24.4	7.2	552	
	0.25	D	7.4	24.2	6.5	780		D	7.3	24.3	7.3	782	
	0.5	D	7.4	24.1	6.6	1298		D	7.3	24.3	7.4	1309	
	1.0	D	7.4	24.0	6.6	2240		D	7.4	24.2	7.4	2100	
		D						D					
		D						D					
	Measured by		BA	BA	BA	BA			BA	BA	BA	BA	
	Recorded by		BA	BA	BA	BA			BA	BA	BA	BA	

Comments: 24.4 BA

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

Chronic SRT Parameters Benchsheet

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

parameter pg. 2

Start Date: 10/31-11/2 End Date: 11-7-12

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	7.3	24.1	6.8	317		A	7.3	24.3	6.6	317	
	0.125	A	7.3	24.1	6.2	563		A	7.3	24.1	6.5	587	
	0.25	A	7.3	24.0	6.3	798		A	7.4	24.2	6.5	822	
	0.5	A	7.3	24.0	6.3	1351		A	7.4	24.0	6.6	1296	
	1.0	A	7.4	25.4	6.7	2230		A					
		A						A					
		A						A					
	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 5	Control	B	7.4	24.1	6.9	314		B	7.5	24.2	8.0	298	
	0.125	B	7.4	24.4	7.0	596		B	7.5	24.2	8.0	528	
	0.25	B	7.4	24.5	7.0	818		B	7.6	24.3	7.7	778	
	0.5	B	7.4	24.6	6.7	1332		B	7.6	24.2	7.7	1249	
		B						B					
		B						B					
		B						B					
	Measured by		BA	BA	BA	BA			MF	MF	MF	MF	
	Recorded by		BA	BA	BA	BA			MF	MF	MF	MF	
		Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 6	Control	C	7.3	24.6	6.7	312		C	7.2	25.2	5.9	302	
	0.125	C	7.3	24.4	6.5	563		C	7.2	25.1	6.2	548	
	0.25	C	7.3	25.0	6.5	815		C	7.2	24.3	6.3	806	
	0.5	C	7.3	25.2	6.5	1294		C	7.3	24.2	6.5	1267	
		C						C					
		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	7.2	25.9	6.6	315		D					
	0.125	D	7.2	25.9	6.5	578		D					
	0.25	D	7.2	25.9	6.5	842		D					
	0.5	D	7.2	25.5	6.4	1301		D					
		D						D					
		D						D					
		D						D					
	Measured by		BA	BA	BA	BA							
	Recorded by		BA	BA	BA	BA							

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

FDEP Biology Laboratory - Chronic SRT Benchsheet

Pimephales promelas or *Menidia beryllina* Weights

SOP TA06_21

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

Concentration: ppt (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	25	0.01767	0.02290	0.00523	10	0.523	
	B	26	0.01907	0.02438	0.00529	10	0.529	
	C	27	0.01885	0.02464	0.00579	10	0.579	0.5635
	D	28	0.02004	0.02627	0.00623	10	0.623	
0.125	A	29	0.02007	0.02734	0.00727	10	0.727	
	B	30	0.01928	0.02567	0.00639	10	0.639	
	C	31	0.02071	0.02768	0.00697	10	0.697	0.678
	D	32	0.01958	0.02586	0.00628	10	0.628	
0.25	A	33	0.01945	0.02627	0.00682	10	0.682	
	B	34	0.01863	0.02466	0.00603	10	0.603	0.6518
	C	35	0.02048	0.02627	0.00579	10	0.579	
	D	36	0.01970	0.02713	0.00743	10	0.743	
0.5	A	37	0.01890	0.02397	0.00507	10	0.507	
	B	38	0.01947	0.02489	0.00542	10	0.542	0.5498
	C	39	0.02018	0.02511	0.00493	10	0493	
	D	40	0.01834	0.02491	0.00657	10	0.657	
	A					10		
	B					10		
	C					10		
	D					10		
	A					10		
	B					10		
	C					10		
	D					10		
	A					10		
	B					10		
	C					10		
	D					10		
		Weighed by:	BA	BA				

Comments:

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

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: 11.5.12 Weighed by: BA

	Pan 1 wt.	Pan 1 initial wt.
after Pan 5	0.01922	@ 0.01922
after Pan 10	0.01924	@ 0.01922
after Pan 15	0.01923	@ 0.01922
after Pan 20	0.01922	@ 0.01922
after Pan 25	0.01923	@ 0.01922
after Pan 30	0.01922	@ 0.01922
after Pan 35	0.01924	@ 0.01922
after Pan 40	0.01923	@ 0.01922
after Pan 45		@
after Pan 48		@

	Measured Value	S-weight Value
S-weights	0.01001	@ 0.01
	0.05002	@ 0.05

Balance: Ohaus 250D Ser# 1125481084

S-Weights: BIO-S-Weights-01

Fish + Pan Weights Date: 11.13.12 Weighed by: BA

	Pan 1 wt.	Pan 1 initial wt.
after Pan 5	0.02516	@ 0.02518
after Pan 10	0.02518	@ 0.02518
after Pan 15	0.02518	@ 0.02518
after Pan 20	0.02514	@ 0.02518
after Pan 25	0.02519	@ 0.02518
after Pan 30	0.02515	@ 0.02518
after Pan 35	0.02520	@ 0.02518
after Pan 40	0.02519	@ 0.02518
after Pan 45		@
after Pan 48		@

	Measured Value	S-weight Value
S-weights	0.02000	@ 0.02
	0.05004	@ 0.05

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:

Test ID: P. promelas Chronic SRT Dates: October 31 – November 7, 2012

METER / DEVICE	ID	SOP	Parameter	Method	√ 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 #1	05110C042029	TA06_22	Total Residual Chlorine	EPA 330.5 SM 4500 CL G	✓
Hach Pocket Colorimeter II #2	05050C026378	TA06_22	Total Residual Chlorine	EPA 330.5 SM 4500 CL G	✓
Alkalinity (Hach Kit)	No SN	TA06_08	Alkalinity	SM 2320 B	✓
Hardness (Hach Kit)	No SN	TA06_09	Hardness	SM 2340 C	✓
OHAUS Balance 250D	1125481084	TA06_21 TA06_27	Weight	-	✓
S-Weights	BIO-S-WEIGHTS-01	NA	Balance check	-	✓

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

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

Entered By: M. Faircloth 11-20-12

V 1.2 2/20/11 MF/jd

~~Test Page 8 of 8~~ 98

PAGE 28

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Shipping Date: 10/30/12

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	300	<24 hrs	Fm1x1029-1920	25	7.8	50
Ceriodaphnia dubia						
Daphnia magna						
YCT						
P. subcapitata						

Packed by: mp

Shipped Via: Fedex

Notes: _____

Thank you for your order.

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

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	12/4/2012 09:30	Test ID:	cdsrtdec12	Sample ID:	REF-Ref Toxicant
End Date:	12/10/2012 09:45	Lab ID:	DEP TOXLAB-FDEP Biology T	Sample Type:	NACL-Sodium chloride
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	CD-Ceriodaphnia dubia
Comments:	C. dubia chronic srt concurrent with pace repeat 12 4 12				

Conc-gm/L	1	2	3	4	5	6	7	8	9	10
D-Control	22.000	20.000	23.000	22.000	25.000	25.000	21.000	23.000	23.000	21.000
0.4	18.000	17.000	21.000	19.000	20.000	13.000	19.000	1.000	20.000	5.000
0.8	19.000	21.000	14.000	18.000	17.000	11.000	21.000	4.000	18.000	17.000
1.6	7.000	5.000	0.000	5.000	12.000	14.000	10.000	11.000	13.000	13.000
3.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6.4	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	22.500	1.0000	22.500	20.000	25.000	7.333	10	22.500	1.0000
0.4	15.300	0.6800	15.300	1.000	21.000	45.183	10	15.650	0.6956
0.8	16.000	0.7111	16.000	4.000	21.000	32.409	10	15.650	0.6956
1.6	9.000	0.4000	9.000	0.000	14.000	50.783	10	9.000	0.4000
3.2	0.000	0.0000	0.000	0.000	0.000	0.000	10	0.000	0.0000
6.4	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)	0.86427	0.919	-1.41	1.79836
Bartlett's Test indicates unequal variances (p = 3.15E-03)	13.8256	11.3449		

			Linear Interpolation (200 Resamples)		
Point	gm/L	SD	95% CL		Skew
IC05*	0.0657	0.0208	0.0461	0.1284	1.3178
IC10*	0.1314	0.0416	0.0921	0.2568	1.3178
IC15*	0.1971	0.0622	0.1382	0.3851	1.2998
IC20*	0.2628	0.1133	0.1843	0.6134	2.6344
IC25*	0.3285	0.1966	0.2304	0.9027	1.4066
IC40	1.0586	0.2157	0.3686	1.2460	-1.5748
IC50	1.3293	0.1379	1.0868	1.6211	0.2428

* indicates IC estimate less than the lowest concentration

Appendix I

Wetland Condition Index (WCI) plant taxa list

Taxa	Control					Test				
	Transect 1	Transect 2	Transect 3	Transect 4	Total Occurrences	Transect 1	Transect 2	Transect 3	Transect 4	Total Occurrences
Acer rubrum	9	10	7	8	34	3	7	8	10	28
Arundinaria gigantea	0	0	1	0	1	0	0	0	0	0
Boehmeria cylindrica	2	3	5	1	11	0	0	0	0	0
Centella asiatica	3	3	6	1	13	1	1	0	3	5
Chamaecyparis thyoides	0	0	0	0	0	1	2	0	0	3
Chasmanthium laxum var. sessiliflorum	0	0	0	0	0	0	0	0	1	1
Cliftonia monophylla	0	0	0	0	0	1	3	1	2	7
Decumaria barbara	1	1	0	0	2	3	5	6	4	18
Dichanthelium scabriusculum	1	0	0	0	1	0	0	0	0	0
Dichanthelium sp.	0	0	1	0	1	0	0	0	0	0
Gelsemium rankinii	0	0	0	1	1	0	0	0	0	0
Hydrocotyle sp.	1	1	3	2	7	2	0	0	0	2
Hypericum hypercoides	1	0	0	0	1	0	0	0	0	0
Ilex cassine	0	3	2	0	5	0	0	0	1	1
Ilex coriacea	2	0	0	0	2	4	4	3	1	12
Ilex opaca	2	0	1	1	4	1	0	0	0	1
Ilex vomitoria	0	0	1	0	1	0	0	1	1	2
Illicium floridanum	0	0	3	0	3	5	7	6	0	18
Itea virginica	9	5	5	6	25	8	7	9	7	31
Leucothoe axillaris	0	2	0	0	2	2	4	7	1	14
Leucothoe racemosa	0	0	0	0	0	0	0	1	2	3
Ligustrum sinense §	2	0	0	0	2	9	7	6	10	32
Liriodendron tulipifera	0	0	2	0	2	1	0	0	0	1
Lycopodim sp.	1	2	1	2	6	1	0	1	0	2
Lygodium japonicum §	1	0	0	0	1	1	0	1	0	2
Lyonia lucida	0	0	2	4	6	1	6	2	0	9
Magnolia grandiflora	0	0	0	1	1	0	0	0	0	0
Magnolia virginiana	10	6	8	10	34	6	3	7	7	23
Mikania scandens	1	0	0	1	2	0	0	0	0	0
Murdannia sp. §	1	0	1	0	2	1	0	0	0	1
Myrica cerifera	0	0	2	1	3	0	0	0	0	0
Nyssa sylvatica var. biflora	2	3	5	7	17	7	5	8	5	25
Onoclea sensibilis	0	0	0	0	0	2	0	3	0	5
Osmunda cinnamonmoea	5	4	3	5	17	3	5	5	2	15
Osmunda regalis	4	2	1	5	12	2	2	5	2	11
Peltandra sp.	1	0	0	0	1	0	1	0	2	3
Persea palustris	5	7	2	0	14	2	0	1	0	3
Quercus nigra	2	1	2	0	5	0	0	0	1	1
Quercus laurifolia	0	0	0	0	0	0	0	0	1	1
Rhododendron viscosum var. serrulatum	6	5	1	5	17	0	0	0	0	0
Rhynochospora miliacea	1	0	0	0	1	0	0	0	0	0
Rubus pensilvanicus	7	1	8	3	19	3	4	3	1	11
Sacciolepis striata	1	0	0	0	1	0	0	0	0	0
Sagitaria latifolia	3	0	1	0	4	0	0	0	0	0
Sambucus canadensis	0	0	1	0	1	1	0	1	0	2
Saururus cernuus	2	1	1	2	6	0	0	0	0	0
Smilax glauca	1	2	0	0	3	0	0	1	0	1
Smilax laurifolia	1	2	2	3	8	4	7	6	2	19
Smilax walteri	1	4	5	7	17	0	0	0	3	3
Sphagnum Moss	9	7	2	3	21	3	5	4	7	19
Toxicodendron radicans	4	9	4	5	22	3	3	5	6	17
Toxicodendron vernix	2	2	0	4	8	1	1	0	0	2
Triadenum virginicum	0	0	1	0	1	0	0	0	0	0
Undetermined Cyperaceae	9	2	6	5	22	0	0	0	4	4
Viburnum nudum	0	1	0	2	3	4	3	2	0	9
Viola primulifolia	0	0	0	0	0	1	0	0	0	1
Vitis rotundifolia	8	5	10	6	29	1	5	1	1	8
Woodwardia areolata	6	10	8	7	31	9	6	8	10	33

§ - exotic taxa

The Bioassay of the Pace Water System, Inc. WWTP effluent sampled on October 29 and December 3, 2012, NPDES #FL0102202

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

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

Remarks

#

The Priority Pollutants Analysis for Bioassay of the Pace Water System, Inc. WWTP effluent sampled on October 29, 2012, NPDES #FL0102202

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

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

Remarks

#

Biological Analyses of the Pace Water System, Inc. WWTP effluent sampled on October 29, 2012, NPDES #FL0102202

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

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

Remarks

#