

Biological Assessment of

Starke Wastewater Treatment Facility

Bradford County

NPDES #FL0028126

Sampled March 1, 2010

July 2010

Biology Section

Bureau of Laboratories

Division of Environmental Assessment and Restoration

Quality Manual No. 870346G
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EPA End Sheet

Fifth Year Inspection Summary

The Fifth Year Inspection of Starke WWTF conducted March 1, 2010 produced the following notable results:

No organic constituents were detected in the effluent.

The No Observed Effect Concentration (NOEC) for the invertebrate, *Ceriodaphnia dubia*, and the fish, *Pimephales promelas*, during the chronic screening bioassay was 100% effluent, which is in compliance with permit limits and Class III Freshwater Quality Criterion (62-302.530(61) F.A.C.).

Effluent metals were all within permit limits and Class III Freshwater Quality Criteria. Metals detected at both the Control and Test Sites were within Class III Freshwater Quality Criteria.

The Control and Test Sites were similar with respect to dissolved oxygen (D.O.), pH, conductivity and temperature. Levels of nitrogen and phosphorus at the Test Site reflected the influence of the effluent as they were approximately 3 times higher than those of the Control Site. The elevated nutrients in the effluent and Test Site were reflected in Algal Growth Potential (AGP) values that exceeded the 5.0 mg dry wt/L problem threshold (Raschke and Shultz). AGP of the effluent was 141.0 mg dry wt/L, and AGP of the Test Site was 59.6 mg dry wt/L.

Both the Control and Test Sites scored low on the habitat assessment. During the field reconnaissance trip, it was noted that there was less than 3% productive habitat in Alligator Creek above and below the effluent due to scouring, and the facility reported that water levels in the stream were highly variable. It was decided that Stream Condition Index (SCI) sampling would likely fail due to habitat alone and not contribute any additional biological information, so only Hester-Dendy sampling was conducted for macroinvertebrates. Hester-Dendy diversity was slightly higher at the Test Site than at the Control Site, and Test Site diversity may be potentially negatively biased due to less than 300 individuals (approximately one-third the number found at the Control Site) being recovered from the Hester-Dendy condo. Periphyton samples at both the Control and Test Sites were dominated by diatoms with slightly more blue-greens and greens at the Test Site. The site visits and habitat assessment indicate that the system lacks productive habitat and is hydrologically impacted. However, the biological measures did not show any negative impact on the Test Site with respect to the effluent.

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.

Introduction

The Starke Wastewater Treatment Facility is a Domestic Wastewater Treatment facility. The effluent is discharged into Alligator Creek, a Class III Freshwater (see map Appendix A). The design flow of the wastewater system is 1.65 million gallons per day (MGD), and flow measured during the survey was 1.197 MGD. The facility also has a 0.4 MGD limited wet weather discharge which is directed through the same outfall pipe as the main effluent when discharge is needed and a 0.8 MGD slow-rate restricted public access irrigation system.

See the Facility Summary (Appendix B) for a description of the facility, summary of permit limits, and discharge monitoring report (DMR) information.

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 Site (located in Alligator Creek starting approximately 5 meters above the discharge and ending approximately 105 meters above the discharge) and a Test Site (located in Alligator Creek starting approximately 110 meters below the discharge and ending approximately 10 meters below the discharge). Effluent samples for the toxicity, TSS, CBOD, and metals were taken as composite samples from monitoring location EFD-1, after chlorine disinfection and dechlorination. Effluent samples for all other analyses were taken as grab samples.

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

The following were involved in this investigation: Eesa Ali, Sharon Piltz, Jeremy Parrish, and Malton Prifti (DEP Northeast District) and DEP Central Laboratory in Tallahassee. The report was reviewed by District representatives and the Point Source Studies Review Committee (Michael Tanski, Cari Butler and Nancy Ross).

Results and Discussion

Organic Constituents (See Table 1 and Appendix E)

- No organic constituents were detected in the effluent.
- No organic constituents were detected in the field blank.

Metals (See Table 2 and Appendix E)

- All metals detected in effluent, Control Site and Test Site samples were present at levels that complied with Class III Fresh Water Quality Criteria (62-302.530 F.A.C.).
- All metals detected at levels between the MDL and PQL in effluent, Control Site and Test Site samples were present at levels that complied with the water quality criteria.
- Metals were not detected in the field blank.

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

- The No Observed Effect Concentration (NOEC) for the invertebrate, *Ceriodaphnia dubia*, and the fish, *Pimephales promelas*, during the chronic screening bioassay was 100% effluent, which is in compliance with permit limits and Class III Freshwater Quality Criterion (62-302.530(61) F.A.C.).

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

- The Habitat Assessment scores at both the Control and Test Sites (51 and 45, respectively) were low and placed both sites in the Marginal category. Both sites had the same velocity (0.18 m/s), which is not optimal, but is still enough flow to support a healthy macroinvertebrate community. The overall low scores were due to lack of habitat, riparian buffer and sand smothering. The decision was made to deploy only Hester-Dendy samplers rather than conduct SCI dipnet sampling because of the lack of habitat.
- Dissolved oxygen (mg/L), pH (Standard Units), specific conductance (µmhos/cm), and temperature (°C) of the effluent measured during this inspection complied with Class III Freshwater Quality Criteria (62-302.530 F.A.C.) and effluent permit limits.
- Dissolved oxygen, pH, and specific conductance at both the Control and Test Sites complied with Class III Freshwater Quality Criteria and were similar to each other.
- Chlorophyll *a* content estimates algal biomass, and high algal biomass implies nutrient stress (Stevenson and Bahls, 1999). Chlorophyll *a* was undetected in the effluent and was detected at relatively low levels in the water column at both the Control and Test Sites.
- Total suspended solids (mg/L) and Carbonaceous Biological Oxygen Demand (CBOD; mg/L) of the effluent complied with permit limits.

Microbiology (See Table 1 and Appendix E)

- Microbiological analysis was performed by Advanced Environmental Laboratories in Jacksonville, Florida. Fecal coliforms were detected in the effluent at a low level which complied with Class III Freshwater Quality Criterion (62-302.530(6) F.A.C) and permit limits.

Nutrients (See Table 1 and Appendix E)

- Effluent unionized ammonia and organic nitrogen levels were in compliance with permit limits.
- Effluent total nitrogen was approximately 6 times higher than that of the Test Site and approximately 20 times higher than that of the Control Site. Effluent total phosphorus was approximately 7 times higher than that of the Test Site and approximately 23 times higher than that of the Control Site. Effluent nutrients appear to be contributing to nutrient enrichment at the Test Site.

Algal Growth Potential (See Table 3 and Appendix E)

- Algal growth potential (AGP) is a measure of nutrients available for algal growth (Miller *et al*. 1978). Raschke and Shultz (1987) determined that AGP values above 5.0 mg dry weight/L represent a “problem” threshold for fresh receiving waters, implying nutrient enrichment. The AGP value of the effluent was well above the problem threshold (141.0 mg dry wt/L).
- AGP of the Test Site was also above the threshold at 59.6 mg dry wt/L. AGP of the Control Site was below the threshold. The analytical chemistry suggests that the Control Site, Test Site and the effluent are all likely co-limited.

Bioassessment

Periphyton (See Table 4 and Appendices I-1 and I-2)

- Periphyton communities at both the Control and Test Sites consisted mostly of diatoms. The Test Site had slightly more blue-green and green algae than the Control Site, which is probably a reflection of the higher nutrients there.

Macroinvertebrates (See Table 5 and Appendices J-1, J-2)

- Quantitative macroinvertebrate data from Hester-Dendys deployed to be retrieved on the inspection date was lost due to flooding. Hester-Dendys were redeployed on the date of the inspection and retrieved on 3/22/2010. Although diversity at the Test Site may be negatively biased by the low number of individuals recovered (<300), it was still slightly higher than the diversity of the Control Site. The number of individuals recovered from the Test Site Hester-Dendys was approximately one-third that recovered from the Control Site. Community composition was similar at both sites, dominated by dipterans and oligochaetes, which are generally pollution tolerant.
- Qualitative macroinvertebrate sampling was not performed due to lack of habitat and potential for scouring at both sites.

Summary

The Site visits and habitat assessment indicate that the system lacks productive habitat and is hydrologically impacted. Despite elevated nutrients at the Test Site as a result of the effluent, the Test Site biological communities did not differ significantly from those of the Control Site. Macroinvertebrate communities at both sites appear to be more strongly impacted by the poor hydrology of the system than the nutrient input from the effluent, and periphyton growth may be limited by adequate shading.

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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.

Starke WWTF	Class III Criteria	Effluent Limits	Effluent	Control Site	Test Site
Organic Constituents (µg/L)					
None Detected	-	-	None Detected		
Nutrients (mg/L)					
Ortho-phosphate	-	-	0.65	0.013	0.071
Total Phosphorus	-	-	0.74 A	0.032 A	0.11
Total Ammonia	-	-	0.039 J	0.01 U	0.01 U
Un-ionized Ammonia	≤ 0.02 s	≤ 0.02 s	≤ 0.02 c	≤ 0.02 c	≤ 0.02 c
Nitrate and Nitrite	-	-	10	0.037	1.2
Total Kjeldahl Nitrogen	-	-	0.93	0.5	0.58
Organic Nitrogen	-	≤ 10.0 s	0.891 c	0.495 c	0.575 c
Total Nitrogen	-	-	10.93 c	0.537 c	1.78 c
General Physical and Chemical Parameters					
Habitat Assessment	-	-	-	51	45
Dissolved Oxygen (mg/L)	≥ 5.0	≥ 5.5	10.2	9.4	9.5
pH (SU)	6.0 - 8.5	6.0 - 8.5 s	7.0	6.9	6.9
Conductivity (µmhos/cm)	≤ 1,275	-	555	202	232
Temperature (°C)	-	-	15.6	14.7	15.0
Sample Depth (m)	-	-	0.1	0.3	0.3
Total Residual Chlorine (mg/L)	≤ 0.01	≤ 0.01 s	0.03 £ UQ	-	-
Chlorophyll *a* (µg/L) - Corrected	-	-	0.55 U	3.7	3.0
Phaeophytin (µg/L)	-	-	0.4 U	0.57 I	0.5 U
Total Suspended Solids (mg/L)	-	≤ 60.0 s,p	4 U	6 I	11 I
CBOD, 5 day (mg/L), N - inhibited	-	≤ 24.0 s,p	2.4 V	-	-
Flow (MGD)	-	1.65	1.197	-	-
Hardness (mg $CaCO_3$)	-	-	147.68 c	67.60 c	- c
Toxicity (Chronic Screen, NOEC - % Effluent)					
Bioassay - Water flea *(Ceriodaphnia dubia)*	-	100	100	-	-
Bioassay - Fish *(Pimephales promelas)*	-	100	100	-	-
Microbiology (Number of colony forming units/100ml)					
Fecal Coliforms ≠	≤ 400s #	≤ 400 s	2 B	-	-

Value exceeds the Class III Water Quality Criteria or permit limits

c - Value is calculated
s - Single sample
p - 24-hour flow proportioned composite
A - Value reported is the mean of two or more determinations
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
J - Estimated value
Q - Sample held beyond normal holding time
U - Material analyzed for but not detected; value reported is the method detection limit
V - Analyte was detected in both sample and method blank
£ - Laboratory measurement from first bioassay sample received
NOEC - A no observed effect concentration less than 100% effluent will constitute a violation of this permit
≠ - Fecal coliform analysis performed by Advanced Environmental Laboratories, Jacksonville, FL
- If 10 or fewer samples are taken within a month, the single sample limit is 400 CFU (62-302.530(6), F.A.C.)

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.

Starke WWTF	Effluent Limits	Effluent Class III Criteria	Effluent	Control Site Class III Criteria	Control Site	Test Site Class III Criteria	Test Site
Metals (µg/L unless otherwise noted)							
Aluminum	-	-	60 U	-	510	-	560
Arsenic	-	≤ 50	0.44 I	≤ 50	0.56 I	≤ 50	0.53 I
Cadmium	-	≤ 0.36 b	0.03 U	≤ 0.20 b	0.03 U	≤ 0.23 b	0.03 U
Calcium (mg/L)	-	-	41	-	22.8	-	25.8
Chromium-III	-	≤ 118.60 b	0.3 U	≤ 62.53 b	0.78 I	≤ 71.63 b	0.8 I
Copper	≤ 13.02 b,p	≤ 13.02 b	2.8	≤ 6.68 b	0.74	≤ 7.69 b	0.94
Iron	-	≤ 1,000	91 I	≤ 1,000	740	≤ 1,000	690
Lead	-	≤ 5.23 b	0.27 I	≤ 1.93 b	0.52 I	≤ 2.39 b	0.71 I
Magnesium (mg/L)	-	-	11	-	2.59	-	3.73
Nickel	-	≤ 72.54 b	0.79 I	≤ 37.45 b	1.06	≤ 43.09 b	0.98 I
Selenium	-	≤ 5.0	0.32 I	≤ 5.0	0.24 I	≤ 5.0	0.27 I
Silver	≤ 0.07 p	≤ 0.07	0.025 U	≤ 0.07	0.025 U	≤ 0.07	0.025 U
Zinc	-	≤ 166.71 b	40	≤ 85.98 b	7.3 I	≤ 98.95 b	11 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

p - 24-hour flow-proportioned composite

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

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

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

Starke WWTF						
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	141.0	381.5 ± 76.3	279.5 ± 55.9	415.3 ± 83.1	318.2 ± 63.6	15.4	14.8
Control Site	3.5	1.8 ± 0.4	5.6 ± 1.1	20.4 ± 4.1	13.8 ± 2.8	3.6	16.8
Test Site	59.6 A	46.0 ± 9.2	30.5 ± 6.1	67.6 ± 13.5	47.3 ± 9.5	17.0	16.2

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

Table 4. Periphyton Composition - Qualitative.

Starke WWTF	Control Site	Test Site
Number of Wet Taxa	9	13
Number of Wet Algal Units Identified	301	301
Percent Dominant Wet Taxon	90.7	76.1
Dominant Wet Taxon Name	Bacillariophyta (Diatoms)	Bacillariophyta (Diatoms)
Number of Diatom Taxa	65	63
Number of Diatom Algal Units Identified	500	500
Percent Dominant Diatom Taxon	27.6	11.0
Dominant Diatom Taxon Name	*Synedra ulna*	*Nitzschia* sp.
Percentage Composition for Wet Algae		
Blue-green algae	6.6	11.3
Green algae	2.7	12.3
Diatoms	90.7	76.1
Euglenophytes	0.0	0.3

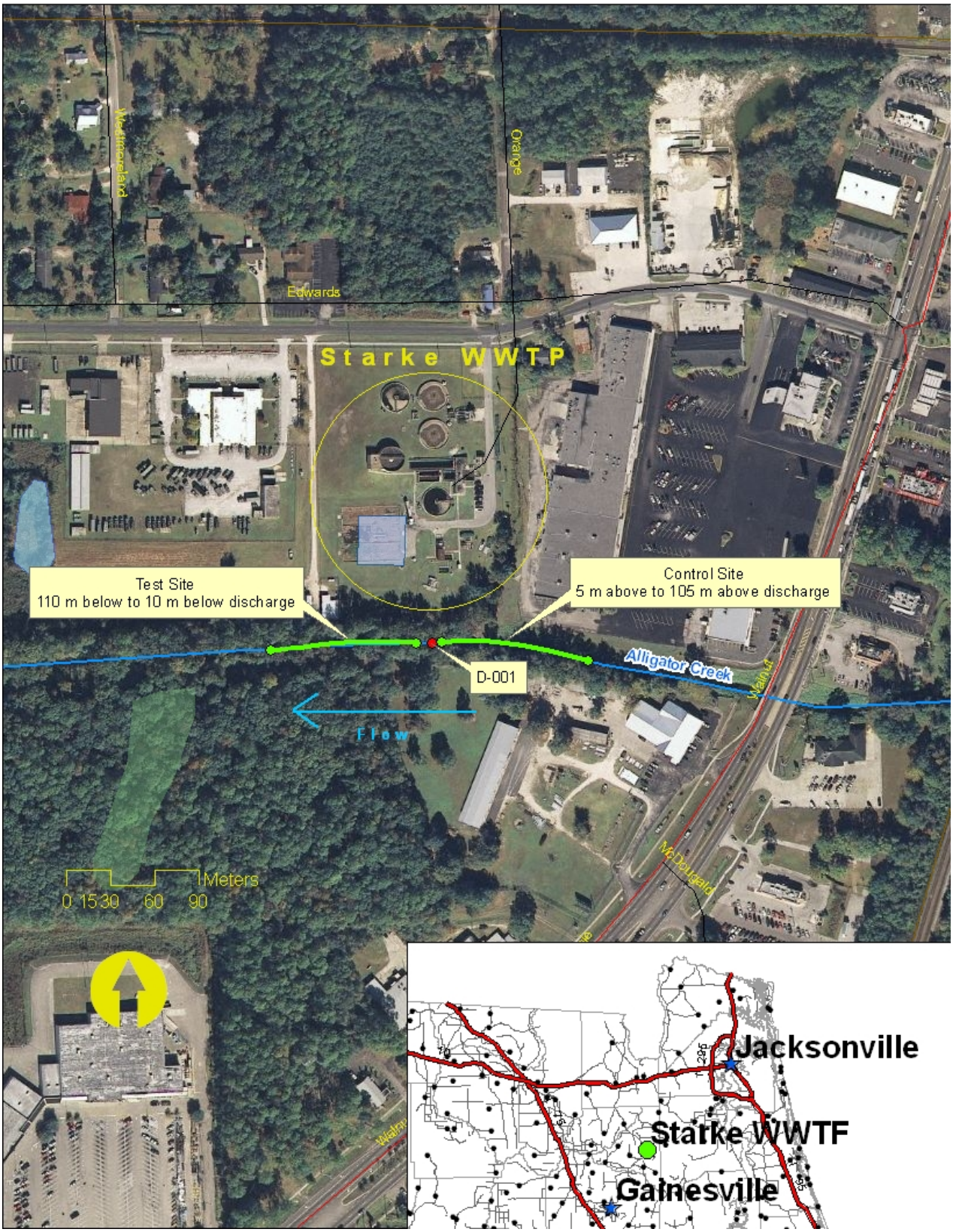
Table 5. Macroinvertebrate Hester-Dendy Samples - Quantitative.

Starke WWTF	Control Site	Test Site
Summary Statistics		
Shannon-Weaver Diversity	3.35	3.62 *
Number of Taxa	30	28
Number of EPT Taxa	3	0
Percent Dominant Taxon	29.4	20.8
Dominant Taxon Name	*Rheocricotopus robacki* (Diptera)	*Thienemanniella xena* (Diptera)
Total Number of Individuals (counted)	608	203
Total Number of Individuals (#/m^2)	1,611	538
Community Composition: Percent of total		
Coleoptera	1.7	2.0
Diptera	67.6	76.3
Ephemeroptera	1.0	0.0
Gastropoda	0.0	1.5
Odonata	0.5	0.5
Oligochaeta	27.9	19.8
Plecoptera	0.0	0.0
Trichoptera	1.3	0.0
Functional Feeding Groups: Percent of total		
Burrowing Deposit Feeders	27.9	18.8
Piercers	0.2	0.0
Predators	2.1	1.5
Scrapers	1.3	1.0
Shredders	20.1	18.3
Surface Deposit Feeders	40.6	56.1
Suspension Feeders	7.5	3.3
Unknown	0.4	1.0

* - Shannon Weaver Diversity scores calculated on samples with < 300 individuals have the potential for negative bias (lower diversity scores compared to sites with more individuals)(Lande 1996).

Appendix A

Map of Facility



Appendix B

Facility Summary

Starke WWTP – FL0028126 – November-2009

State of Florida
Department of Environmental Protection
Facility Introduction & Summary

PART I: Information gathered prior to sampling event	
Prepared By: Samuel Schllesinger	**Contact Number:** 904-807-3333
Facility Name (as it appears on permit): Starke Wastewater Treatment Facility	**Current Name:** same
NPDES Permit Number: FL0028126	**Permit Expiration Date:** June 8, 2010
Physical Address: 602 Edwards Road Starke, FL 32091	
District: Northeast	**County:** Bradford
Function of Facility: Facility treats domestic wastewater.	
Facility Type: Domestic Wastewater	**Permitted Capacity (MGD):** 1.65

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

Outfall D-001	
Month	AADF
Sept--08	442,000
Oct	399,000
Nov	378,000
Dec	354,000
Jan --09	377,000
Feb	325,000
March	301,000
April	315,000
May	347,000
June	377,000
July	405,000
Aug	401,000

Outfall D-002	
Month	AADF
Sept--08	0
Oct	0
Nov	0
Dec	0
Jan --09	0
Feb	0
March	0
April	0
May	0
June	0
July	0
Aug	0

Starke WWTP – FL0028126 – November-2009

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

Outfall R-001	
Month	AADF
Sept--08	273,000
Oct	305,000
Nov	326,000
Dec	354,000
Jan --09	370,000
Feb	379,000
March	392,000
April	383,000
May	370,000
June	365,000
July	-
Aug	371,000

Description of type of Discharge:

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

Starke WWTP – FL0028126 – November-2009

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

EFA-1 – Sample point immediately after disinfection and prior to dechlorination. (Outfall D-001, D-002, and R-001)
EFD-1 – Sample point after dechlorination and prior discharge to Alligator Creek. (Outfall D-001 and D-002)
EFD-2 - Sample point after dechlorination and prior to discharge to Alligator Creek under the LWWD mechanism. (Outfall D-002)
SWU-1 – Upstream of the outfall on the Alligator Creek at U.S.301. (Outfall D-001)
SWD-1 –100 yards downstream from the outfall on the Alligator Creek. (Outfall D-001)
SWU-3 - Stream flow at the USGS Gauge Station: Alligator Creek at Stark, Florida. (Outfall D-002)
OTH-1 - The average annual rainfall shall be reported as measured at the City of Starke, Florida. (Outfall D-002)
LAL-1 - Sample point of the final effluent prior discharge to the reuse system. (Outfall R-001)
FLW-1- Monitoring point for total flow through the treatment plant.
INF-1 – Influent, prior to biological treatment (cannot contain internal recycled streams)

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

Surface Water Discharge:

An existing 1.25 MGD annual average daily flow (AADF) permitted discharge to Alligator Creek (Class III fresh waters) at Discharge Location (D-001). The point of discharge is located approximately at latitude 29 ° 56' 16" N, longitude 82 ° 06' 55" W.

An existing 0.4 MGD annual average daily flow (AADF) permitted limited wet weather discharge (LWWD) to discharge to Alligator Creek (Class III fresh waters) at Discharge Location (D-002). The LWWD is directed through the same outfall pipe as D-001.

Land Application:

An existing 0.8 MGD annual average daily flow (AADF) permitted capacity slow-rate restricted public access irrigation system (R-001). R-001 consists of City of Starke Effluent Irrigation Site located approximately at latitude 29° 56' 26" N, longitude 82° 06' 53" W

Starke WWTP – FL0028126 – November-2009

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

An existing 1.65 million gallon per day (MGD) annual average daily flow (AADF) permitted capacity conventional activated sludge domestic wastewater treatment facility (WWTF) with the following units:

- One (1) influent headworks consisting of:
  - A coarse bar screen;
  - An influent pump station including three self-priming centrifugal pumps (598 gpm, 748 gpm, and 1,010 gpm; all @ 31 feet TDH), and two vertical centrifugal pumps (1,050 gpm @ 16 feet TDH);
  - An equalization/rejection basin consists of four adjacent concrete tanks (Tank No.1 is 27 feet by 21 feet; tanks No.2 & 3 is 12 feet by 54 feet; and tank No.4 is 100 feet by 17 feet);
  - A static screen (with a slot size of 0.10-inch) including an inlet headbox, overflow weir, screen section, and effluent distribution structure. The static screen is manually operated with the flow being controlled by two 10" plus valves and one 10" gate valve;
  - A cyclone grit removal chamber (The main chamber is 7.0 feet in diameter and has a capacity of approximately of 3.0 MGD).
- Two (2) aeration basins which are constructed of concrete; each basin has volume of 310,000 gallons, 60-foot diameter, and fitted with one 60 hp floating mechanical aerator.
- Two (2) secondary clarifiers each followed by a Parshall flume:
  - Each clarifier has 60-foot diameter, 12 feet water depth, and surface loading of 390.0 gal. per day (gpd) per square feet;
  - The Parshall flume for Clarifier No.1 is 24-inch height, 6-inch throat width, and 2.5 MGD maximum flow; the Parshall flume for Clarifier No. 2 is 24-inch height, 9-inch throat width, and 5.73 MGD maximum flow.
- One (1) chlorine contact chamber;
- One (1) aerobic digester with 55 feet diameter and one floating aerator powered by a 40-hp motor.
- One (1) sludge drying bed consisting of layers of sand (7-inch thick) and gravel (3-inch thick for $\frac{1}{8}$ to $\frac{1}{4}$-inch size stone and 6 to 12-inch thick for $\frac{1}{4}$- to $\frac{3}{4}$-inch size stone)
- One (1) effluent transfer pump station consisting of three (3) suction lift pumps (30 hp, 1,300 RPM) and one (1) self priming pump (7.5 hp, 3,600 RPM).

The domestic residuals are treated to meet Class B requirements and land applied on agricultural sites and/or air dried on sand filter beds and disposed of at an approved landfill.

Permit Revision: June 29, 2007

The permittee has proposed to construct improvements to the treatment process. The schedule for the improvements and submittal requirements is included in specific condition VI. There is no increase in permitted capacity and no increase in the discharge to surface waters.

- Convert chlorine gas disinfection to sodium hypochlorite solution for disinfection.
- Convert gas sulfur dioxide to sodium bisulfite solution for dechlorination.
- Disc Filter system: cloth filter media, and each unit contains 4 cloth disks. Design flow at 5 gpm/SF at 3 MGD peak flow.
- Modify and convert the four (4) existing equalization basins to anoxic zones to provide removal and reduction of nitrate-nitrogen and improve the overall total nitrogen removal.
- Construct BioChem Neutralizer System to produce Class B domestic wastewater residuals treatment system. Allows demonstration project for a pilot study as part of an on-going Class A residuals study. The system is designed to accommodate 3.0 MGD AADF permitted treatment capacity.

	PART I: Continued
	List current Effluent Limits of Outfall(s) to be Sampled: This should include any AO or CO limits the facility may be under **1. During the period beginning on the issuance date and lasting through the expiration date of this permit, the permittee is authorized to discharge effluent from Outfall D-001 to Alligator Creek. Such discharge shall be limited and monitored by the permittee as specified below:**

			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, Discharge to the Alligator Creek	MGD	Maximum	1.25	Report	-	-		Recording flow meters and totalizers	EFD-1	See Cond.I.A. 4
BOD, Carbonaceous 5 day, 20C	MG/L	Maximum	12.00	15.0	18.0	24.0	Weekly	24-hour flow proportioned composite	EFD-1	
Solids, Total Suspended	MG/L	Maximum	20.0	30.0	45.0	60.0	Weekly	24-hour flow proportioned composite	EFD-1	
Solids, Suspended, % Removal	PERCENT	Minimum	-	85	-	-	Monthly	Calculated	CAL-1	
pH	SU	Range	-	-	-	6.0 to 8.5	Continuous	Meter or Instrument	EFD-1	See Cond.I.A. 3
Coliform, Fecal	#/100ML	Maximum	See Permit Condition I.A.5.				Weekly	Grab	EFD-1	
Total Residual Chlorine (For Disinfection)	MG/L	Minimum	-	-	-	0.5	Continuous	Meter or Instrument	EFA-1	See Cond.I.A. 3, 6
Total Residual Chlorine (For Dechlorination)	MG/L	Maximum	-	-	-	0.01	Daily (7days/Week)	Meter or Instrument	EFD-1	

PART I: Continued

List current Effluent Limits of Outfall(s) to be Sampled: This should include any AO or CO limits the facility may be under

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

			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
Nitrogen, Organic, Total as N	MG/L	Maximum	Report	5.0	7.5	10.0	Weekly	Grab	EFD-1	
Ammonia, Total as N	MG/L	Maximum	Report	Report	Report	Report	Weekly	Grab	EFD-1	See Cond.I.A. 8
Unionized Ammonia, Total as N	MG/L	Maximum	-	-	-	0.02	Weekly	Calculation	CAL-2	See Cond.I.A. 8
Water Temperature	Degree C	Maximum	-	-	-	Report	Weekly	Meter or Instrument	EFD-1	See Cond.I.A. 8
Nitrogen, Total as N	MG/L	Maximum	Report	Report	Report	Report	Weekly	Grab	EFD-1	
Nitrogen, Total as N	Lb/day	Maximum	119.0	Report	Report	Report	Weekly	Calculation	CAL-3	See Cond.I.A. 13
Oxygen, Dissolved (DO)	MG/L	Minimum	-	-	-	5.5	Daily (7days/Week)	Meter or Instrument	EFD-1	See Cond.I.A. 9
Hardness, Total (as CaCO3)	MG/L	Maximum	-	-	-	Report	Monthly	24-hour flow proportioned composite	EFD-1	See Cond.I.A. 11

	PART I: Continued
	List current Effluent Limits of Outfall(s) to be Sampled: This should include any AO or CO limits the facility may be under **1. During the period beginning on the issuance date and lasting through the expiration date of this permit, the permittee is authorized to discharge effluent from Outfall D-001 to Alligator Creek. Such discharge shall be limited and monitored by the permittee as specified below:**

			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
Copper, Total Recoverable	UG/L	Maximum	-	-	-	$e^{(0.8545[\ln H]-1.702)}$	Monthly	24-hour flow proportioned composite	EFD-1	See Cond.I.A. 11, 12, 13
Silver, Total Recoverable	UG/L	Maximum	-	-	-	0.07	Monthly	24-hour flow proportioned composite	EFD-1	See Cond.I.A. 12, 13
Nutrient Monitoring	See Note 1 below						Quarterly	24-hour flow proportioned composite	EFD-1	
Stream Monitoring	See Note 2 below						Semi-annually	Grab	SWU-1 SWD-1	
Whole Effluent Toxicity	See Note 3 below						Semi-annually	24-hour flow proportioned composite	EFD-1	

NOTES:

Nutrient Monitoring

1. Monitoring on a quarterly basis shall be performed on the effluent with analysis by a certified laboratory for the parameters listed below. Sampling shall be performed on the same day as routine effluent sampling and stream sampling as described in condition I.A.15 below.

PARAMETER	REPORTING UNITS	SAMPLE TYPE
Nitrite + Nitrate	MG/L as N	16-hour flow-proportional composite
Total Kjeldahl Nitrogen	MG/L as N	16-hour flow-proportional composite
Total Phosphorous	MG/L	16-hour flow-proportional composite
Orthophosphate	MG/L	16-hour flow-proportional composite

2. The following stream monitoring and sampling shall be performed on Alligator Creek at the upstream and downstream locations described below.

SITE NUMBER	DESCRIPTION
SWU-1	Upstream, Alligator Creek at U.S. 301
SWD-1	Downstream, Alligator Creek 100 yards from the outfall

The permittee shall sample the following parameters at the two sites

- Dissolved oxygen,
- pH,
- Temperature,
- Conductivity,
- $CBOD_5$,
- Total ammonia,
- TKN,
- Nitrite + Nitrate,
- Total phosphorous,
- Fecal coliform,
- Hardness.

The samples shall be collected on a semi-annual basis and concurrently with the quarterly effluent nutrient samples listed in condition I.A.11. All samples shall be collected at mid-depth.

PART II: Sampling Event Information

Date(s) sample collected: 3/1/2010	**Sampler(s):** Eesa Ali, Sharon Piltz
Temperature (Deg C): 15.62 C	**pH (SU):** 6.99 SU
Dissolved Oxygen (mg/L): 10.18 mg/L	**Conductivity (umhos/cm):** 555 umhos/cm
Total Residual Chlorine (mg/L):	**Total Residual Chlorine - after Disinfection (mg/L):** 0.00 mg/L
Method of Chlorination: Chlorine Gas	**Method of De-chlorination:** Sulfur Dioxide

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):

Outfall D-001	
Month	AADF
Sept--08	442,000
Oct	399,000
Nov	378,000
Dec	354,000
Jan --09	377,000
Feb	325,000
March	301,000
April	315,000
May	347,000
June	377,000
July	405,000
Aug	401,000

Outfall D-002	
Month	AADF
Sept--08	0
Oct	0
Nov	0
Dec	0
Jan --09	0
Feb	0
March	0
April	0
May	0
June	0
July	0
Aug	0

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: None Noted

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.floridadep.org/labs/qa/index.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 exceedence 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 exceedences of 62-302.530(20), 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 exceedence of 62-302.530(6) and/or a violation of facility permit limits.

(5) Habitat Assessment

Habitat assessment is used to evaluate the physical structure and extent of disturbance in a water body. Eight aspects are ranked, with 20 possible points for each aspect (QA Rule SOP FT 3100). The Habitat Assessment score includes types and amounts of benthic substrates, water velocity, amount of sand or silt accumulation, extent of artificial channelization, bank stability, and riparian zone width and vegetation type. All scores are summed to yield an overall Habitat Assessment score. Habitat Assessment score ranges from 11-160 and overall habitat quality is assigned to one of four categories: Optimal (120-160 points), Suboptimal (80-119 points), Marginal (40-79 points), and Poor (11-39 points).

(6) 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 exceedences 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 ± 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 exceedence of 62-302.530(61) F.A.C.

(7) Algal Phytoplankton and Periphyton Assemblages

Qualitative periphyton are sampled by taking subsamples of algae from natural substrates throughout the sample reach. Phytoplankton were sampled from the water column using a 1 L grab sample. Periphyton were subsampled and identified to the lowest practical level, usually species. Wet taxa and diatoms are identified separately. In the wet taxa analysis, soft algae are identified to the lowest practical level, and diatoms are identified only to order level (diatom). In the diatom analysis, diatoms are identified to the lowest practical level.

Chlorophyll *a* Content: Chlorophyll *a* content is an estimate of algal biomass . High algal biomass implies nutrient stress (Stevenson and Bahls 1999) and may be constitute exceedences 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..

Algal Density: Algal density is estimated as number of natural units/ml for phytoplankton samples. Although algal density of a single site is highly variable and depends on a number of factors, comparison of algal density at a control site to algal density at a related test site gives a partial comparison of algal biomass at the two sites (Stevenson and Smol 2003).

Taxa richness: Taxa richness is the number of distinct algal taxa present in a sample. Extreme nutrient enrichment tends to reduce the number of different types of algae present in a sample because a few tolerant taxa tend to reproduce rapidly and constitute the majority of the cells present. However, moderate nutrient enrichment of nutrient poor waters may sometimes be correlated with increased algal taxa richness (Stevenson and Bahls 1999) as the algal community begins to respond to the increased input of nutrients.

Community Composition: Shifts in relative proportions of major groups of algae downstream of a point source, compared to upstream, control conditions, may indicate negative effects of a discharge (Stevenson and Bahls 1999) and may constitute exceedences of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C., 62-302.530(47)(b) F.A.C. and/or 62-302.530(61) F.A.C.

(8) Benthic Macroinvertebrate Assemblages

Benthic macroinvertebrates were collected using two methods. Quantitative samples were collected from Hester-Dendy multi-plate samplers incubated for 28 days. Qualitative collections are made using 20 dipnet sweeps (QA Rule SOP FS7420). Benthic macroinvertebrates were sorted and identified to the lowest practical taxonomic level, usually species.

Taxa richness: Taxa richness is the number of distinct macroinvertebrate taxa present in a sample. Stress, habitat destruction and pollution tend to reduce the number of different types of organisms present (Karr and Chu 1998). Decreases in taxa richness related to a facility's effluent may constitute exceedences of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C., 62-302.530(47)(b) F.A.C. and/or 62-302.530(61) F.A.C..

Percent Contribution of Dominant Taxon: Percent contribution of the dominant taxon is calculated by dividing the number of individuals in the most abundant taxa by the total number of individuals counted. Percent contribution of the dominant taxon tends to increase with increasing perturbation (Plafkin *et al*., 1989). Increases in the percent contribution of the dominant taxon related to a facility's effluent may constitute exceedences 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..

Community Composition: Shifts in proportions of major groups of organisms downstream of a point source, compared to upstream, control conditions, may indicate negative effects of a discharge (Fore et. al. 2007, Karr and Chu 1998). Shifts in community composition related to a facility's effluent may constitute exceedences of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C., 62-302.530(47)(b) F.A.C. and/or 62-302.530(61) F.A.C..

Functional Feeding Groups: Environmental degradation may differentially affect groups of invertebrates based on how the group feeds (e.g. predators, deposit feeders, etc.). In Florida, pollution may be responsible for reducing the numbers of filter feeders and shredders (Fore et. al. 2007). Changes in the proportions of functional feeding groups related to a facility's effluent may constitute exceedences of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C., 62-302.530(47)(b) F.A.C. and/or 62-302.530(61) F.A.C..

Shannon-Weaver Diversity Index: This index is specified in the Florida Administrative Code 62-302 as a measure of biological integrity. Low diversity scores are undesirable. Where diversity is low, only a few taxa are abundant as compared to an area where many taxa are present in equitable abundance among taxa (Magurran 1988). A difference of 25% in Shannon-Weaver diversity between results from Hester-Dendy multiplate samplers incubated for 28 days at test and control sites constitute exceedences of 62-302.530(10) F.A.C..

The Stream Condition Index (SCI): The SCI is a composite macroinvertebrate metric developed for Florida (Fore et. al. 2007). This Index was revised in 2007 using data from qualitative dipnet samples. The SCI now assigns points to ten parameters; depending on how closely each parameter approaches an expected value (QA Rule SOP LT 7200). Points are assigned according to in which bioregion (Panhandle, Northeast, or Peninsula) the sampling location exists -and summed to yield a final SCI score (range 0-100). Included in the calculation of SCI are taxa richness, number of Ephemeroptera taxa, number of Trichoptera taxa, percent contribution of the dominant taxon, number of sensitive taxa, number of clinger taxa, number of long-lived taxa, percent contribution of Tanytarsini, percent contribution of very tolerant, and the percent contribution of suspension and filter feeders. As human disturbance increases, it is expected that taxa richness, the number of Ephemeroptera taxa, Trichoptera taxa, sensitive taxa, clinger taxa, long-lived taxa, and the percent contribution of Tanytarsini and suspension and filter feeders will decrease while percent contribution of dominant taxon, and percent contribution of very tolerant taxa will increase.

Scores are broken into three categories (1, 2, and 3). Sites in Category 1 are described as having higher diversity than Category 2 sites, particularly for Ephemeroptera and Trichoptera. A Category 1 site may have several more clinger and sensitive taxa, a higher proportion of Tanytarsini, and a lower percent of a dominant taxon than a site in Category 2. The site will also have a very small percentage of very tolerant individuals, if any.

Sites in Category 2 are described as having an average of 30 species with several different taxa of Ephemeroptera and Trichoptera. A Category 2 site also has several different long-lived taxa and, on average, 5 clinger and 6 sensitive taxa. There is a slight increase in dominance by a single taxon relative to sites in Category 1. Very tolerant taxa represent a small percentage of individuals but are noticeably increased as compared to sites in Category 1.

Sites in Category 3 are described as having a notable loss in taxonomic diversity, and Ephemeroptera, Trichoptera, long-lived, clinger and sensitive taxa are uncommon or rare. Filter feeders are reduced by at least 50%. The site is dominated by a tolerant taxon, and very tolerant individuals represent a large proportion of the individuals collected.

SCI 2007 categories are from Table LT 7200-2 of DEP-SOP-002/01 as referenced in Draft Quality Assurance Rule (62-160 F.A.C.), December 3, 2008. A decrease in ordinal SCI score from the Control to the Test site may be evidence of degradation related to a facility's effluent. An SCI score in Category 3, if it is shown to be related to a facility's effluent, may constitute exceedences of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C., 62-302.530(47)(b) F.A.C. and/or a violation of 62-302.530(61).

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2010-01-25-20
Starke WWTF

Requester: Jennifer Paris
Field Report Prepared By: E A.

Customer: NE-DIST
Collected By: SP/EA
Send Final Report To Tom Kallemeyn

Project ID: FYI5
Sampling Agency: DEP

PMAS: 1143

Lab ID *	Location: Starke WWTF EFD-1			☑ Comp ☐ Grab	Collection (begin) Eastern Date 2-28-10 Time 1000 Central	Collection (end) Eastern Date 3-1-10 Time 1000 Central	Bottle Group(s)**	
	Field ID			Tot Res Chlorine (mg/L): 0.00	Diss Oxygen (mg/L)	Storet Station Number	A	
	Matrix (Include type e.g. Salt, Fresh, etc	Temp (C)	pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number FL0028126		
	Latitude o ' " .	Longitude o ' " .		Comments: TSS BOD COND TOX METALS				
Lab ID *	Location: Starke WWTF EFD-1			☐ Comp ☑ Grab	Collection (begin) Eastern Date 3-1-10 Time 1040 Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**	
	Field ID			Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L): 10.18	Storet Station Number	A	
	Matrix (Include type e.g. Salt, Fresh, etc: effluent	Temp (C): 15.62	pH: 6.99	Sample Depth: 0.1 ☑ m ☐ ft	0.27 ☐ Salinity (PPTh) 555 ☐ Sp Conductance (umho/cm)	NPDES Number		
	Latitude o ' " .	Longitude o ' " .		Comments				
Lab ID *	Location: Blank			☐ Comp ☑ Grab	Collection (begin) Eastern Date 3-1-10 Time 1040 Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**	
	Field ID			Tot Res Chlorine (mg/L): 0.00	Diss Oxygen (mg/L)	Storet Station Number	D	
	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) Eastern Date Time Central	Collection (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 o ' " .	Longitude o ' " .		Comments				

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
EA	3-1-10	Fed ex	ABB	3/2/10 0920				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Picked up 2 biomass jugs M. Faircloth 3-2-2010 1019

Advanced
Environmental Laboratories, Inc.
☒ 6601 Southpoint Pkwy. • Jacksonville, FL 32216 • 904.363.9350 • Fax 904.363.9354 • E82574
☐ 9610 Princess Palm Ave. • Tampa, FL 33619 • 813.630.9616 • Fax 813.630.4327 • E84589
☐ 6815 SW Archer Road • Gainesville, FL 32608 • 352.377.2349 • Fax 352.395.6639 • E82001
☐ 528 S. North Lake Blvd., Ste. 1016 • Altamonte Springs, FL 32701 • 407.937.1594 • Fax 407.937.1597 • E53076

Page_____ of _____ LAB NUMBER:

CLIENT NAME: DEP
ADDRESS: 7825 BAYMEADOWS WAY
2006 JAX 32256
PHONE: 904 807 3230
FAX:
CONTACT: E. Ali
SAMPLED BY: E. Ali
TURN AROUND TIME:
☑ STANDARD _____ ☐ RUSH _____

PROJECT NAME: Starke EFD-1
P.O. NUMBER/PROJECT NUMBER: 2010-01-25-20
PROJECT LOCATION:
REMARKS/SPECIAL INSTRUCTIONS:

ANALYSIS REQUIRED: Fecal coliform

SAMPLE ID	SAMPLE DESCRIPTION	Grab Comp	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. COUNT	PRESERVATION	LABORATORY I.D. NUMBER
	Starke EFD-1	G	3-1-10	1040	SW			01

Matrix Code: WW = wastewater SW = surface water GW = ground water DW = drinking water O = oil A = air SO = soil SL = sludge
Preservation Code: I = ice H=(HCl) S = (H2SO4) N = (HNO3) T = (Sodium Thiosulfate)

Received on Ice ☒ Yes ☐ No ☒ Temp taken from sample ☐ Temp from blank ☐ Where required, pH checked Temperature when received 5 (in degrees celcius)

Form revised 2/8/08

Device used for measuring Temp by unique identifier (circle IR temp gun used) J: 9A G-LT-1 LT-2 T: 10A A: 3A

	Relinquished by:	Date	Time	Received by:	Date	Time
1	E. Ali	3-1-10	1310		3-1-10	3:10
2						
3						
4						

FOR DRINKING WATER USE:
(When PWS information not otherwise supplied) PWS ID:_____
Contact Person:_____ Phone :_____
Supplier of Water:_____
Site-Address:_____

2010-01-25-20

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: ~~RQ-2010-01-11-44~~

Ocklawaha River Rodman Reservoir Sampling

Starke WWTF FY15

Requester: ~~Kathryn Brackett~~

Field Report Prepared By: ~~Tom~~ E. Ali

Customer: ~~DIVISN-EAR~~ NE-DIST

Collected By: E. Ali / S. Filtz

Send Final Report To ~~Frank Nearhoof~~ Tom Kallemeyn

Project ID: ~~OCKLAWAHA~~

FY15

PMAS:

Sampling Agency: OEP

Lab ID *	Location	Comp / Grab	Collection (begin) Date Time Eastern Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
	Starke WWTF Control	☐ Comp ☑ Grab			B+C
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L) 9.41	Storet Station Number	
	Matrix (Include type e.g. Salt, Fresh, etc) Temp (C) 14.73 pH 6.85	Sample Depth 0.3 ☑ m ☐ ft	202 ☐ 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)**
	Starke WWTF HD #1	☑ Comp ☐ Grab	Date 2-22-10 Time 1000	Date 3-22-10 Time 1030	C
	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 0.5 ☑ 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)**
	Starke WWTF HD #2	☑ Comp ☐ Grab	Date 2-22-10 Time 1000	Date 3-22-10 Time 1030	C
	Field ID	Tot Res Chlorine (mg/L) 0.03	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (Include type e.g. Salt, Fresh, etc) Temp (C) pH	Sample Depth 0.5 ☑ 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)**
	Starke WWTF HD #3	☑ Comp ☐ Grab	Date 2-22-10 Time 1000	Date 3-22-10 Time 1030	C
	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 0.5 ☑ 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
E. Ali	3-22-10	Fedex						

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

2010-01-25-20

Request Number: ~~RQ-2010-02-01-21~~

UEC B 2, 2363F,2363G1

Starke WWTF FY15

Event ID *

Requester: ~~Jann Gruentzel~~ E. Ali

Field Report Prepared By: E. Ali

Customer: NE-DIST

Collected By: E. Ali

Send Final Report To ~~Lee Banks~~ Tom Kallemeyn

Project ID: ~~SMP~~ FY15

Sampling Agency: DEP

PMAS:

Lab ID *	Location: Starke WWTF TEST			☐ Comp ☑ Grab	Collection (begin) Date 3-22-10 Time 1050 Eastern Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
	Field ID			Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L) 9.45	Storet Station Number	B+C
	Matrix (Include type e.g. Salt, Fresh, etc	Temp (C) 15.04	pH 6.92	Sample Depth 0.3 ☑ m ☐ ft	☐ Salinity (PPTh) ☑ Sp Conductance (umho/cm) 232	NPDES Number	
	Latitude o ' "	Longitude o ' "		Comments			
Lab ID *	Location: Starke WWTF HD #1			☑ Comp ☐ Grab	Collection (begin) Date 2-22-10 Time 1100 Eastern Central	Collection (end) Date 3-22-10 Time 1030 Eastern Central	Bottle Group(s)**
	Field ID			Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	C
	Matrix (Include type e.g. Salt, Fresh, etc	Temp (C)	pH	Sample Depth 0.4 ☑ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number	
	Latitude o ' "	Longitude o ' "		Comments			
Lab ID *	Location: Starke WWTF HD #2			☑ Comp ☐ Grab	Collection (begin) Date 2-22-10 Time 1000 Eastern Central	Collection (end) Date 3-22-10 Time 1030 Eastern Central	Bottle Group(s)**
	Field ID			Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	C
	Matrix (Include type e.g. Salt, Fresh, etc	Temp (C)	pH	Sample Depth 0.4 ☑ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number	
	Latitude o ' "	Longitude o ' "		Comments			
Lab ID *	Location: Starke WWTF HD #3			☑ Comp ☐ Grab	Collection (begin) Date 2-22-10 Time 1000 Eastern Central	Collection (end) Date 3-22-10 Time 1030 Eastern Central	Bottle Group(s)**
	Field ID			Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	C
	Matrix (Include type e.g. Salt, Fresh, etc	Temp (C)	pH	Sample Depth 0.4 ☑ 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
E. Ali	3-22-10	FedEx						

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Advanced Environmental Laboratories, Inc.

Page 1 of 1 LAB NUMBER:

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CLIENT NAME: DEP
ADDRESS: 7825 Baymeadows Way Suite 200B
PHONE: 904 807 3230
FAX:
CONTACT: E. Thi
SAMPLED BY: E. Thi
TURN AROUND TIME:
☒ STANDARD ☐ RUSH

PROJECT NAME: Starke WWTF FY1
P.O. NUMBER/PROJECT NUMBER: 2010 01 2520
PROJECT LOCATION: Starke WWTF
REMARKS/SPECIAL INSTRUCTIONS:

BOTTLE SIZE & TYPE
ANALYSIS REQUIRED
PRESERVATION
Fecal bac

SAMPLE ID	SAMPLE DESCRIPTION	Grab Comp	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. COUNT		LABORATORY I.D. NUMBER
	Starke WWTF Control	S	3-22	1050	FW		X	001
	Starke WWTF Test	S	3-22	1050	FW		X	002

Matrix Code: WW = wastewater SW = surface water GW = ground water DW = drinking water O = oil A = air SO = soil SL = sludge
Preservation Code: I = ice H=(HCl) S = (H2SO4) N = (HNO3) T = (Sodium Thiosulfate)

Received on Ice ☒ Yes ☐ No ☒ Temp taken from sample ☐ Temp from blank ☐ Where required, pH checked Temperature when received 4 (in degrees celcius)

Form revised 2/8/08

Device used for measuring Temp by unique identifier (circle IR temp gun used) J : 9A G: LT-1 LT-2 T: 10A A: 3A

	Relinquished by:	Date	Time	Received by:	Date	Time
1	E. Thi	3/24	1540	Dhutzie	3-22-10	15:40
2						
3						
4						

FOR DRINKING WATER USE:
(When PWS Information not otherwise supplied) PWS ID:
Contact Person: Phone :
Supplier of Water:
Site-Address:

Appendix E

Chemical analysis of effluent and receiving water

Date_Sampled	UDL	SCH_Group	Component	Result		Units	MDL	PQL
3/1/2010 10:40	Effluent	AGP/LN	Algal Growth Potential	141		mg DryWt/L	0.3	0.9
3/1/2010 10:40	Effluent	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.4	U	ug/L	0.4	1.2
3/1/2010 10:40	Effluent	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	2.4	V	mg/L	0.2	2
3/1/2010 10:40	Effluent	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	0.55	U	ug/L	0.55	1.7
3/1/2010 10:40	Effluent	Overflow	Fecal Coliforms-Membrane Filter	2	B	#/100 mL		
3/1/2010 10:00	Effluent	Toxicology	Bioassay-Chronic-Scrn-FW-C.dubia, NOEC	100		NOEC		
3/1/2010 10:00	Effluent	Toxicology	Bioassay-Chronic-Scrn-FW-Fish, NOEC	100		NOEC		
3/1/2010 10:40	Effluent	Metals	Selenium	0.32	I	ug/L	0.2	0.8
3/1/2010 10:40	Effluent	Metals	Nickel	0.79	I	ug/L	0.25	1
3/1/2010 10:40	Effluent	Metals	Lead	0.27	I	ug/L	0.2	0.8
3/1/2010 10:40	Effluent	Metals	Arsenic	0.44	I	ug/L	0.25	1
3/1/2010 10:40	Effluent	Metals	Calcium	41		mg/L	0.075	0.3
3/1/2010 10:40	Effluent	Metals	Zinc	40		ug/L	5	20
3/1/2010 10:40	Effluent	Metals	Chromium	0.3	U	ug/L	0.3	1.2
3/1/2010 10:40	Effluent	Metals	Silver	0.025	U	ug/L	0.025	0.1
3/1/2010 10:40	Effluent	Metals	Cadmium	0.03	U	ug/L	0.03	0.12
3/1/2010 10:40	Effluent	Metals	Magnesium	11		mg/L	0.04	0.16
3/1/2010 10:40	Effluent	Metals	Copper	2.8		ug/L	0.5	0.5
3/1/2010 10:40	Effluent	Metals	Sodium	42.3		mg/L	0.5	2
3/1/2010 10:40	Effluent	Metals	Iron	91	I	ug/L	30	120
3/1/2010 10:40	Effluent	Metals	Aluminum	60	U	ug/L	60	240
3/1/2010 10:40	Effluent	Nutrients	Specific_Conductance	536		umhos/cm	2	8
3/1/2010 10:40	Effluent	Nutrients	Ammonia-N	0.039	J	mg N/L	0.01	0.02
3/1/2010 10:40	Effluent	Nutrients	Kjeldahl Nitrogen	0.93		mg N/L	0.08	0.2
3/1/2010 10:40	Effluent	Nutrients	Total-P	0.74	A	mg P/L	0.005	0.05
3/1/2010 10:40	Effluent	Nutrients	TSS	4	U	mg/L	4	16
3/1/2010 10:40	Effluent	Nutrients	O-Phosphate-P	0.65		mg P/L	0.04	0.1
3/1/2010 10:40	Effluent	Nutrients	NO2NO3-N	10		mg N/L	0.08	0.2
3/1/2010 10:40	Effluent	Pesticides	Ametryn	0.048	U	ug/L	0.048	0.19
3/1/2010 10:40	Effluent	Pesticides	Metalaxyl	0.24	UJ	ug/L	0.24	0.96
3/1/2010 10:40	Effluent	Pesticides	Norflurazon	0.14	U	ug/L	0.14	0.56
3/1/2010 10:40	Effluent	Pesticides	Gamma-BHC	0.0096	U	ug/L	0.0096	0.038
3/1/2010 10:40	Effluent	Pesticides	Chlorpyrifos Ethyl	0.048	U	ug/L	0.048	0.19
3/1/2010 10:40	Effluent	Pesticides	Metolachlor	0.48	U	ug/L	0.48	1.9
3/1/2010 10:40	Effluent	Pesticides	Mevinphos	0.19	U	ug/L	0.19	0.76

Date Sampled	UDL	SCH Group	Component	Result		Units	MDL	PQL
3/1/2010 10:40	Effluent	Pesticides	Dieldrin	0.019	U	ug/L	0.019	0.076
3/1/2010 10:40	Effluent	Pesticides	Endrin	0.048	U	ug/L	0.048	0.19
3/1/2010 10:40	Effluent	Pesticides	Endrin Aldehyde	0.019	U	ug/L	0.019	0.076
3/1/2010 10:40	Effluent	Pesticides	Heptachlor	0.0096	U	ug/L	0.0096	0.038
3/1/2010 10:40	Effluent	Pesticides	Heptachlor Epoxide	0.019	U	ug/L	0.019	0.076
3/1/2010 10:40	Effluent	Pesticides	Atrazine	0.048	U	ug/L	0.048	0.19
3/1/2010 10:40	Effluent	Pesticides	Bromacil	0.19	U	ug/L	0.19	0.76
3/1/2010 10:40	Effluent	Pesticides	Butylate	0.19	U	ug/L	0.19	0.76
3/1/2010 10:40	Effluent	Pesticides	Ethion	0.048	U	ug/L	0.048	0.19
3/1/2010 10:40	Effluent	Pesticides	Ethoprop	0.096	U	ug/L	0.096	0.38
3/1/2010 10:40	Effluent	Pesticides	Hexazinone	0.096	U	ug/L	0.096	0.38
3/1/2010 10:40	Effluent	Pesticides	Alpha-BHC	0.0096	U	ug/L	0.0096	0.038
3/1/2010 10:40	Effluent	Pesticides	Chlordane	0.19	U	ug/L	0.19	0.76
3/1/2010 10:40	Effluent	Pesticides	DDE-p,p'	0.019	U	ug/L	0.019	0.076
3/1/2010 10:40	Effluent	Pesticides	Methoxychlor	0.048	U	ug/L	0.048	0.19
3/1/2010 10:40	Effluent	Pesticides	Chlorpyrifos Methyl	0.096	U	ug/L	0.096	0.38
3/1/2010 10:40	Effluent	Pesticides	Naled	0.77	U	ug/L	0.77	3.1
3/1/2010 10:40	Effluent	Pesticides	Parathion Methyl	0.096	U	ug/L	0.096	0.38
3/1/2010 10:40	Effluent	Pesticides	Endosulfan I	0.019	U	ug/L	0.019	0.076
3/1/2010 10:40	Effluent	Pesticides	Toxaphene	0.72	U	ug/L	0.72	2.9
3/1/2010 10:40	Effluent	Pesticides	Aldrin	0.0096	U	ug/L	0.0096	0.038
3/1/2010 10:40	Effluent	Pesticides	DDT-p,p'	0.029	U	ug/L	0.029	0.12
3/1/2010 10:40	Effluent	Pesticides	Delta-BHC	0.0096	U	ug/L	0.0096	0.038
3/1/2010 10:40	Effluent	Pesticides	Endosulfan Sulfate	0.019	U	ug/L	0.019	0.076
3/1/2010 10:40	Effluent	Pesticides	Azinphos Methyl	0.19	UJ	ug/L	0.19	0.76
3/1/2010 10:40	Effluent	Pesticides	Diazinon	0.048	U	ug/L	0.048	0.19
3/1/2010 10:40	Effluent	Pesticides	Fenamiphos	0.19	UJ	ug/L	0.19	0.76
3/1/2010 10:40	Effluent	Pesticides	Malathion	0.14	U	ug/L	0.14	0.56
3/1/2010 10:40	Effluent	Pesticides	Metribuzin	0.096	UJ	ug/L	0.096	0.38
3/1/2010 10:40	Effluent	Pesticides	Parathion Ethyl	0.14	U	ug/L	0.14	0.56
3/1/2010 10:40	Effluent	Pesticides	Simazine	0.048	U	ug/L	0.048	0.19
3/1/2010 10:40	Effluent	Pesticides	Beta-BHC	0.0096	U	ug/L	0.0096	0.038
3/1/2010 10:40	Effluent	Pesticides	DDD-p,p'	0.019	U	ug/L	0.019	0.076
3/1/2010 10:40	Effluent	Pesticides	Alachlor	0.58	U	ug/L	0.58	2.3
3/1/2010 10:40	Effluent	Pesticides	Fonofos	0.096	U	ug/L	0.096	0.38
3/1/2010 10:40	Effluent	Pesticides	Phorate	0.048	U	ug/L	0.048	0.19
3/1/2010 10:40	Effluent	Pesticides	Prometryn	0.14	U	ug/L	0.14	0.56
3/1/2010 10:40	Effluent	Pesticides	Endosulfan II	0.019	U	ug/L	0.019	0.076

Date Sampled	UDL	SCH Group	Component	Result		Units	MDL	PQL
3/1/2010 10:40	Effluent	Priority Organic Pollutants	2,4-Dichlorophenol	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Phenanthrene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Benzo(a)anthracene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Benzo(b)fluoranthene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Pyrene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	2,4-Dimethylphenol	9.8	U	ug/L	9.8	39
3/1/2010 10:40	Effluent	Priority Organic Pollutants	2,4-Dinitrotoluene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Butyl benzyl phthalate	4.9	U	ug/L	4.9	20
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Di-n-butyl phthalate	4.9	U	ug/L	4.9	20
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Diethyl phthalate	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Hexachlorobenzene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Hexachlorobutadiene	2.9	U	ug/L	2.9	12
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Nitrobenzene	2	U	ug/L	2	7.8
3/1/2010 10:40	Effluent	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	2.9	U	ug/L	2.9	12
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Anthracene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Benzo(k)fluoranthene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Di-n-octyl phthalate	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Hexachlorocyclopentadiene	2.9	U	ug/L	2.9	12
3/1/2010 10:40	Effluent	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	2	U	ug/L	2	7.8
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Phenol	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	15	U	ug/L	15	59
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Chrysene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Fluoranthene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	N-Nitrosodimethylamine	2	U	ug/L	2	7.8
3/1/2010 10:40	Effluent	Priority Organic Pollutants	2,6-Dinitrotoluene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Benzidine	98	U	ug/L	98	390
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Isophorone	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Pentachlorophenol	2.9	U	ug/L	2.9	12
3/1/2010 10:40	Effluent	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	2,4-Dinitrophenol	15	U	ug/L	15	59
3/1/2010 10:40	Effluent	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	2	U	ug/L	2	7.8
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Acenaphthene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Benzo(a)pyrene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.98	U	ug/L	0.98	3.9

Date Sampled	UDL	SCH Group	Component	Result		Units	MDL	PQL
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	2.9	U	ug/L	2.9	12
3/1/2010 10:40	Effluent	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	2.9	U	ug/L	2.9	12
3/1/2010 10:40	Effluent	Priority Organic Pollutants	2-Nitrophenol	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Acenaphthylene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Naphthalene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	2-Chloronaphthalene	0.98	UJ	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	2-Chlorophenol	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	3,3'-Dichlorobenzidine	39	U	ug/L	39	160
3/1/2010 10:40	Effluent	Priority Organic Pollutants	4-Nitrophenol	15	U	ug/L	15	59
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Dimethyl phthalate	9.8	U	ug/L	9.8	39
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Fluorene	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Priority Organic Pollutants	Hexachloroethane	2.9	U	ug/L	2.9	12
3/1/2010 10:40	Effluent	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.98	U	ug/L	0.98	3.9
3/1/2010 10:40	Effluent	Nutrients	Sample Depth	0.1		m		
3/1/2010 10:00	Effluent	Nutrients	Total Residual Chlorine	0		mg/L		
3/1/2010 10:40	Effluent	Nutrients	Dissolved Oxygen	10.18		mg/L		
3/1/2010 10:40	Effluent	Nutrients	Temperature	15.62		C		
3/1/2010 10:40	Effluent	Nutrients	pH	6.99				
3/1/2010 10:40	Effluent	Nutrients	Specific Conductance	555		umhos/cm		
3/22/2010 10:50	Control Site	AGP/LN	Algal Growth Potential	3.49		mg DryWt/L	0.3	0.9
3/22/2010 10:50	Control Site	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	3.7		ug/L	0.69	2.1
3/22/2010 10:50	Control Site	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.57	I	ug/L	0.5	1.5
3/22/2010 10:50	Control Site	Overflow	Fecal Coliforms-Membrane Filter	200		#/100 mL		
3/22/2010 10:50	Control Site	Metals	Iron	740		ug/L	30	120
3/22/2010 10:50	Control Site	Metals	Copper	0.74		ug/L	0.5	0.5
3/22/2010 10:50	Control Site	Metals	Calcium	22.8		mg/L	0.075	0.3
3/22/2010 10:50	Control Site	Metals	Arsenic	0.56	I	ug/L	0.25	1
3/22/2010 10:50	Control Site	Metals	Sodium	13.4		mg/L	0.5	2
3/22/2010 10:50	Control Site	Metals	Magnesium	2.59		mg/L	0.04	0.16
3/22/2010 10:50	Control Site	Metals	Selenium	0.24	I	ug/L	0.2	0.8
3/22/2010 10:50	Control Site	Metals	Cadmium	0.03	U	ug/L	0.03	0.12
3/22/2010 10:50	Control Site	Metals	Nickel	1.06		ug/L	0.25	1
3/22/2010 10:50	Control Site	Metals	Zinc	7.3	I	ug/L	5	20
3/22/2010 10:50	Control Site	Metals	Aluminum	510		ug/L	60	240
3/22/2010 10:50	Control Site	Metals	Silver	0.025	U	ug/L	0.025	0.1
3/22/2010 10:50	Control Site	Metals	Lead	0.52	I	ug/L	0.2	0.8

Date_Sampled	UDL	SCH_Group	Component	Result		Units	MDL	PQL
3/22/2010 10:50	Control Site	Metals	Chromium	0.78	I	ug/L	0.3	1.2
3/22/2010 10:50	Control Site	Nutrients	O-Phosphate-P	0.013		mg P/L	0.004	0.01
3/22/2010 10:50	Control Site	Nutrients	Kjeldahl Nitrogen	0.5		mg N/L	0.08	0.2
3/22/2010 10:50	Control Site	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
3/22/2010 10:50	Control Site	Nutrients	NO2NO3-N	0.037		mg N/L	0.004	0.01
3/22/2010 10:50	Control Site	Nutrients	Specific_Conductance	199		umhos/cm	2	8
3/22/2010 10:50	Control Site	Nutrients	Total-P	0.032	A	mg P/L	0.004	0.01
3/22/2010 10:50	Control Site	Nutrients	TSS	6	I	mg/L	4	16
3/22/2010 10:50	Control Site	Nutrients	Sample Depth	0.5		m		
3/22/2010 10:50	Control Site	Nutrients	Temperature	14.73		C		
3/22/2010 10:50	Control Site	Nutrients	Dissolved Oxygen	9.41		mg/L		
3/22/2010 10:50	Control Site	Nutrients	pH	6.85				
3/22/2010 10:50	Control Site	Nutrients	Specific Conductance	202		umhos/cm		
3/22/2010 10:50	Control Site	Nutrients	Sample Depth	0.3		m		
3/22/2010 10:50	Test Site	AGP/LN	Algal Growth Potential	59.6	A	mg DryWt/L	0.3	0.9
3/22/2010 10:50	Test Site	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	3		ug/L	0.69	2.1
3/22/2010 10:50	Test Site	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.5	U	ug/L	0.5	1.5
3/22/2010 10:50	Test Site	Overflow	Fecal Coliforms-Membrane Filter	230		#/100 mL		
3/22/2010 10:50	Test Site	Metals	Arsenic	0.53	I	ug/L	0.25	1
3/22/2010 10:50	Test Site	Metals	Sodium	17.8		mg/L	0.5	2
3/22/2010 10:50	Test Site	Metals	Zinc	11	I	ug/L	5	20
3/22/2010 10:50	Test Site	Metals	Magnesium	3.73		mg/L	0.04	0.16
3/22/2010 10:50	Test Site	Metals	Lead	0.71	I	ug/L	0.2	0.8
3/22/2010 10:50	Test Site	Metals	Cadmium	0.03	U	ug/L	0.03	0.12
3/22/2010 10:50	Test Site	Metals	Copper	0.94		ug/L	0.5	0.5
3/22/2010 10:50	Test Site	Metals	Silver	0.025	U	ug/L	0.025	0.1
3/22/2010 10:50	Test Site	Metals	Nickel	0.98	I	ug/L	0.25	1
3/22/2010 10:50	Test Site	Metals	Calcium	25.8		mg/L	0.075	0.3
3/22/2010 10:50	Test Site	Metals	Aluminum	560		ug/L	60	240
3/22/2010 10:50	Test Site	Metals	Selenium	0.27	I	ug/L	0.2	0.8
3/22/2010 10:50	Test Site	Metals	Iron	690		ug/L	30	120
3/22/2010 10:50	Test Site	Metals	Chromium	0.8	I	ug/L	0.3	1.2
3/22/2010 10:50	Test Site	Nutrients	O-Phosphate-P	0.071		mg P/L	0.004	0.01
3/22/2010 10:50	Test Site	Nutrients	Total-P	0.11		mg P/L	0.005	0.05
3/22/2010 10:50	Test Site	Nutrients	Kjeldahl Nitrogen	0.58		mg N/L	0.08	0.2
3/22/2010 10:50	Test Site	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
3/22/2010 10:50	Test Site	Nutrients	Specific_Conductance	239		umhos/cm	2	8
3/22/2010 10:50	Test Site	Nutrients	TSS	11	I	mg/L	4	16

Date_Sampled	UDL	SCH_Group	Component	Result	Units	MDL	PQL
3/22/2010 10:50	Test Site	Nutrients	NO2NO3-N	1.2	mg N/L	0.04	0.1
3/22/2010 10:50	Test Site	Nutrients	Sample Depth	0.3	m		
3/22/2010 10:50	Test Site	Nutrients	pH	6.92			
3/22/2010 10:50	Test Site	Nutrients	Sample Depth	0.4	m		
3/22/2010 10:50	Test Site	Nutrients	Specific Conductance	232	umhos/cm		
3/22/2010 10:50	Test Site	Nutrients	Dissolved Oxygen	9.45	mg/L		
3/22/2010 10:50	Test Site	Nutrients	Temperature	15.04	C		

Appendix F

Toxicological results

FDEP Biology Laboratory - Chronic Screen Bench Sheet

Ceriodaphnia dubia

Facility: STARKE wastewater treatment facility
Address: 602 Edwards Road Starke
County: Bradford 32091
NPDES Permit #: FL 0128126
Contact/District: Eesa ali / Northeast

LIMS entry: 3-16-10 MF verified: BA 3.16.10

Diluent/Batch: 20% DMW /2230 Test Days Used: 0-3
20% DMW /3240 Test Days Used: 4-5

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

Organism: *Ceriodaphnia dubia*
Organism Batch #: 4.10
Organism age: 24 hours
Feeding: Prior to Test and Daily
Food: ☑ YCT ☑ *P. subcapitata*
Food Batch: 10-30-09 12-23-09
Chamber size : 30 ml
Sample volume : 20 ml

Sample Received	LAB Sample #	LIMS JOB #	LIMS SAMPLE #	Collection Date/Time	Received Date/Time
Test Day 0	1	TLH-2010-03-02-21	1252718	3.1.10 10:10.	3-2-10 1019
Test Day 2	2	TLH-2010-03-04-68	1254041	3-3-10 1000	3-4-10 1144
Test Day 4	3	TLH-2010-03-05-32	1255023	3-4-10 1044	3-5-10 1500

Batch #	2-23-10	3-2-10	NA	NA	NA			
Water Quality Parameters	20% DMW	20% DMW	Sample 1	Sample 2	Sample 3	Other:	Measured By:	Verified by:
Field Total Residual Cl_2 (mg/L):	NA	NA	0.00	Ø	Ø		Eesa ali Shimmy Lily	MF
Lab Total Residual Cl_2 (mg/L):	<0.03	<0.03	<0.03	<0.03	<0.03		BA	
Alkalinity (mg/L as $CaCO_3$):	97	78	124	143	139		CF	
Hardness (mg/L as $CaCO_3$):	85	85	150	166	156		CF	
Total Ammonia (mg/L as N):	<0.017	<0.017	<0.017	<0.017	<0.017		MF	
Conductivity: (umhos) mmhos:	185	181	558	530	535		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. 25.4 max. 27.6 mean 26.5
Room B246 min. 24.5 max. 26.1 mean 25.3
Test min.____ max.____ mean____

Loaded by:

Test Replicates	Loaded from culture vial
1	B9
2	A17
3	A22
4	A5
5	A12
6	B21
7	B26
8	B8
9	B15
10	A1

Results	
Control % CV:	21.8%
Dunnetts PMSD:	20.3%
Reproduction NOEC:	100%
Reproduction LOEC:	—
Survival NOEC:	100%
Survival LOEC:	—
ICP_{20}:	>100%
ICP_{25}:	>100%

Investigators' signatures
Marshall Faircloth
Bree Alexander
James Daniels
Chelsea French
Liz Miller
REVIEWER

Comments:

Test Page 1 of 4 PAGE 00 05 Revised 07/15/2008 MF

FDEP Biology Laboratory - Chronic Screen Bench Sheet

Ceriodaphnia dubia Survival and Reproduction

SOP TA07_05

Facility: STARKE WWTF

LIMS Sample # 1252718 for lab sample 1

Start Date: 3-2-10 Time: 1255

End Date: 3-8-10 Time: 14:30

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	6	4	3	0	0	0	0	0	0	0	13	10	1.3
	4	0	0	0	6	4	6	4	4	4	5	33	10	3.3
	5	11	10	10	8	11	10	8	12	10	10	100	10	10.0
	6	5	19	17	0	18	15	13	15	17	11	130	10	13.0
	7													
	8													
	Total	22	33	30	14	33	31	25	31	31	26	276	10	27.6

Conc.	Day	Replicate Number 1	2	3	4	5	6	7	8	9	10	Total Neonates	Surviving adults	Neonates per adult
100% sample	0*												10	
	1												10	
	2	0	0	0	0	0	0	0	0	0	0	0	10	0
	3	0	5	6	0	0	0	0	0	0	0	11	10	1.1
	4	5	0	0	8	4	0	6	6	6	6	41	10	4.1
	5	0	3	7	3	14	12	5	14	6	11	75	10	7.5
	6	16	17	19	0	0	17	8	9	0	18	104	10	10.4
	7													
	8													
	Total	21	25	32	11	18	29	19	29	12	35	231	10	23.1

Organisms loaded by: MF

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

Concentration	Mean neonates /adult	% survival
Control	27.6	100
100%	23.1	100

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

revised 7/15/2008 MF

Comments:

00 06

FDEP Biology Laboratory - Chronic Screen Bench Sheet

Ceriodaphnia dubia Parameters

Facility: STARKE SOP TA07_05

LIMS Sample #: 1252718 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	8.1	24.1	7.8	183					
	1	100%	M	7.8	24.9	7.9	558					
	Measured by:			MF	MF	MF	MF					
	Recorded by:			MF	MF	MF	MF					
Day 1	sample:	Control	M	8.2	24.0	8.2	181	M	8.1	24.0	7.6	207
	1	100%	M	8.4	24.3	8.1	551	M	8.3	24.0	7.7	552
	Measured by:			BA	BA	BA	BA		BA	BA	BA	BA
	Recorded by:			BA	BA	BA	BA		BA	BA	BA	BA
Day 2	sample:	Control	M	8.1	24.3	7.3	176	M	8.2	24.4	7.3	187
	2	100%	M	8.0	25.7	7.2	530	M	8.3	24.5	7.4	550
	Measured by:			BA	MF	BA	BA		BA	MF	BA	BA
	Recorded by:			BA	MF	BA	BA		BA	MF	BA	BA
Day 3	sample:	Control	M	8.1	24.0	7.3	178	M	8.1	24.0	7.1	194
	2	100%	M	7.7	24.5	7.4	538	M	8.2	24.0	7.0	548
	Measured by:			BA	BA	BA	BA		BA	BA	BA	BA
	Recorded by:			BA	BA	BA	BA		BA	BA	BA	BA
Day 4	sample:	Control	M	8.2	24.3	7.6	185	M	8.2	24.2	7.6	198
	3	100%	M	8.1	24.2	7.6	535	M	8.3	24.4	7.6	542
	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	8.2	24.0	7.6	171	M	8.2	24.2	7.0	181
	3	100%	M	7.9	24.0	8.1	528	M	8.4	24.0	7.3	511
	Measured by:			BA	BA	BA	BA		BA	BA	BA	BA
	Recorded by:			BA	BA	BA	BA		BA	BA	BA	BA
Day 6	sample:	Control	M					M	8.0	24.1	7.5	185
	3	100%	M	Not Renewed				M	8.2	24.6	7.5	552
	Measured by:								BA	BA	BA	BA
	Recorded by:								BA	BA	BA	BA
Day 7	sample:	Control	M					M				
	3		M					M				
	Measured by:											
	Recorded by:											
Day 8	sample:	Control						M				
	3							M				
	Measured by:											
	Recorded by:											

Comments:

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

FDEP Biology Laboratory - Bioassay Instrument Identification

Test ID: STARKE WWTF Dates: 3-2-10 — 3-8-10

METER / DEVICE	ID	SOP	Parameter	Method	v used
YSI Model 58 Dissolved Oxygen Meter	90H018262	TA06_04	Dissolved Oxygen	SM 4500 O G	✓
Accumet AR-10 pH Meter	93312105	TA06_23	pH	SM 4500 H^+	✓
Mettler-Toledo SevenMulti Conductivity Meter	SN 1225117049 Probe H04257	TA06_25	Conductivity Salinity	SM 2510 B SM 2520 B	✓
Denver Model 225 ISE with ammonia probe	SN K01377	TA06_17	Ammonia	SM 4500 NH3 F	✓
Thermometer (DO probe)	YSI 5750 SN 05J1720	TA06_05	Temperature	SM-2530B modified DEP SOP-001/01 FT1400	✓
Hach Pocket Colorimeter II	05050C026378	TA06_22	Total Residual Chlorine	EPA 330.5 SM 4500 CL G	✓
Alkalinity (Hach Kit)	No SN	TA06_08	Alkalinity	SM 2320 B	✓
Hardness (Hach Kit)	No SN	TA06_09	Hardness	SM 2340 C	✓
OHAUS Balance 250D	1125481084	TA06_21 TA06_27	Weight	-	
S-Weights	BIO-S-WEIGHTS-01	NA	Balance check	-	

SM-2530B modified to allow use electronic and non-mercury filled thermometers.
Insert other device information in blank spaces(if used). Test ID = Facility or SRTs (acute SRT--Chronic SRT)

Comments: Entered by: MF 3/10/10

V 1.4 8/21/08 BA Page 4 of 4 MP

FDEP Biology Laboratory - Chronic Bioassay Bench Sheet

Pimphales promelas or Menidia beryllina

Facility: Stark wastewater treatment Facility
Address: 602 Edwards Road Starke
County: Bradford 32091
NPDES Permit #: FL 0028126
Contact/District: Eesa Ali / Northeast

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

Start Date: 3-2-10 Time: 1330
End Date: 3-9-10 Time: 1000

Diluent/ Batch:
MHW / 2.26.10 Test Days Used: 0-7
MHW / _____ Test Days Used: _____
ASW / _____ Test Days Used: _____
ASW / _____ Test Days Used: _____

Organism Batch # : 3-2-10
Feeding Prior to Test and Daily
Artemia Lot # : 23613
Chamber size : 1000 ml
Test volume : 500 ml

Organism age: ~~48 hrs~~ ~~days~~

Artemia Batch #		Day 3	43-10
Day 0	40-10	Day 4	44-10
Day 1	41-10	Day 5	45-10
Day 2	42-10	Day 6	46-10

LIMS:	Date	Initials
Entry:	3-12-10	MF
Verification:	3.16.10	BA

Sample Received	Lab Sample #	LIMS Job #	LIMS Sample #	Collection Date/Time	Received Date/Time
Test Day 0	1	TLH- 2010-03-02-21	1252718	3-01-10 1010	3-2-10 1019
Test Day 2	2	TLH- 2010-03-04-68	1254041	3-3-10 1000 MF/BA	3-4-10 1144
Test Day 4	3	TLH- 2010-03-05-32	1255023	3-4-10 1049 MF/BA	3-5-10 1500

Water Quality Parameters	Batch # 2.26.10 [X] MHW [ ] ASW	[ ] MHW [ ] ASW	NA Sample 1	NA Sample 2	NA Sample 3	Other:	Measured by:	Verified by:
Field Total Residual Cl_2 (mg/L):	NA	NA	0.00	0	0		Eesa Ali, Shannon Ivey, Hunter Hall	MF
Lab Total Residual Cl_2 (mg/L):	<0.03		<0.03	<0.03	<0.03		BA	BA
Alkalinity (mg/L as $CaCO_3$):	74		124	143	131		CF/BA	BA
Hardness (mg/L as $CaCO_3$):	94		150	166	156		CF/BA	BA
Total Ammonia (mg/L as N):	<0.017		<0.017	<0.017	<0.017		MF	BA
Conductivity: µmhos mmhos:	342		556	544	520		CF	BA
Salinity (ppth):	—		—	—	—		—	—

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

Temperature Range °C: (if used)
Incubator # 2 min. 25.4 max. 27.6 mean 26.5
Water bath # ____ min. _____ max. _____ mean _____
Room B246 min. 24.5 max. 26.1 mean 25.3

Test Incubated in: [✓] Incubator #: 2
[ ] Waterbath #: ____

Investigators' signatures
James Daniel
Marshall Faircloth
Chelsea French
Brett Alexander

REVIEWER: Loretta Wolfe

Statistics	
Control %cv:	11.06%
Dunnetts PMSD:	15.4%
Survival NOEC:	100%
Survival LOEC:	—
Growth NOEC:	100%
Growth LOEC:	—

Comments:

revised 7/15/08 MF

FDEP Biology Laboratory - Chronic Screen Bench Sheet

Pimphales promelas or Menidia beryllina Survival

Facility: Starke WWTF

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

LIMS Sample Number: 1252718 for lab sample #1

Start Date: 3-2-10 Time: 1330
End Date: 3-9-10 Time: 1000

		TEST DAY							
Concentration	Replicate	0	1	2	3	4	5	6	7
Control	A	10	10	10	10	8 20	8	8	8
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
100 % sample concentration	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
Control	A	10							
	B	10							
	C	10							
	D	10							
% sample concentration	A	10							
	B	10							
	C	10							
	D	10							
Loaded by: [illegible]	Checked by:		[illegible]	[illegible]	[illegible]	BA	[illegible]	[illegible]	[illegible]
Verified by: CF									

Comments:

Biology Laboratory Chronic Screening Bioassay Benchsheet

Parameters

P. promelas SOP TA-07_09 *M. beryllina* SOP TA-07_14

Sample Source: Starke WWTF

LIMS Sample #: 1252718 (for Lab sample #1)

Test Day ↓		Conc.	Old Sample: Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Cond (µmhos/cm) (mmhos/cm)	Salinity ppth	New Sample: Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Cond (µmhos/cm) (mmhos/cm)	Salinity ppth
Day 0	sample:	Control							A	8.0	24.1	7.8	342	—
	1	100%							A	7.7	24.0	7.8	556	—
	Measured by:									CF	CF	CF	CF	CF
	Recorded by:									CF	CF	CF	CF	CF
Day 1	sample:	Control	B	8.0	24.3	7.6	352	—	B	8.1	24.1	8.3	384	—
	1	100%	B	8.1	25.2	7.6	564	—	B	8.3	24.0	8.2	561	—
	Measured by:			CF	[illegible]	CF	CF	—		CF	CF	CF	CF	—
	Recorded by:			CF	[illegible]	CF	CF	—		CF	CF	CF	CF	—
Day 2	sample:	Control	C	7.7	25.6	6.7	340	—	C	7.9	24.0	7.3	351	—
	2	100%	C	8.1	25.4	7.0	543	—	C	8.0	24.0	7.2	544	—
	Measured by:			CF	[illegible]	CF	CF	CF		CF	CF	CF	CF	—
	Recorded by:			CF	[illegible]	CF	CF	CF		CF	CF	CF	CF	—
Day 3	sample:	Control	D	7.9	24.5	7.0	359	—	D	8.0	24.1	7.1	359	—
	2	100%	D	8.0	24.7	6.7	564	—	D	7.6	24.0	7.6	562	—
	Measured by:			[illegible]	[illegible]	[illegible]	[illegible]	—		[illegible]	[illegible]	[illegible]	[illegible]	—
	Recorded by:			[illegible]	[illegible]	[illegible]	[illegible]	—		[illegible]	[illegible]	[illegible]	[illegible]	—
Day 4	sample:	Control	A	7.6	25.4	6.5	335	—	A	7.8	24.4	6.9	327	—
	3	100%	A	7.7	25.5	6.3	542	—	A	7.7	25.3	6.6	520	—
	Measured by:			BA	BA	BA	BA	—		BA	BA	BA	BA	—
	Recorded by:			BA	BA	BA	BA	—		BA	BA	BA	BA	—
Day 5	sample:	Control	B	7.7	24.0	7.1	333	—	B	8.0	24.5	7.2	352	—
	3	100%	B	7.8	24.6	7.0	521	—	B	7.7	24.6	7.9	504	—
	Measured by:			[illegible]	[illegible]	[illegible]	[illegible]	—		[illegible]	[illegible]	[illegible]	[illegible]	—
	Recorded by:			[illegible]	[illegible]	[illegible]	[illegible]	—		[illegible]	[illegible]	[illegible]	[illegible]	—
Day 6	sample:	Control	C	7.8	25.8	6.4	351	—	C	7.9	24.0	7.3	345	—
	3	100%	C	7.8	25.7	6.4	515	—	C	7.7	24.0	7.8	514	—
	Measured by:			[illegible]	[illegible]	[illegible]	[illegible]	—		[illegible]	[illegible]	[illegible]	[illegible]	—
	Recorded by:			[illegible]	[illegible]	[illegible]	[illegible]	—		[illegible]	[illegible]	[illegible]	[illegible]	—
Day 7	sample:	Control	D	7.7	25.1	7.2	344	—						
	3	100%	D	7.8	25.9	6.9	526	—						
	Measured by:			[illegible]	[illegible]	[illegible]	[illegible]	—						
	Recorded by:			[illegible]	[illegible]	[illegible]	[illegible]	—						

Test Rep. = Replicate Record Salinity < 1 if freshwater Circle µmhos-cm or mmhos-cm

Comments:

revised 7/15/08 mf

FDEP Biology Laboratory - Chronic Screen Bench Sheet

Facility: Starke WWTF

LIMS Sample Number: B52718 for lab sample #1

Concentration	Replicate	Pan #	Pan wt. (g)	Pan + Fish (g)	Fish wt. (g)	Original # Fish	Mean wt. (mg)
			mean wt = fish wt divided by 10 convert g to mg: move decimal 3 places to right				
Control	A	51	0.02105	0.02551	0.00446	10	.446
	B	52	0.02022	0.02592	0.00570	10	.570
	C	53	0.02208	0.02765	0.00557	10	.557
	D	54	0.02067	0.02629	0.00562	10	.562
100 % sample	A	55	0.02246	0.02723	0.00477	10	.477
	B	56	0.02257	0.02702	0.00445	10	.445
	C	57	0.01961	0.02539	0.00578	10	.578
	D	58	0.02206	0.02749	0.00543	10	.543
Control	A					10	
	B					10	
	C					10	
	D					10	
% sample	A					10	
	B					10	
	C					10	
	D					10	
	Weighed by initials:		CF	JD			

	%CV	PMSD
Control	NA	NA

Growth	Table	Calculated	dF
T-test	1.94300	0.54443	6
Survival	1.94300	-0.34655	6

Drying WWR #2	
Temperature °C:	100
Hours:	8

S-weight ID: BIO-S-WEIGHTS-01

Balance ID: OHAUS 250D SER. 1125481084

Tare Weighing Date: 3,8,10 Final Weighing Date: 3,12,10

				Measured Value (g)		S-weight Value (g)
Tare Pan 1 after Pan 5 (g)	0.02101 @	0.02105	S-weights	0.01001	@	JD ~~0.03~~ 0.01
Tare Pan 1 after Pan 8 (g)	0.02101 @	0.02105	at tare	JD ~~0.01~~ 0.03	@	0.03
Final Pan 1 after Pan 5 (g)	0.02555 @	0.02551	S-weights	0.00999	@	JD ~~0.05~~ 0.01
Final Pan 1 after Pan 8 (g)	0.02556 @	0.02551	at final	JD ~~0.01~~ 0.05	@	0.05

Comments:

Bioassay Instrument ID

Test ID: STARKE WWTF Dates: 2-2-2010 — 3-9-2010

METER / DEVICE	ID	SOP	Parameter	Method	√used
YSI Model 58 Dissolved Oxygen Meter	90H018262	TA06_04	Dissolved Oxygen	SM 4500 O G	✓
Accumet AR-10 pH Meter	93312105	TA06_23	pH	SM 4500 H+	✓
Mettler-Toledo SevenMulti Conductivity Meter	SN 1225117049 Probe H04257	TA06_25	Conductivity	SM 2510 B	✓
			Salinity	SM 2520 B	✓
Denver Model 225 ISE with ammonia probe	SN K01377	TA06_17	Ammonia	SM 4500 NH3 F	✓
Thermometer (DO probe)	YSI 5750 SN 05J1720	TA06_05	Temperature	SM-2530B modified DEP SOP-001/01 FT1400	✓
Hach Pocket Colorimeter II	05050C026378	TA06_22	Total Residual Chlorine	EPA 330.5 SM 4500 CL G	✓
Alkalinity (Hach Kit)	No SN	TA06_08	Alkalinity	SM 2320 B	✓
Hardness (Hach Kit)	No SN	TA06_09	Hardness	SM 2340 C	✓
OHAUS Balance 250D	1125481084	TA06_21 TA06_27	Weight	-	✓
S-Weights	BIO-S-WEIGHTS-01	NA	Balance check	-	✓
VWR # 2 Daytop pump					✓

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 MF 3-12-10

V 1.1 6/12/08 MF

Appendix G

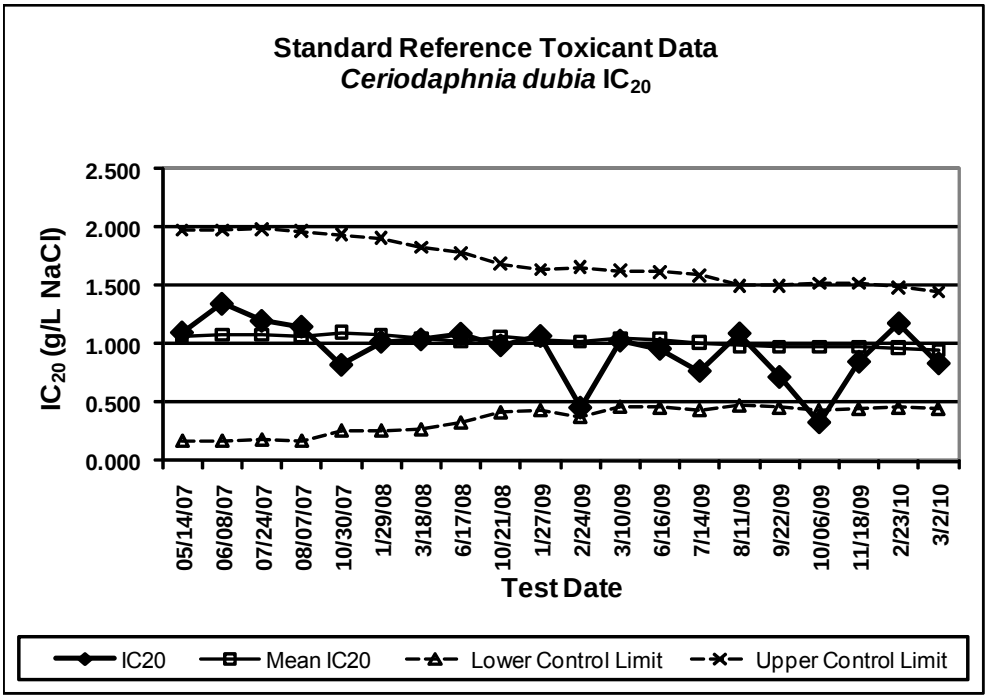
Standard Reference Toxicant Data

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	IC20	Mean IC20	Std Dev	Lower Control Limit	Upper Control Limit
05/14/07	1.100	1.07	0.45	0.17	1.98
06/08/07	1.347	1.08	0.45	0.17	1.98
07/24/07	1.200	1.08	0.45	0.18	1.99
08/07/07	1.150	1.07	0.45	0.17	1.97
10/30/07	0.821	1.10	0.42	0.26	1.94
1/29/08	1.020	1.08	0.41	0.26	1.91
3/18/08	1.040	1.05	0.39	0.27	1.83
6/17/08	1.090	1.02	0.36	0.33	1.78
10/21/08	0.989	1.06	0.32	0.42	1.69
1/27/09	1.070	1.04	0.30	0.44	1.64
2/24/09	0.452	1.02	0.32	0.38	1.66
3/10/09	1.030	1.05	0.29	0.47	1.63
6/16/09	0.960	1.04	0.29	0.46	1.62
7/14/09	0.768	1.01	0.29	0.44	1.59
8/11/09	1.093	0.99	0.26	0.48	1.50
9/22/09	0.716	0.98	0.26	0.46	1.50
10/06/09	0.325	0.98	0.27	0.44	1.52
11/18/09	0.848	0.98	0.27	0.45	1.52
2/23/10	1.180	0.97	0.26	0.46	1.49
3/2/10	0.834	0.95	0.25	0.45	1.45

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



FDEP Biology Laboratory - Acute SRT Bench Sheet

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

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

Test Type: ☐ non-renewal ☒ renewal

Test Page 1 of 2

Diluent/ Batch #: 2mm / 3-1-10
Toxicant/ Batch#: NaCl / 13-7-10
Organism Batch: 510 **Age:** <24hr
Test Beginning: Date: 3-9-10 Time: 12:40
Test Ending: Date: 3-13-10 Time: 0900

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	<0.03	TA06_22	BA
Alkalinity (mg/L as $CaCO_3$):	78	TA06_08	CF
Hardness (mg.L as $CaCO_3$):	38385	TA06_09	CF
Total Ammonia (mg/L as N):	<0.017	TA06_17	MF
Conductivity ~~µmhos~~ ~~mmhos~~:	0.171	TA06_25	BA
(A) Salinity (ppth):	—	TA06_25	—

Food:		Batch
☒	YCT	10-30-09
☒	*P. subcapitata*	11-9-09
☐	Artemia Lot #	

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

Chamber size: 30 mL
Test volume: 120 mL per replicate

Concentrations prepared by: BA
Test Incubated in: Incubator # 2 Waterbath # ____
Light Intensity: 50-100 Ft. candles
Photoperiod: 16 hours Light / 8 hours dark

Temperature Range °C:(if used)
Incubator # 2 min 26.5 max 27.9 mean 27.2
Waterbath # ___ min. ____ max. ____ mean ____
Room B246 min. 25.2 max. 26.0 mean 25.6

Feeding: √as needed
√ Before test
☐ 0 hr
☐ 24 hr
√ 48 hr
☐ 72 hr

all species 2 hrs prior to test
mysids daily
all species except *H. azteca* 2 hr prior to renewal
H. azteca 0 hr and 48 hr

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

Concentration µg/L mg/L (G/L)	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Control	A	A	5	5	5	5	5	5
	B	B	5	5	5	5	5	5
	C	C	5	5	5	5	5	5
	D	D	5	5	5	5	5	5
1.5	A	A	5	5	5	5	5	5
	B	B	5	5	5	5	5	5
	C	C	5	5	5	5	4 1D	4
	D	D	5	5	5	5	5	5
2.0	A	A	5	5	5	5	5	4 1D
	B	B	5	5	5	5	5	4 1D
	C	C	5	5	2 3D	2	1 1D	1
	D	D	5	5	4 1D	4	4	3 1D
2.5	A	A	5	5	0 4D	0	—	—
	B	B	5	5	1 4D	1	1	0 1D
	C	C	5	4 1D	1 3D	1	0 1D	—
	D	D	5	5	0 5D	0	—	—
3.0	A	A	5	4 1D	0 4D	—	—	—
	B	B	5	5	0 5D	—	—	—
	C	C	5	2 3D	0 3D	—	—	—
	D	D	5	3 2D	0 3D	—	—	—
4.0	A	A	5	0 4D	—	—	—	—
	B	B	5	1 4D	0 1D	—	—	—
	C	C	5	2 3D	0 2D	—	—	—
	D	D	5	0 3D	—	—	—	—
Organisms loaded by: BA		Checked by: BA	BA		BA	BA	BA	MF
Loading Verified by: ~~BA~~								

AR = after renewal
m = missing d = dead BR = before renewal hr = hour

Comments: (A) Transcription error BA

Investigators' Signatures
Bruce Alexander
Marshall Faircloth
Jason Daniel
Chelsea French
Reviewer: Walter Wolfe

Method: TSK

Statistics: LC50	95% confidence intervals Lower	Upper
48 hour: 2.168	1.056	2.287
96 hour: ~~1.013~~ 1.013	1.389	2.196

Revised 7/15/2008 mf

FDEP Biology Laboratory - Acute SRT Bench Sheet

0-96 hour parameters

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

Test Page ___2___ of ___2___

Test Organism: (check one)

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

Test Beginning: Date: 3-9-10 Time: 12 40

Test Ending: Date: 3-13-10 Time: 0900

Test Type: ☐ non-renewal ☒ renewal

hr = hour AR = after renewal BR = before renewal

Concentration µg/L mg/L g/L	Replicate	Test Hour	pH (SU)	Temperature (° C)	Dissolved Oxygen (mg/L)	Conductivity ☐ µmhos ☒ mmhos	Salinity (ppth)
Control	M	0 hr	8.0	24.5	7.2	0.171	—
	—	24 hr	—	—	—	—	—
	A	48 hr BR	8.0	24.0	7.1	0.206	—
	M	48 hr AR	8.0	24.6	6.9	0.177	—
	—	72 hr	—	—	—	—	—
	A	96 hr	8.1	24.7	7.4	0.178	—
1.5	M	0 hr	8.1	24.8	7.3	2.93	—
	—	24 hr	—	—	—	—	—
	A	48 hr BR	8.1	24.0	7.2	3.43	—
	M	48 hr AR	8.0	25.2	6.9	3.05	—
	—	72 hr	—	—	—	—	—
	A	96 hr	8.1	24.3	7.6	3.30	—
2.0	M	0 hr	8.1	24.8	7.4	3.80	—
	—	24 hr	—	—	—	—	—
	A	48 hr BR	8.1	24.0	7.3	4.45	—
	M	48 hr AR	8.0	25.3	7.0	3.98	—
	—	72 hr	—	—	—	—	—
	A	96 hr	8.1	24.0	7.7	4.49	—
2.5	M	0 hr	8.1	24.7	7.3	4.65	—
	—	24 hr	—	—	—	—	—
	A	48 hr BR	8.1	24.0	7.3	5.46	—
	M	48 hr AR	8.1	25.3	7.0	4.84	—
	—	72 hr	—	—	—	—	—
	A	96 hr	8.1	24.4	7.7	5.03	—
3.0	M	0 hr	8.1	25.2	7.4	5.59	—
	—	24 hr	—	—	—	—	—
	A	48 hr BR	8.1	24.0	7.4	6.39	—
	M	48 hr AR	8.1	25.0	7.0	5.74	—
	—	72 hr	—	—	—	—	—
	—	96 hr	—	—	—	—	—
4.0	M	0 hr	8.0	24.3	7.4	7.28	—
	—	24 hr	—	—	—	—	—
	A	48 hr BR	8.1	24.0	6.9	9.58	—
	—	48 hr AR	—	—	—	—	—
	—	72 hr	—	—	—	—	—
	—	96 hr	—	—	—	—	—

Investigators Signatures

Marshall Faircloth

John Prosser

Jenna Frank

Bryce Alexander

Chelsea Frank

Reviewed By: Loretta Wolfe

Measured by:

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

Measure/record salinity for marine tests

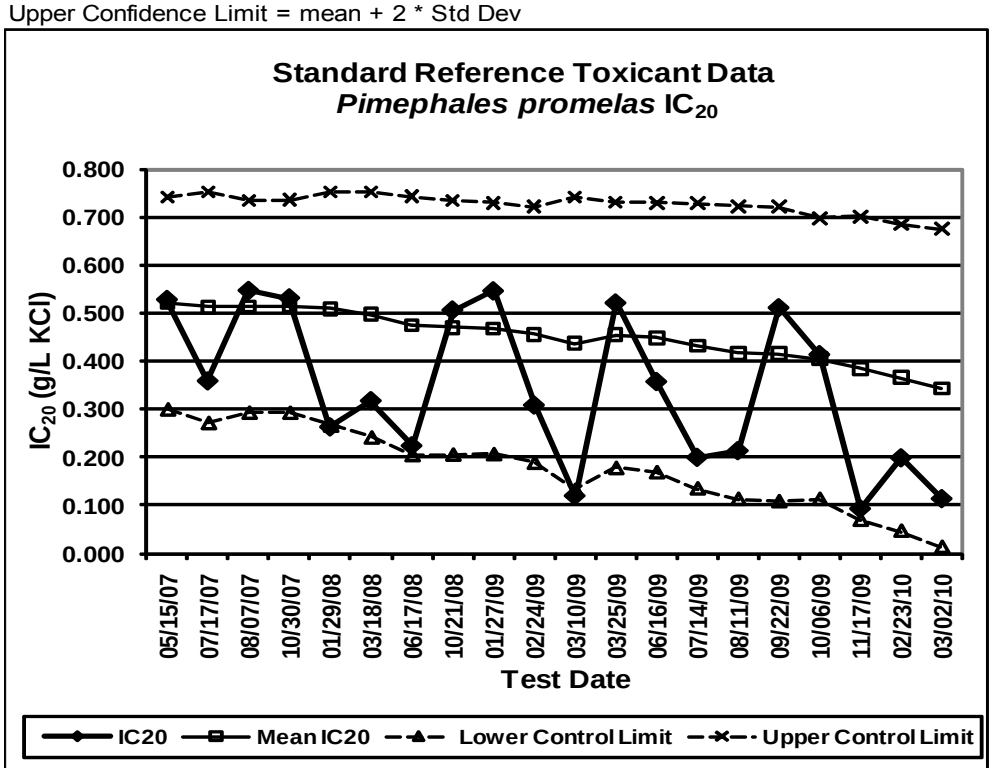
Comments:

Revised 07/15/2008 MF

Florida Department of Environmental Protection
Bureau of Laboratories
Standard Reference Toxicant (SRT) Test Data - 7-Day Chronic Toxicity
Pimephales promelas (fathead minnow) - Potassium Chloride (KCl)

Date	IC20	Mean IC20	Std Dev	Lower Control Limit	Upper Control Limit
05/15/07	0.528	0.521	0.11	0.301	0.741
07/17/07	0.358	0.513	0.12	0.273	0.753
08/07/07	0.547	0.514	0.11	0.294	0.734
10/30/07	0.531	0.515	0.11	0.294	0.736
01/29/08	0.263	0.509	0.12	0.267	0.752
03/18/08	0.317	0.497	0.13	0.242	0.752
06/17/08	0.223	0.474	0.13	0.205	0.743
10/21/08	0.506	0.470	0.13	0.206	0.734
01/27/09	0.546	0.468	0.13	0.207	0.729
02/24/09	0.308	0.455	0.13	0.189	0.721
03/10/09	0.119	0.437	0.15	0.132	0.741
03/25/09	0.521	0.455	0.14	0.178	0.731
06/16/09	0.357	0.449	0.14	0.169	0.729
07/14/09	0.199	0.432	0.15	0.135	0.728
08/11/09	0.213	0.417	0.15	0.113	0.722
09/22/09	0.511	0.415	0.15	0.108	0.721
10/06/09	0.413	0.405	0.15	0.113	0.698
11/17/09	0.092	0.385	0.16	0.069	0.701
02/23/10	0.198	0.365	0.16	0.046	0.685
03/02/10	0.113	0.343	0.02	0.012	0.675

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



FDEP Biology Laboratory - Acute SRT Bench Sheet

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

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

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

Diluent/ Batch #: MHW 1.3.9.10
Toxicant/ Batch#: NaCl 1.3.8.10
Organism Batch: 3.9.10
Age: 8 days
Test Beginning: Date: 3-13-10 Time: 1330
Test Ending: Date: 3-13-10 Time: 0850

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	0.03	TA06_22	BA
Alkalinity (mg/L as $CaCO_3$):	74	TA06_08	BA
Hardness (mg.L as $CaCO_3$):	90	TA06_09	BA
Total Ammonia (mg/L as N):	0.017	TA06_17	MF
Conductivity: µmhos (mmhos)	0.35	TA06_25	JV
Salinity (ppth):	—	TA06_25	—

Food:	Batch
☐ YCT	
☐ *P. subcapitata*	
☒ Artemia Lot # 2563	

Artemia Batch:
0 hr: 47.10
24 hr:
48 hr: 49.10
72 hr:

Chamber size: 1000 mL
Test volume: 500 mL per replicate

Concentrations prepared by: JV JV
Temperature Range °C:(if used)
Test Incubated in: Incubator # 2 Waterbath # ____ Incubator # 2 min. 26.5 max. 27.6 mean 26.7
Light Intensity: 50-100 Ft. candles Waterbath # ___ min. ____ max. ____ mean ____
Photoperiod: 16 hours Light / 8 hours dark Room B246 min. 25.2 max. 26.0 mean 25.6

Feeding: √as needed
☒ Before test
☐ 0 hr
☐ 24 hr
☑ 48 hr
☐ 72 hr

all species 2 hrs prior to test
mysids daily
all species except *H. azteca* 2 hr prior to renewal
H. azteca 0 hr and 48 hr

Concentration µg/L mg/L (circle)	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Control	A	A12	10	10	10	10	10	10
	B	A13	10	10	10	10	10	10
6	A	A14	10	10	10	10	6 2D	8
	B	A15	10	10	10	10	9 1D	8 1D
7	A	A16	10	10	10	10	7 3D	7
	B	A17	10	8 2D	7 1D	7	4 3D	4
8	A	A18	10	6 4D	2 4D	2	0 3D	—
	B	A19	10	6 4D	1 5D	1	1	1
9	A	A20	10	1 9D	0 10	—	—	—
	B	A21	10	1 9D	0 1D	—	—	—
10	A	A22	10	0 10D	—	—	—	—
	B	A23	10	0 10D	—	—	—	—
Organisms loaded by: JV	Checked by:		JV	JV	JV	JV	BA	MF
Loading Verified by: BA								

AR = after renewal
m = missing d = dead BR = before renewal hr = hour

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

Investigators' Signatures
Jaime Daniels
Marshall Faircloth
Brett Alexander
Reviewer: Loretta Wolfe

Comments:

Statistics: LC50	Method: TSK	95% confidence intervals Lower	Upper
48 hour:	7.463	7.239	7.694
96 hour:	6.966	6.585	7.369

Revised 7/15/2008 mf

FDEP Biology Laboratory - Acute SRT Bench Sheet

0-96 hour parameters

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

Test Page 2 of 2

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

Test Beginning: Date: 3-9-10 Time: 13:30

Test Ending: Date: 3-13-10 Time: 0850

Test Type: ☐ non-renewal ☒ renewal

hr = hour AR = after renewal BR = before renewal

Concentration µg/L mg/L g/L	Replicate	Test Hour	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity ☐ µmhos ☒ mmhos	Salinity (ppth)
Control	A	0 hr	8.2	24.0	7.4	0.315	—
	B	24 hr	7.9	24.8	7.2	0.343	—
	A	48 hr BR	7.9	25.4	7.1	0.371	—
	A	48 hr AR	8.1	24.0	7.5	0.556	—
	B	72 hr	7.7	24.3	6.4	0.601	—
	A	96 hr	8.1	25.2	7.6	0.348	
6	A	0 hr	8.0	24.9	7.1	11.10	—
	B	24 hr	7.8	24.8	6.9	11.21	—
	A	48 hr BR	7.7	25.2	6.9	11.3	—
	A	48 hr AR	7.9	24.4	7.1	11.26	—
	B	72 hr	7.5	24.6	6.5	11.4	—
	A	96 hr	7.7	25.2	7.2	11.7	
7	A	0 hr	8.0	25.2	7.2	12.81	—
	B	24 hr	7.8	24.8	6.9	13.10	—
	A	48 hr BR	7.8	25.1	7.0	13.2	—
	A	48 hr AR	7.9	24.5	7.0	13.03	—
	B	72 hr	7.6	24.7	6.7	13.1	—
	A	96 hr	7.9	25.1	7.0	13.3	
8	A	0 hr	8.0	25.3	7.1	14.51	—
	B	24 hr	7.8	24.9	6.9	14.76	—
	A	48 hr BR	7.8	25.0	7.0	15.1	—
	A	48 hr AR	7.9	24.5	7.1	14.33	—
	B	72 hr	7.9	24.8	6.8	14.5	—
	B	96 hr	7.8	24.8	7.0	14.8	
9	A	0 hr	8.0	25.3	7.2	16.13	—
	B	24 hr	7.7	24.8	6.6	16.37	—
	A	48 hr BR	7.8	24.8	7.2	17.0	—
	—	48 hr AR	—	—	—	—	—
	—	72 hr	—	—	—	—	—
	—	96 hr	—	—	—	—	—
10	A	0 hr	8.0	25.5	7.2	17.73	—
	B	24 hr	7.7	24.7	6.6	18.47	—
	—	48 hr BR	—	—	—	—	—
	—	48 hr AR	—	—	—	—	—
	—	72 hr	—	—	—	—	—
	—	96 hr	—	—	—	—	—

Investigators Signatures

Jonathan Jacobs

James Daniels

Maryfell Faircloth

Bruce Alexander

Reviewed By: Lorette Wolfe

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

Measure/record salinity for marine tests

Comments:

PAGE 48

Revised 07/15/2008 MF

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Shipping Date: 3/1/10

Ship to: FDEP

P.O. No: _____

Species	Quantity	Age	Brood/Lot Number	Temp. (°C)	pH (S.U.)	Salinity (‰)
Mysidopsis bahia	150	3DAYS	MS100226	25	8.0	20
Menidia beryllina	150	12DAYS	SS100219	25	8.0	20
						Hardness mg/L
Cyprinella leedsi						
Pimephales promelas	450	<24	FM100228-1600	25	7.8	80
Ceriodaphnia dubia						
Daphnia magna						
YCT						
P. subcapitata						

Packed by: PM

Shipped Via: FedEx P.O.

Notes: MS+SS acute age on 3/3

Thank you for your order.

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

Appendix H

Physical/Chemical and Habitat Assessment field sheets

DEP-SOP-001/01: Form FD 9000-3

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: _____ SUBMITTING AGENCY NAME: _____		STORET STATION NUMBER:	DATE (M/D/Y): 3-22-10	TIME 1200	RECEIVING BODY OF WATER: Lake Ronell
REMARKS: NA20100125 20	COUNTY: BRADFORD	LOCATION: Down Stream Starke WWTF TEST			FIELD ID/NAME:

RIPARIAN ZONE/STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category):

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
49		2	21	21	3	2	3 Utilities Roads/pastures

LOCAL WATERSHED EROSION (check box): None ☐ Slight ☐ Moderate ☑ Heavy ☐

LOCAL WATERSHED NPS POLLUTION (check box): No evidence ☐ Slight ☐ Moderate potential ☑ Obvious sources ☐

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side:

LIST & MAP DOMINANT VEGETATION ON BACK

ARTIFICIALLY CHANNELIZED ☐ no ☐ recent, severe ☑ some recovery ☐ mostly recovered more sinuous

ARTIFICIALLY IMPOUNDED ☐ yes

HIGH WATER MARK: 2.5 (m above present water level) + 0.3 (present depth in m) = 2.8 (m above bed)

TYPICAL WIDTH, DEPTH & VELOCITY

5 m wide

.25 m/s .33 m/s 0.25 m/s

.3 m deep 0.4m deep .3m deep

TYPICAL VELOCITIES

7 secs = 0.14 m/s
6 secs = 0.17 m/s
5 secs = 0.20 m/s
4 secs = 0.25 m/s
3 secs = 0.33 m/s
2 secs = 0.50 m/s
1 sec = 1.0 m/s

CANOPY COVER %: OPEN: ☐ LIGHTLY SHADED (11-45%): ☐ MODERATELY SHADED (46-80%): ☒ HEAVILY SHADED: ☐

SEDIMENT/SUBSTRATE

SEDIMENT ODORS: NORMAL: ☐ SEWAGE: ☑ PETROLEUM: ☐ CHEMICAL: ☐ ANAEROBIC: ☐ OTHER: ☐ _____

SEDIMENT OILS: ABSENT: ☑ SLIGHT: ☐ MODERATE: ☐ PROFUSE: ☐

SEDIMENT DEPOSITION: SLUDGE: ☐ SAND SMOTHERING: NONE MODERATE SLIGHT SEVERE SILT SMOTHERING: NONE MODERATE SLIGHT SEVERE OTHER: _____

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	1.7%			SAND	97.7%		
LEAF PACKS OF MATS	0.2%			MUD/MUCK/SILT			
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE				OTHER:			
ROOTS	0.4%			DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION			

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP								0.5L
MID-DEPTH								
BOTTOM	0.3	15.04	6.92	9.45	232			

SYSTEM TYPE: STREAM: 1ST-2ND ORDER ☒ 3RD-4TH ORDER 5TH – 6TH ORDER 7TH ORDER OR GREATER LAKE: ☐ WETLAND: ☐ ESTUARY: ☐ OTHER: ☐ _____

WATER ODORS (CHECK BOX): NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ OTHER: ☐ _____

WATER SURFACE OILS (CHECK BOX): NONE: ☒ SHEEN: ☐ GLOBS: ☐ SLICK: ☐

CLARITY (CHECK BOX): CLEAR: ☒ SLIGHTLY TURBID: ☐ TURBID: ☐ OPAQUE: ☐

COLOR (CHECK BOX): TANNIC: ☒ GREEN (ALGAE): ☐ CLEAR: ☐ OTHER: ☐ _____

WEATHER CONDITIONS/NOTES:
Cloudy, 56°F
Dog found @ 40m marking test site
smells like urine.
2 pipes to stream.

ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☐	☒	☐
FISH	☒	☐	☐	☐
AQUATIC MACROPHYTES	☒	☐	☐	☐
IRON/SULFUR BACTERIA	☒	☐	☐	☐

SAMPLING TEAM: SP/MP/EA

SIGNATURE: Sharon Pitts

DATE: 3-22-10

Page 11 of 14 Form FD 9000-3 Revision Date: March 31, 2008 (Effective 12/3/08)

DEP-SOP-001/01: Form FD 9000-3

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: DEP_NED SUBMITTING AGENCY NAME:	STORET STATION NUMBER: none	DATE (M/D/Y): 12/1/09	TIME 1300	RECEIVING BODY OF WATER: LAKE ROWELL
REMARKS: RECON for FY10	COUNTY: Bradford	LOCATION: Alligator Creek 5m upstream of STARKE WWTP outfall		FIELD ID/NAME:

RIPARIAN ZONE/STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category):

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
49	~~2~~	~~2~~	21	~~21~~	~~3~~	~~2~~	3 Tract Utilities

LOCAL WATERSHED EROSION (check box): None ☐ Slight ☐ Moderate ☑ Heavy ☐

LOCAL WATERSHED NPS POLLUTION (check box): No evidence ☐ Slight ☐ Moderate potential ☑ Obvious sources ☐

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side: 1

LIST & MAP DOMINANT VEGETATION ON BACK

ARTIFICIALLY CHANNELIZED ☐ no ☑ recent, severe ☐ some recovery ☐ mostly recovered more sinuous

ARTIFICIALLY IMPOUNDED ☐ yes

HIGH WATER MARK: 2.5 (m above present water level) + .4 (present depth in m) = 2.9 (m above bed)

TYPICAL WIDTH, DEPTH & VELOCITY

4-5 m wide

.1k m/s | 0.8 m/s | .1k m/s

m deep | 0.4m deep | m deep

TYPICAL VELOCITIES

7 secs = 0.14 m/s
6 secs = 0.17 m/s
5 secs = 0.20 m/s
4 secs = 0.25 m/s
3 secs = 0.33 m/s
2 secs = 0.50 m/s
1 sec = 1.0 m/s

CANOPY COVER %: OPEN: ☐ LIGHTLY SHADED (11-45%): ☒ MODERATELY SHADED (46-80%): ☐ HEAVILY SHADED: ☐

SEDIMENT/SUBSTRATE

SEDIMENT ODORS: NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ ANAEROBIC: ☐ OTHER: ☐

SEDIMENT OILS: ABSENT: ☒ SLIGHT: ☐ MODERATE: ☐ PROFUSE: ☐

SEDIMENT DEPOSITION: SLUDGE: ☐ SAND SMOTHERING: NONE MODERATE SLIGHT ~~SEVERE~~ SILT SMOTHERING: NONE MODERATE SLIGHT ~~SEVERE~~ OTHER:

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	1K			SAND	98		
LEAF PACKS OF MATS	1K			MUD/MUCK/SILT			
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE	1K			OTHER:			
ROOTS							

DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP								
MID-DEPTH	~~0.5~~ 2	16.36	7.77	8.94	220 / 0.1			0.4L
BOTTOM								

SYSTEM TYPE: STREAM: 1ST-2ND ORDER ~~3RD-4TH ORDER~~ 5TH – 6TH ORDER 7TH ORDER OR GREATER LAKE: ☐ WETLAND: ☐ ESTUARY: ☐ OTHER: ☐

WATER ODORS (CHECK BOX): NORMAL: ☑ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ OTHER: ☐

WATER SURFACE OILS (CHECK BOX): NONE: ☑ SHEEN: ☐ GLOBS: ☐ SLICK: ☐

CLARITY (CHECK BOX): CLEAR: ☑ SLIGHTLY TURBID: ☐ TURBID: ☐ OPAQUE: ☐

COLOR (CHECK BOX): ~~TANNIC:~~ ☐ GREEN (ALGAE): ☐ CLEAR: ☑ OTHER: ☐

WEATHER CONDITIONS/NOTES: cloudy mid 70'S(F)

ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☐	☑	☐
FISH	☐	☐	☑	☐
AQUATIC MACROPHYTES	☐	☐	☑	☐
IRON/SULFUR BACTERIA	☑	☐	☐	☐

SAMPLING TEAM: SHARON PILTZ / JEREMY PARRISH

SIGNATURE: Jeremy Parrish

DATE: 12/1/09

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION
STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

SUBMITTING AGENCY CODE: DEP	STORET STATION NUMBER: 21031007	DATE (mm/dd/yy): 12/1/09	RECEIVING BODY OF WATER: Lake Rowell
SUBMITTING AGENCY NAME: NED			

REMARKS:	COUNTY: Bradford	LOCATION: Alligator Cr Upstream of WWTP City of Starke STP INFL	FIELD ID/NAME:

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 11	Four or more productive habitats present (snags, tree roots, aquatic vegetation, leaf packs (partially decayed), rock) 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) 15 14 13 12 ~~11~~	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 8 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered 5 4 3 2 1
Substrate Availability 2	Greater than 30% productive habitat present at site 20 19 18 17 16	16% to 30% productive habitat, by aerial extent 15 14 13 12 11	6% to 15% productive habitat 10 9 8 7 6	Less than 5% productive habitat 5 4 3 ~~2~~ 1
Water Velocity 14	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: >0.1 to 0.25 m/sec 15 ~~14~~ 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occuring > 1 m/sec 5 4 3 2 1
Habitat Smothering 5 Primary Score 32	Adequate number of pools (1-2 per 12 times width) and <25% of habitats affected by sand or silt accumulation. 20 19 18 17 16	Adequate number of pools (1-2 per 12 times width) and >25% of habitats affected by sand or silt accumulation. 15 14 13 12 11	Does not have required number of pools (1-2 per 12 times width) and/or has shallow pools (<2 times prevailing depth) 10 9 8 7 6	Pools are absent. Most habitats affected by sand or silt accumulation. ~~5~~ 4 3 2 1
Secondary Habitat Components **Artificial Channelization** 4	Good sinuosity. No evidence of dredging or artificial straightening. No spoil banks. Diversity of depths. 20 19 18 17 16	Good sinuosity within old channelized area and a diversity of depths. Evidence of dredging in the past (>10 yrs) but mostly recovered. 15 14 13 12 11	Some sinuosity developed within channelized area. Some diversity of depth, but no pools (>2 times prevailing depth) present. 10 9 8 7 6	Straightened with spoil banks. Box-cut, monotypic depth with no pools. 5 ~~4~~ 3 2 1
Bank Stability Right Bank 3 Left Bank 3	Bankfull > 60% of bank height. Slope of bank < 60°. Bankfull is within or above the root zone with few raw, eroded areas. 10 9	Only meets 2 of the 3 requirements for optimal bank stability. 8 7 6	Only meets 1 of the 3 requirements for optimal bank stability. 5 4	Bankfull < 60% of bank height. Slope of bank > 60°. Bankfull is below the root zone with raw, eroded areas. ~~3~~ 2 1
Riparian Buffer Zone Width Right Bank 3 Left Bank 1	Width of vegetation greater than 18 m 10 9	Width of vegetation >12 to 18 m 8 7 6	Width of vegetation 6 to 12 m, human activities still close to system 5 4	Less than 6 m of buffer zone due to intensive human activities ~~3~~ 2 ~~1~~
Riparian Zone Vegetation Quality Right Bank 3 Left Bank 2 Secondary Score 20	Over 90% of riparian surfaces consist of normal, expected plant community for given sunlight & habitat conditions (e.g., native plants, trees, understory shrubs, or non-woody macrophytes). Minimal disturbance. 10 9	>50% to 90% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Some disruption in community observed. 8 7 6	25% to 50% of riparian is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian is undisturbed (normal, expected plant community for given sunlight & habitat conditions) ~~3~~ ~~2~~ 1

51 ~~52~~ **TOTAL SCORE**

Date: 12/1/09	Analyst: Jeremy Parrish / Sharon Rita	Signature: Jeremy Parrish

L Miller FDEP Tallahassee 6/30/10

DEP-SOP-001/01: Form FD 9000-3

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		3-22-10	1180	Lake Rowell

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
CA2010-01-25-20	BRADFORD	Upstream Starke WWTP Control	

RIPARIAN ZONE/STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category):

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
49		2	21	21	3	2	3 Traff with hies

LOCAL WATERSHED EROSION (check box): None ☐ Slight ☐ Moderate ☑ Heavy ☐

LOCAL WATERSHED NPS POLLUTION (check box): No evidence ☐ Slight ☐ Moderate potential ☑ Obvious sources ☐

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side:

LIST & MAP DOMINANT VEGETATION ON BACK

ARTIFICIALLY CHANNELIZED ☐ no ☐ recent, ☐ severe ☑ some recovery ☐ mostly recovered

ARTIFICIALLY IMPOUNDED ☐ yes more sinuous

HIGH WATER MARK: 2.5 (m above present water level) + 0.3 (present depth in m) = 2.8 (m above bed)

TYPICAL WIDTH, DEPTH & VELOCITY

5 m wide

0.25 m/s .33 m/s 0.25 m/s

.1 m deep .4 m deep .1 m deep

TYPICAL VELOCITIES

7 secs = 0.14 m/s
6 secs = 0.17 m/s
5 secs = 0.20 m/s
4 secs = 0.25 m/s
3 secs = 0.33 m/s
2 secs = 0.50 m/s
1 sec = 1.0 m/s

CANOPY COVER %: OPEN: ☐ LIGHTLY SHADED (11-45%): ☑ MODERATELY SHADED (46-80%): ☐ HEAVILY SHADED: ☐

SEDIMENT/SUBSTRATE

SEDIMENT ODORS: NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ ANAEROBIC: ☐ OTHER: ☐

SEDIMENT OILS: ABSENT: ☒ SLIGHT: ☐ MODERATE: ☐ PROFUSE: ☐

SEDIMENT DEPOSITION: SLUDGE: ☐ SAND SMOTHERING: NONE SLIGHT ~~SEVERE~~ MODERATE SILT SMOTHERING: NONE SLIGHT SEVERE MODERATE OTHER: _____

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	1.7%			SAND	97.3%		
LEAF PACKS OF MATS	0.5%			MUD/MUCK/SILT			
AQUATIC VEGETATION	—			OTHER:			
ROCK OR SHELL RUBBLE	—			OTHER:			
ROOTS	0.5%			DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION			

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP								0.5L
MID-DEPTH								
BOTTOM ~~0.3~~	0.3	14.73	6.85	9.41	202			

SYSTEM TYPE: STREAM: 1ST-2ND ORDER ☐ 3RD-~~4TH~~ ORDER ☐ 5TH – 6TH ORDER ☐ 7TH ORDER OR GREATER ☐ LAKE: ☐ WETLAND: ☐ ESTUARY: ☐ OTHER: ☐

WATER ODORS (CHECK BOX): NORMAL: ☑ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ OTHER: ☐

WATER SURFACE OILS (CHECK BOX): NONE: ☑ SHEEN: ☐ GLOBS: ☐ SLICK: ☐

CLARITY (CHECK BOX): CLEAR: ☑ SLIGHTLY TURBID: ☐ TURBID: ☐ OPAQUE: ☐

COLOR (CHECK BOX): TANNIC: ☑ GREEN (ALGAE): ☐ CLEAR: ☐ OTHER: ☐

WEATHER CONDITIONS/NOTES: cloudy, 56°F

ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☐	☑	☐
FISH	☑	☐	☐	☐
AQUATIC MACROPHYTES	☑	☐	☐	☐
IRON/SULFUR BACTERIA	☑	☐	☐	☐

SAMPLING TEAM: SP IMP IEA

SIGNATURE: Sharon [illegible]

DATE: 3-22-10

DEP-SOP-001/01: Form FD 9000-3

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME: DEP NED	STORET STATION NUMBER: none	DATE (M/D/Y): 12/1/09	TIME 1400	RECEIVING BODY OF WATER: LAKE ROWELL
REMARKS: RECON for FH Starke WWTP09-10	COUNTY: Bradford	LOCATION: Alligator Creek 10m down from Starke WWTP D001		FIELD ID/NAME:

RIPARIAN ZONE/STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category):

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
49		2	20	21	3	2	3 Transp/Util.

LOCAL WATERSHED EROSION (check box): None ☐ Slight ☐ Moderate ☑ Heavy ☐

LOCAL WATERSHED NPS POLLUTION (check box): No evidence ☐ Slight ☐ Moderate potential ☑ Obvious sources ☐

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side: 1

LIST & MAP DOMINANT VEGETATION ON BACK

ARTIFICIALLY CHANNELIZED ☐ no ☑ recent, severe ☐ some recovery ☐ mostly recovered

ARTIFICIALLY IMPOUNDED ☐ yes more sinuous

HIGH WATER MARK: 2.5 (m above present water level) + .4 (present depth in m) = 2.9 (m above bed)

TYPICAL WIDTH, DEPTH & VELOCITY

5.5 m wide

.1K m/s | 0.18 m/s | .1K m/s

m deep | .4m deep | m deep

TYPICAL VELOCITIES

7 secs = 0.14 m/s
6 secs = 0.17 m/s
5 secs = 0.20 m/s
4 secs = 0.25 m/s
3 secs = 0.33 m/s
2 secs = 0.50 m/s
1 sec = 1.0 m/s

CANOPY COVER %: OPEN: ☐ LIGHTLY SHADED (11-45%): ☑ MODERATELY SHADED (46-80%): ☐ HEAVILY SHADED: ☐

SEDIMENT/SUBSTRATE

SEDIMENT ODORS: NORMAL: ☑ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ ANAEROBIC: ☐ OTHER: ☐

SEDIMENT OILS: ABSENT: ☑ SLIGHT: ☐ MODERATE: ☐ PROFUSE: ☐

SEDIMENT DEPOSITION: ~~SLUDGE:~~ ☑ SAND SMOTHERING: NONE MODERATE SLIGHT ~~SEVERE~~ SILT SMOTHERING: NONE MODERATE SLIGHT ~~SEVERE~~ OTHER:

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	1K			SAND	99		
LEAF PACKS OF MATS				MUD/MUCK/SILT			
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE				OTHER:			
ROOTS	1K						

DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP *	0.2	20.74	7.17	7.7	599/29			0.4L
MID-DEPTH	0.2	16.92	7.26	8.68	272/13			
BOTTOM	~~0~~	~~20.74~~	~~7.19~~	~~9.7~~				

SYSTEM TYPE: STREAM: 1ST-2ND ORDER 5TH – 6TH ORDER ~~3RD-4TH ORDER~~ 7TH ORDER OR GREATER LAKE: ☐ WETLAND: ☐ ESTUARY: ☐ OTHER: ☐

WATER ODORS (CHECK BOX): NORMAL: ☑ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ OTHER: ☐

WATER SURFACE OILS (CHECK BOX): NONE: ☑ SHEEN: ☐ GLOBS: ☐ SLICK: ☐

CLARITY (CHECK BOX): CLEAR: ☑ SLIGHTLY TURBID: ☐ TURBID: ☐ OPAQUE: ☐

COLOR (CHECK BOX): TANNIC: ☐ GREEN (ALGAE): ☐ CLEAR: ☑ OTHER: ☐

WEATHER CONDITIONS/NOTES: 70's (°F) cloudy (100%)

ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☐	☑	☐
FISH	☐	☐	☑	☐
AQUATIC MACROPHYTES	☐	☐	☐	☐
IRON/SULFUR BACTERIA	☑	☐	☐	☐

SAMPLING TEAM: JEREMY PARRISH | SHARON PILZ

SIGNATURE: Jeremy Parrish

DATE: 12/1/09

* @ outfall

DEP-SOP-001/01: Form FD 9000-5

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION
STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

SUBMITTING AGENCY CODE: DEP SUBMITTING AGENCY NAME: NED	STORET STATION NUMBER: 21031007	DATE (MM/DD/YY): 12/1/09	RECEIVING BODY OF WATER: Lake Rowell
REMARKS:	COUNTY: Bradford	LOCATION: Alligator Cr Downstream of WWTP City of Starke STP INFL	FIELD ID/NAME:

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 16	Four or more productive habitats present [snags, tree roots, aquatic vegetation, leaf packs (partially decayed), rock] 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) 15 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 8 7 ~~6~~	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered 5 4 3 2 1
Substrate Availability 1	Greater than 30% productive habitat present at site 20 19 18 17 16	16% to 30% productive habitat, by aerial extent 15 14 13 12 11	6% to 15% productive habitat 10 9 8 7 6	Less than 5% productive habitat 5 4 3 2 ~~1~~
Water Velocity 14	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: >0.1 to 0.25 m/sec 15 ~~14~~ 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec 5 4 3 2 1
Habitat Smothering 4 Primary Score 25	Adequate number of pools (1-2 per 12 times width) and <25% of habitats affected by sand or silt accumulation. 20 19 18 17 16	Adequate number of pools (1-2 per 12 times width) and >25% of habitats affected by sand or silt accumulation. 15 14 13 12 11	Does not have required number of pools (1-2 per 12 times width) and/or has shallow pools (<2 times prevailing depth). 10 9 8 7 6	Pools are absent. Most habitats affected by sand or silt accumulation. 5 ~~4~~ 3 2 1
Secondary Habitat Components **Artificial Channelization** 4	Good sinuosity. No evidence of dredging or artificial straightening. No spoil banks. Diversity of depths. 20 19 18 17 16	Good sinuosity within old channelized area and a diversity of depths. Evidence of dredging in the past (>10 yrs) but mostly recovered. 15 14 13 12 11	Some sinuosity developed within channelized area. Some diversity of depth, but no pools (>2 times prevailing depth) present. 10 9 8 7 6	Straightened with spoil banks. Box-cut, monotypic depth with no pools. 5 ~~4~~ 3 2 1
Bank Stability Right Bank 3 Left Bank 3	Bankfull > 60% of bank height. Slope of bank ≤ 60°. Bankfull is within or above the root zone with few raw, eroded areas. 10 9	Only meets 2 of the 3 requirements for optimal bank stability. 8 7 6	Only meets 1 of the 3 requirements for optimal bank stability. 5 4	Bankfull < 60% of bank height. Slope of bank > 60°. Bankfull is below the root zone with raw, eroded areas. ~~3~~ 2 1
Riparian Buffer Zone Width Right Bank 3 Left Bank 2	Width of vegetation greater than 18 m 10 9	Width of vegetation >12 to 18 m 8 7 6	Width of vegetation 6 to 12 m. human activities still close to system 5 4	Less than 6 m of buffer zone due to intensive human activities ~~3~~ ~~2~~ 1
Riparian Zone Vegetation Quality Right Bank 3 Left Bank 2 Secondary Score 20	Over 80% of riparian surfaces consist of normal, expected plant community for given sunlight & habitat conditions (e.g., native plants, trees, understory shrubs, or non-woody macrophytes). Minimal disturbance. 10 9	>50% to 80% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Some disruption in community observed. 8 7 6	25% to 50% of riparian is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian is undisturbed (normal, expected plant community for given sunlight & habitat conditions). ~~3~~ ~~2~~ 1

45 **TOTAL SCORE**

Date: 12/1/09	Analyst: Jeremy Parrish / Sharon Piltz	Signature: Jeremy Parrish

Appendix I-1

Wet ID taxa list and number of algal units counted to a target of 300 natural units for qualitative natural periphyton collections made from Starke WWTF on 3/22/2010.

	Control Site	Test Site
Bacillariophyta		
Bacillariophyta	273	229
Chlorophyceae		
Apatococcus lobatus	1	-
Actinotaenium cucurbitinum cucurbitinum	-	1
Characium pringsheimii	-	1
Mougeotia sp.	1	-
Spirogyra sp.	6	35
Cyanophyceae		
Cyanobium parvum	2	7
Anabaena sp.	1	-
Geitlerinema acutissimum	-	1
Jaaginema sp.	5	5
Komvophoron schmidlei	-	1
Merismopedia tenuissima	-	1
Merismopedia warmingiana	-	1
Planktolyngbya sp.	-	4
Pseudanabaena sp.	3	3
Schizothrix calcicola	8	11
Synechocystis sp.	1	-
Euglenophyceae		
Euglena sp.	-	1

Appendix I-2

Diatom taxa list and number of valves counted to a target of 500 valves for qualitative periphyton collected from Starke WWTF on 3/22/2010.

	Control Site	Test Site
Bacillariophyceae		
Achnanthes rupestoides	2	3
Achnanthidium exiguum	5	2
Achnanthidium microcephalum	17	18
Achnanthidium minutissimum	8	2
Adlafia minuscula	1	-
Brachysira sp.	-	1
Brachysira microcephala	4	1
Caloneis sp.	3	-
Chamaepinnularia minutissima	-	2
Cocconeis sp.	1	-
Cocconeis fluviatilis	2	-
Craticula sp.	2	-
Diadesmis confervacea	1	34
Diploneis parma	2	-
Encyonema minutum	2	-
Encyonema silesiacum	9	6
Encyonopsis microcephala	4	-
Eunotia sp.	9	19
Eunotia bilunaris	7	4
Eunotia incisa	1	-
Eunotia monodon	-	3
Eunotia naegelii	1	1
Fallacia tenera	2	1
Frustulia sp.	3	-
Frustulia vulgaris	1	1
Gomphonema sp.	16	1
Gomphonema affine	2	-
Gomphonema gracile	8	1
Gomphonema minutum	4	3
Gomphonema parvulum	21	23
Hantzschia sp.	1	-
Hippodonta capitata	5	4
Hippodonta hungarica	3	2
Kobayasiella sp.	-	3
Luticola mutica	-	3
Navicula sp.	3	11

Appendix I-2 (cont.)

	Control Site	Test Site
Navicula bouillantensis	3	-
Navicula cryptocephala	5	7
Navicula germainii	9	18
Navicula gregaria	-	13
Navicula lanceolata	3	-
Navicula longicephala	1	-
Navicula minima	14	13
Navicula rhynchocephala	5	6
Navicula rostellata	-	1
Navicula seminulum hustedtii	-	10
Navicula symmetrica	1	3
Neidium sp.	3	1
Neidium binodis	-	1
Nitzschia sp.	31	55
Nitzschia amphibia	-	6
Nitzschia capitellata	4	9
Nitzschia clausii	5	10
Nitzschia filiformis	8	1
Nitzschia frustulum	1	-
Nitzschia linearis	7	-
Nitzschia nana	-	2
Nitzschia palea	16	26
Nupela sp.	-	5
Nupela neotropica	5	-
Nupela vitiosa	-	1
Pinnularia sp.	-	5
Placoneis clementis	2	3
Placoneis elginensis	2	-
Placoneis gastrum	-	2
Planothidium apiculatum	1	-
Planothidium frequentissimum	-	3
Planothidium rostratum	-	4
Psammothidium sacculum	-	1
Rhopalodia sp.	-	1
Rossithidium pusillium	3	2
Sellaphora laevissima	-	5
Sellaphora pupula	1	-
Sellaphora seminulum	7	30
Stauroneis agrestis	-	1
Stauroneis smithii	2	-

Appendix I-2 (cont.)

	Control Site	Test Site
Surirella sp.	**-**	**6**
Surirella angusta	**-**	**10**
Surirella minuta	**16**	**3**
Undetermined Naviculaceae	**7**	**5**
Coscinodiscophyceae		
Aulacoseira sp.	1	-
Cyclotella meneghiniana	4	2
Melosira sp.	12	13
Fragilariophyceae		
Fragilaria capucina	23	9
Meridion sp.	7	-
Synedra acus	2	-
Synedra ulna	138	54
Undetermined Fragilariaceae	1	4

Appendix J-1

Benthic macroinvertebrate collapsed taxa list and density (average number of individuals/m2 rounded to the nearest individual, n = 3 samples) from Hester-Dendy artificial substrates incubated for 28 days upstream and downstream of the Starke WWTF and collected on 3/22/2010. See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site	Test Site
Annelida		
Oligochaeta		
Allonais sp.	-	3
Enchytraeidae	-	5
Nais communis complex	399	87
Rhizodrilus lacteus	-	5
Slavina appendiculata	50	5
Arthropoda		
Insecta		
Coleoptera		
Ancyronyx variegatus	8	3
Microcylloepus pusillus	11	3
Stenelmis sp.	8	5
Diptera		
Chironomus sp.	-	6
Cladotanytarsus cf. daviesi	12	-
Corynoneura sp.	123	38
Cricotopus bicinctus	77	30
Cricotopus or Orthocladius sp.	3	8
Cryptochironomus sp.	-	3
Palpomyia/bezzia grp.	8	-
Parakiefferiella sp. B Epler	3	8
Parametriocnemus sp.	-	6
Paratanytarsus sp.	19	6
Pentaneura inconspicua	22	-
Polypedilum epleri	10	8
Polypedilum flavum	33	-
Polypedilum illinoense grp.	-	98
Polypedilum scalaenum grp.	50	14
Polypedilum tritum	-	3
Rheocricotopus robacki	473	35
Rheotanytarsus exiguus grp.	25	-
Rheotanytarsus pellucidus	15	-

Appendix J-1 (cont.)

	Control Site	Test Site
Tanytarsus sp. C Epler	83	25
Tanytarsus sp. D Epler	6	-
Tanytarsus sp. L Epler	3	-
Tanytarsus sp. U Epler	12	6
Tanytarsus sp. Y Epler	6	-
Thienemanniella sp. B Epler	-	3
Thienemanniella xena	98	112
Thienemannimyia grp.	-	3
Tribelos fuscicornis	6	-
Ephemeroptera		
Maccaffertium exiguum	16	-
Odonata		
Aeshnidae	8	-
Coenagrionidae	-	3
Trichoptera		
Cheumatopsyche sp.	18	-
Hydroptila sp.	3	-
Mollusca		
Gastropoda		
Hydrobiidae	-	8

Appendix J-2

Benthic macroinvertebrates taxa list and counts (number of individuals counted) collected from Hester-Dendy artificial substrates (n= 3 samples) incubated upstream and downstream of the Starke WWTF for 28 days and collected on 3/22/2010.

	Control Site	Test Site
Annelida		
Oligochaeta		
Allonais sp.	-	1
Enchytraeidae	-	2
Naididae	-	1
Nais communis complex	151	32
Rhizodrilus lacteus	-	1
Slavina appendiculata	19	2
Tubificidae	-	1
Arthropoda		
Insecta		
Coleoptera		
Ancyronyx variegatus	3	1
Microcylloepus pusillus	4	1
Stenelmis sp.	3	2
Diptera		
Chironomus sp.	-	2
Cladotanytarsus cf. daviesi	4	-
Corynoneura sp.	40	14
Cricotopus sp.	3	1
Cricotopus bicinctus	22	10
Cricotopus or Orthocladius sp.	1	3
Cryptochironomus sp.	-	1
Palpomyia/bezzia grp.	3	-
Parakiefferiella sp. B Epler	1	3
Parametriocnemus sp.	-	2
Paratanytarsus sp.	6	2
Pentaneura inconspicua	7	-
Polypedilum sp.	2	1
Polypedilum epleri	3	3
Polypedilum flavum	10	-
Polypedilum illinoense grp.	-	35
Polypedilum scalaenum grp.	15	5
Polypedilum tritum	-	1
Rheocricotopus robacki	154	13
Rheotanytarsus exiguus grp.	8	-
Rheotanytarsus pellucidus	5	-

Appendix J-2 (cont.)

	Control Site	Test Site
Tanytarsus sp. C Epler	27	9
Tanytarsus sp. D Epler	2	-
Tanytarsus sp. L Epler	1	-
Tanytarsus sp. U Epler	4	2
Tanytarsus sp. Y Epler	2	-
Thienemanniella sp.	2	-
Thienemanniella sp. B Epler	-	1
Thienemanniella xena	30	41
Thienemannimyia grp.	-	1
Tribelos fuscicornis	2	-
Chironomidae	57	5
Ephemeroptera		
Maccaffertium sp.	1	-
Maccaffertium exiguum	5	-
Odonata		
Aeshnidae	3	-
Coenagrionidae	-	1
Trichoptera		
Cheumatopsyche sp.	6	-
Hydroptila sp.	1	-
Undetermined Trichoptera	1	-
Mollusca		
Gastropoda		
Hydrobiidae	-	3

The Bioassay of the Starke Wastewater Treatment Facility effluent sampled on March 2 2010, NPDES #FL0028126

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

Transaction Code			NPDES NUMBER										YR/MO/DA						Insp Type		Inspector		Fac Type	
1	N	2	5	3	F	L	0	0	2	8	1	2	6	11	12	1	0	0	3	0	1	#	**B**	#	**S**	#	1

Remarks

#

The Priority Pollutants Analysis for Bioassay of the Starke Wastewater Treatment Facility effluent sampled on March 2 2010, NPDES #FL0028126

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

Transaction Code			NPDES NUMBER										YR/MO/DA						Insp Type		Inspector		Fac Type	
1	N	2	5	3	F	L	0	0	2	8	1	2	6	11	12	1	0	0	3	0	1	#	**X**	#	**S**	#	1

Remarks

#

Biological Analyses of the City of Starke Wastewater Treatment Facility effluent sampled on March 22, 2010, NPDES #FL0028126

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

Transaction Code			NPDES NUMBER										YR/MO/DA						Insp Type		Inspector		Fac Type	
1	N	2	5	3	F	L	0	0	2	8	1	2	6	11	12	1	0	0	3	2	2	#	**I**	#	**S**	#	1

Remarks

#