

Biological Assessment of

Arvah B. Hopkins Generating Station

Leon County

NPDES #FL0025518

Sampled February 4, 2008

July 2008

Biology Section

Bureau of Laboratories

Division of Environmental Assessment and Restoration

Quality Manual No. 870346G

NELAC Certification No. E31780

Florida Department of Environmental Protection

Fifth Year Inspection Summary

Discharger:	Arvah B. Hopkins Generating Station
Physical Address:	County Road 1585 – Geddie Road, Tallahassee, FL 32304
County:	Leon
NPDES Number:	FL0025518
Permit Expiration:	October 1, 2008

Toxics Sampling Inspection **(XSI)**

Date Sampled: February 4, 2008

Results: No organic priority pollutants were detected in the effluent. Arsenic, copper, and nickel were detected in the effluent, below the copper mixing zone, and at both the Test and Control Sites at levels that complied with Class III Fresh Water Criteria (62-302.530 F.A.C.) and the facility's permit limits. Iron was detected at the Control Site at a level that complied with Class III Water Quality Criteria. Aluminum was detected at the Test and Control Sites and below the mixing zone, but there is no water quality criterion for aluminum. All other metals detected were detected at levels above the minimum detection limit (MDL) but below the practical quantitation limit (PQL) which complied with Class III Water Quality Criteria and the facility's permit limits.

Compliance Biomonitoring Inspection **(CBI)**

Date Sampled: February 4, 2008

Results: The effluent sample was not acutely toxic to the fish, *Cyprinella leedsi,* or to the water flea, *Ceriodaphnia dubia,* during the 96-hour acute screening bioassays.

Water Quality Inspection **(WQI)**

Date Sampled: February 4, 2008

Results: Fecal coliforms were detected in the effluent and the receiving water at levels that complied with Class III Water Quality Criteria (62-302.530 F.A.C.). Note that fecal coliform samples from the effluent and Control Site were analyzed beyond the six-hour holding time, and counts from the Test and Control Sites and below the mixing zone were based on counts that were outside the acceptance range. Ortho-phosphate at the Control Site (0.13 mg/L) was higher than levels detected in the effluent, Test Site, and below the copper mixing zone (0.083-0.088 mg/L). However, total phosphorus and nitrate-nitrite levels measured in the effluent, Test Site, and below the copper mixing zone were higher than levels measured at the Control Site. Dissolved oxygen (D.O.), pH, and conductivity measurements were similar in the effluent and at all sites and complied with Class III Water Quality Criteria and facility permit limits. Conductivity was high throughout the stream, ranging from 648 µmhos/cm at the Control Site to 678 and 679 µmhos/cm at the Test Site and the site below the copper mixing zone, respectively, reflecting the dominance of the

the stream by the effluent. Effluent conductivity was 702 µmhos/cm. Although effluent temperature complied with permit limits, the warmer effluent (20.6 ˚C) appeared to be elevating the temperature in the much of the upper portion of Beaver Creek. Temperatures at the Test Site (21.6 ˚C) and below the copper mixing zone (21.3 ˚C) were almost 10 degrees Celsius higher than at the Control Site (11.7 ˚C). Algal Growth Potential (AGP) values were above the 5.0 mg dry wt/L problem threshold in the effluent and at all study sites.

Impact Bioassessment Inspection **(IBI)**

Date Sampled: February 4 and 16, 2008

Results: Habitat assessment scores indicated much better habitat at the Control Site (132; "optimal") than at the Test Site (77; "marginal"). The Test Site lost points for lack of substrate diversity and availability and for artificial channelization. Shannon-Weaver Diversity from Hester-Dendy samples could not be used because there were less than 300 individuals recovered from samplers deployed at both the Test and Control Sites. Stream Condition Index (SCI) scores from dipnet samples were 43 A at the Control Site (Category 1) and 24 A at the Test Site (Category 3). The most notable community changes from the Control Site to the Test Site were the absence of some of the groups more sensitive to human disturbance, such as plecopterans, at the Test Site and a larger percentage of very tolerant individuals at the Test Site than at the Control Site.

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 Arvah B. Hopkins Generating Station is located in Leon County, Florida (Appendix A). This facility is a steam electric power generating plant. Activities at this plant include mixing, flocculation and sedimentation of Low Volume Wastes and Metal Cleaning Wastes (see Facility Summary in Appendix B). Additionally, cooling tower blowdown is pH adjusted and temperature is reduced with heat exchangers prior to discharge. The effluent is then discharged into the Class III fresh waters of Beaver Creek. The discharge from this facility forms the head waters of Beaver Creek, which then flows through the Talquin Wildlife Management Area and ultimately to the Ochlockonee River, an Outstanding Florida Water Body. The facility has a permitted mixing zone for total recoverable copper, which extends 330 m downstream from the point of discharge in Beaver Creek. The design flow of the wastewater system is 1.87 million gallons per day (MGD) average with a maximum of 3.3 MGD. The mean flow for the facility from December, 2006 to November, 2007 was 2.35 MGD (Kim Allen, FDEP Northwest District).

Surface Water Quality Criteria and facility permit limits are listed in Table 1. The monitoring location for the copper mixing zone is EFF-1A, which is located approximately 650 m downstream of the point of discharge. According to information from the Northwest District (Kim Allen) and DMR data, the plant has not had any violations within the last year at monitoring point EFF-1A or at EFF-1.

Methods

The purpose of this investigation was to determine the potential effects of the facility's effluent on the biota of the receiving waters. Chemical and biological comparisons were made between a Test Site (located in Beaver Creek approximately 120 meters downstream of the discharge), a site just below the copper mixing zone (located in Beaver Creek approximately 340 meters downstream of the discharge) and a Control Site (located in Beaver Creek approximately 1800 meters downstream of the discharge). Because the facility's discharge forms the headwaters of Beaver Creek, the Control Site had to be located further down the stream on the other side of the wetland in the Wildlife Management Area. Detailed methods and their relationship to Florida Administrative Code are given in Appendix C.

Originally, this inspection was scheduled for February 19, 2008, and Hester-Dendy's were deployed on January 22, 2008. The FDEP Central Laboratory was advised that Arvah Hopkins would be taking their discharge offline starting February 8, 2008 and that it would be offline until sometime in June, 2008. Therefore, the decision was made to perform all the other biological and chemical sampling prior to the discharge being taken offline and to retrieve the Hester-Dendy's on February 19, 2008 as planned. All field and laboratory biological methods followed Biology Section Standard Operating Procedures (SOPs, see http://www.floridadep.org/labs/qa/2002sops.htm for details) and met FDEP quality assurance/quality control standards (see http://www.floridadep.org/labs/qa/index.htm).

The following were involved in this investigation: Kim Allen (FDEP Northwest District), Danielle Melnick (FDEP Northwest District Branch Office) and the FDEP Central Laboratory in Tallahassee. See Appendix D for the chain of custody form (sample submittal form). The report was reviewed by District representatives and the Point Source Studies Review Committee (Mike Tanski, Jennifer Paris, Nancy Ross, and Frank Butera).

Results and Discussion

- Specific chemical results are reported in Tables 1 and 2, and a complete list of chemical analytes can be reviewed in Appendix E. No organic pollutants were detected in the effluent. Arsenic, copper, and nickel were detected in the effluent, below the copper mixing zone, and at both the Test and Control Sites at levels that complied with Class III Fresh Water Quality Criteria (62-302.530 F.A.C.) and the facility's permit limits. In addition, iron was detected at the Control Site at levels that complied with Class III Water Quality Criteria. Iron detected in the effluent, the Test Site and below the mixing zone, and lead detected at the Test and Control Sites were detected at levels above the minimum detection limit (MDL) but below the practical quantitation limit (PQL) which complied with Class III Water Quality Criteria and the facility's permit limits. Aluminum was detected at the Control Site and detected at levels between the MDL and PQL at the Test Site and below the mixing zone. There is no water quality criterion for aluminum.
- Dissolved oxygen (D.O.), pH, and conductivity measurements were similar in the effluent and at all sites and complied with Class III Water Quality Criteria and facility permit limits. Conductivity was high throughout the stream, ranging from 648 µmhos/cm at the Control Site to 678 and 679 µmhos/cm at the Test Site and at the site below the mixing zone, respectively, reflecting the dominance of this stream by the effluent. Effluent conductivity was 702 µmhos/cm. Although effluent temperature complied with permit limits (20.6 °C), the warmer effluent appeared to be elevating the temperature in much of the upper portion of Beaver Creek. Temperatures at the Test Site and below the mixing zone were almost 10° C higher than at the Control Site.
- The effluent sample was not acutely toxic to the fish, *Cyprinella leedsi,* or to the water flea, *Ceriodaphnia dubia,* during 96-hour acute screening

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

Arvah B. Hopkins Generating Station	Class III Criteria	Effluent Limits	Effluent	Test Site	Below Mixing Zone	Control Site
Organic Constituents (µg/L)						
None Detected	-	-	None Detected			
Nutrients (mg/L)						
Ortho-phosphate	-	-	0.084	0.083	0.088	0.13
Total Phosphorus	-	-	0.56	0.6	0.56	0.39
Total Ammonia	-	-	0.01 U	0.05 U	0.05 U	0.05 U
Un-ionized Ammonia	≤ 0.02 s	-	≤ 0.02 c	≤ 0.02 c	≤ 0.02 c	≤ 0.02 c
Nitrate and Nitrite	-	-	0.065	0.057	0.058	0.013
Total Kjeldahl Nitrogen	-	-	0.18 I	0.2	0.18 I	0.3
Organic Nitrogen	-		0.175 c	0.175 c	0.155 c	0.275 c
Total Nitrogen	-	-	0.245 c	0.257 c	0.238 c	0.313 c
General Physical and Chemical Parameters						
Habitat Assessment	-	-	-	77	-	132
Dissolved Oxygen (mg/L)	≥ 5.0	-	9.4	9.5	9.3	11.3
pH (SU)	6.0 - 8.5	6.0 - 8.5	7.8	8.1	8.3	8.0
Conductivity (µmhos/cm)	≤ 1,275	-	702	678	679	648
Temperature °C	-	≤ 26.7	20.6	21.6	21.3	11.7
Sample Depth (m)	-	-	0.2	0.2	0.25	0.2
Total Residual Chlorine (mg/L)	≤ 0.01	≤ 0.01	< 0.03 ¥	-	-	-
Chlorophyll a (µg/L) - Corrected	-	-	1 AI	0.66 I	0.91 I	1 I
Phaeophytin (µg/L)	-	-	0.35 AI	0.24 U	0.24 I	0.42 I
Total Suspended Solids (mg/L)	-	≤ 100	4 U	4 I	4 I	8 I
Oils and Greases (mg/L)	≤ 5	≤ 5	1.7 I	-	-	-
Flow (MGD)	-	Report	0.2 *	-	-	-
Hardness (mg $CaCO_3$)	-	Report	261.29 c	255.64 c	258.12 c	251.98 c
Toxicity (96-hour acute screening bioassay, percent mortality in 100% effluent)						
Bioassay - Water flea *(Ceriodaphnia dubia)*	-	≤ 50	0	-	-	-
Bioassay - Fish *(Cyprinella leedsi)*	-	≤ 50	5	-	-	-
Microbiology (Number of colony forming units/100ml)						
Fecal Coliforms	≤ 400 &	-	56 Q	34 B	39 B	150 BQ

c - Value is calculated
s - Single sample
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
Q - Sample held beyond normal holding time
U - Material analyzed for but not detected; value reported is the method detection limit
* - Average daily flow from February, 2008
¥ - Measured in the laboratory
& - 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.

Arvah B. Hopkins Generating Station	Effluent Class III Criteria	Effluent Limits	Effluent	Test Site Class III Criteria	Test Site	Below Mixing Zone Class III Criteria	Below Mixing Zone	Control Site Class III Criteria	Control Site
Metals (µg/L unless otherwise noted)									
Aluminum	-	-	60 U	-	120 I	-	140 I	-	320
Arsenic	≤ 50	-	2.4	≤ 50	2.2	≤ 50	2.4 A	≤ 50	2.6
Cadmium	≤ 0.6 b	-	0.02 U	≤ 0.54 b	0.02 U	≤ 0.55 b	0.02 U	≤ 0.54 b	0.02 U
Calcium (mg/L)	-	-	71	-	68.9	-	69.4 A	-	67.6
Chromium-III	≤ 189.2 b	≤ 189.2 b	1 U	≤ 185.89 b	1 U	≤ 187.37 b	1 U	≤ 183.71 b	1 U
Copper	≤ 21.2 b	≤ 50	16.3	≤ 20.80 b	15.2	≤ 20.98 b	16.4 A	≤ 20.55 b	5.2
Iron	≤ 1,000	≤ 1,000	36 I	≤ 1,000	77 I	≤ 1,000	93 I	≤ 1,000	280
Lead	≤ 10.8 b	-	0.2 U	≤ 10.51 b	0.2 I	≤ 10.64 b	0.2 U	≤ 10.32 b	0.26 I
Magnesium (mg/L)	-	-	20.4	-	20.3	-	20.6 A	-	20.2
Nickel	≤ 117.6 b	-	2.38	≤ 115.40 b	2.31	≤ 116.35 b	2.4 A	≤ 114.00 b	1.83
Selenium	≤ 5.0	-	0.5 U	≤ 5.0	0.5 U	≤ 5.0	0.5 U	≤ 5.0	0.5 U
Silver	≤ 0.07	-	0.025 U	≤ 0.07	0.025 U	≤ 0.07	0.025 U	≤ 0.07	0.025 U
Zinc	≤ 270.4 b	≤ 270.4 b	5 U	≤ 265.40 b	5 U	≤ 267.58 b	5 U	≤ 262.18 b	5 U

b - Value is calculated based on hardness
A - Value reported is the mean of two or more determinations
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
U - Material analyzed for but not detected; value reported is the method detection limit

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

Location	AGP (measured)	Predicted AGP (TSIN) ± 20%	Predicted AGP (TN) ± 20%	Inorganic N:P ratio	Total N:P ratio
Effluent	10.9	2.9 ± 0.6	9.3 ± 1.9	0.9	0.4
Test Site	7.3 A	4.1 ± 0.8	9.8 ± 2.0	1.3	0.4
Below Mixing Zone	8.5	4.1 ± 0.8	9.0 ± 1.8	1.2	0.4
Control Site	6.5	2.4 ± 0.5	11.9 ± 2.4	0.5	0.8

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

bioassays (See Table 1 for percent mortality, Appendix F for bioassay bench sheets, and Appendix G for supporting standard reference toxicant data).

- Fecal coliforms were detected in the effluent and receiving waters at levels that complied with Class III Water Quality Criteria and facility permit limits (See Table 1 for results and Appendix F for laboratory worksheets).
- Ortho-phosphate at the Control Site (0.13 mg/L) was higher than levels detected in the effluent, Test Site and below the mixing zone (ranging from 0.083 to 0.088 mg/L). Total phosphorus (ranging from 0.56 to 0.60 mg/L) and nitrate-nitrite (ranging from 0.057 to 0.065 mg/L) levels measured in the effluent, Test Site and below the mixing zone were higher than levels measured at the Control Site (0.39 mg/L total phosphorus and 0.013 mg/L nitrate-nitrite). Since the analytical chemistry suggests that this system is nitrogen limited, the higher nitrate-nitrite levels in the effluent warrant further monitoring.
- Algal growth potential (AGP) is a measure of nutrients available for algal growth (Miller *et al*. 1978). Raschke and Shultz (1987) found that AGP above 5.0 mg dry weight/L represents a "problem" threshold for fresh receiving waters, implying nutrient enrichment. Effluent AGP was 10.9 mg dry weight/L (Table 3). The AGP values at the Test Site, below the mixing zone, and at the Control Site were 7.3 A, 8.5, and 6.5 mg dry wt/L, respectively. All AGP values were above the 5.0 mg dry wt/L threshold. This indicates there is some nutrient enrichment related to the Arvah B. Hopkins discharge in this portion of Beaver Creek. There was no evidence of growth inhibition in AGP data (Table 3).
- Chlorophyll-*a* was detected in water samples of the effluent, the Test and Control Sites, and below the mixing zone at low levels (levels between the MDL and PQL) (Table 1). Note that nutrients in the water column may or may not fuel algal production immediately, depending upon the sum of environmental conditions that limit algal growth at the site (e.g. pH, shading, turbidity). Thus it is not necessarily contradictory for ambient nutrient levels to be high and for no chlorophyll to be detected in water samples.
- There were no major differences in algal community composition between the Test and Control Sites (Table 4, Appendix I). Although the Control Site had more taxa represented than the Test Site, both sites were dominated by diatoms. The dominant diatom taxon at the Control Site was *Achnanthes exigua*, and the dominant diatom at the Test Site was *Achnanthes* sp.
- Habitat assessment scores were 132 (Optimal) at the Control Site and 77 (Marginal) at the Test Site (Table 1, data sheets in Appendix H). The Test Site had less substrate diversity and availability than the Control Site. The Test Site also lost points for artificial channelization since the first 220m of the creek, in which the Test Site occurs, was channelized years ago. The effluent continues to scour this area of the creek. The creek then turns 90 degrees in a ditch across an access road and then begins a more natural sinuous pattern before entering the wetland area.
- Shannon-Weaver Diversity from Hester-Dendy samples could not be used because there were less than 300 individuals recovered from samplers deployed at both the Test and Control Sites (Table 5, Appendix J). Plecoptera, which comprised 39.9% of the organisms identified from the Control

Table 4. Periphyton Composition - Qualitative.

Arvah B. Hopkins Generating Station	Test Site	Control Site
Number of Wet Taxa	10	6
Number of Wet Algal Units Identified	301	300
Percent Dominant Wet Taxon	87.0	94.0
Dominant Wet Taxon Name	Bacillariophyta (Diatoms)	Bacillariophyta (Diatoms)
Number of Diatom Taxa	34	55
Number of Diatom Algal Units Identified	502	500
Percent Dominant Diatom Taxon	23.7	15.6
Dominant Diatom Taxon Name	*Achnanthes* sp.	*Achnanthes exigua*
Percentage Composition for Wet Algae		
Blue-green algae	12.3	5.7
Green algae	0.7	0.3
Diatoms	87.0	94.0

Table 5. Macroinvertebrate Hester-Dendy Samples - Quantitative.

Arvah B. Hopkins Generating Station	Test Site	Control Site
Summary Statistics		
Shannon-Weaver Diversity	2.61 *	3.23 *
Number of Taxa	13	20
Florida Index	15	11
Number of EPT Taxa	2	3
Percent Dominant Taxon	45.3	39.9
Dominant Taxon Name	*Baetis intercalaris* (Ephemeroptera)	*Perlesta placida* complex (Plecoptera)
Total Number of Individuals (counted)	163	75
Total Number of Individuals (#/m^2)	433	199
Community Composition: Percent of total		
Amphipoda	0.0	2.7
Coleoptera	0.0	2.7
Diptera	34.4	49.6
Ephemeroptera	45.3	2.7
Odonata	0.6	0.0
Oligochaeta	6.2	0.0
Plecoptera	0.0	39.9
Trichoptera	12.9	2.7
Other	0.7	0.0
Functional Feeding Groups: Percent of total		
Burrowing Deposit Feeders	10.8	3.4
Predators	4.2	46.8
Scrapers	22.6	1.3
Shredders	3.9	1.3
Surface Deposit Feeders	34.6	19.7
Suspension Feeders	12.9	14.0
Unknown	11.0	13.6

* - Shannon Weaver Diversity cannot be used because < 300 individuals were identified.

Site Hester-Dendy's, were absent from Test Site samples. This corresponded to a much lower percentage of predators (4.2%) at the Test Site when compared to the Control Site (46.8% predators).

- Qualitative measures of benthic macroinvertebrate assemblages from dipnet samples are summarized in Table 6 and in Appendix K. The Control Site SCI score of 43 A placed it in Category II while the Test Site, with an SCI score of 24 A, ranked lower in Category III. As was seen with the Hester-Dendy samples, plecoptera were absent in the Test Site dipnet samples but comprised approximately 6% of the organisms identified from the Control Site dipnet samples. Other groups that were present in small percentages at the Control Site that were absent from the Test Site samples were amphipods, bivalves, and decapods. There was also a higher percentage of very tolerant individuals at the Test Site (8.3% and 5.3% in replicate 1 and 2, respectively) than at the Control Site (0.7% and 0% in replicate 1 and 2, respectively). Differences in macroinvertebrate communities are likely due to habitat alterations in the upper portion of Beaver Creek, which affects recruitment potential.

Summary

DMR data provided by the District do not indicate any violations at EFF-1 or EFF-1A for year preceding this sampling event. Although no violations or exceedances were noted during this inspection, copper levels detected in the effluent and at the Test Site were higher than levels detected during the June, 2002 FDEP Biological Assessment. Although effluent temperature complied with facility permit limits, it appeared that the effluent was elevating the temperature of the water in Beaver Creek at the Test Site and even below the mixing zone when compared to the water temperature at the Control Site. This elevated temperature, along with habitat disruption in the upper portion of Beaver Creek, resulted in an absence of stoneflies (plecopterans), a group known to be sensitive to human disturbance, at the Test Site. The elevation of temperature in Beaver Creek by the Arvah Hopkins effluent warrants further attention.

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Table 6. Macroinvertebrate Dipnet Samples - Qualitative.

Arvah B. Hopkins Generating Station	Test Site		Control Site	
Summary Statistics				
Stream Condition Index 2007 (value)	24 A		43 A	
Stream Condition Index 2007 (category) *	Category 3		Category 2	
Stream Condition Index Metrics	Rep 1	Rep 2	Rep 1	Rep 2
Number of Total Taxa	23	19	22	22
Number of Ephemeroptera Taxa	1	1	2	2
Number of Trichoptera Taxa	3	2	1	1
Number of Clinger Taxa	4	4	3	4
Number of Long-lived Taxa	1	1	4	2
Number of Sensitive Taxa	2	2	5	6
Percent of Dominant Taxon	40.7	47.7	36.4	42.5
Percent Suspension Feeders and Filterers	9.0	9.6	16.1	17.5
Percent of Tanytarsini Individuals	1.4	2.0	8.4	10.3
Percent of Very Tolerant Individuals	8.3	5.3	0.7	0.0
Total Number of Individuals	145	151	143	146
Community Composition: Percent of total				
Dominant Taxon Name	*Baetis intercalaris* (Ephemeroptera)	*Baetis intercalaris* (Ephemeroptera)	*Baetis intercalaris* (Ephemeroptera)	*Baetis intercalaris* (Ephemeroptera)
Amphipoda	0.0	0.0	5.6	6.2
Bivalvia	0.0	0.0	0.7	1.4
Coleoptera	1.4	1.3	4.2	4.8
Decapoda	0.0	0.0	11.9	9.6
Diptera	39.3	38.4	24.5	26.0
Ephemeroptera	40.7	47.7	40.6	43.8
Gastropoda	0.0	0.0	0.0	0.7
Odonata	2.1	0.7	0.7	0.0
Oligochaeta	6.9	4.0	1.4	0.0
Plecoptera	0.0	0.0	6.3	5.5
Trichoptera	8.3	8.0	4.2	2.1
Other	1.4	0.0	0.0	0.0
Functional Feeding Groups: Percent of total				
Browser-Grazers	0.0	0.0	5.6	4.5
Burrowing Deposit Feeders	6.9	4.0	1.4	0.0
Predators	7.2	6.0	10.1	6.5
Scavengers	0.3	0.0	6.3	4.8
Scrapers	21.4	24.5	21.3	24.3
Shredders	20.0	16.9	5.2	4.8
Surface Deposit Feeders	35.2	39.1	33.9	37.7
Suspension Feeders	9.0	9.6	16.1	17.5

A - Value reported is the mean of two determinations

* SCI_2007 categories from Table LT 7200-2 of Draft DEP-SOP-002/01 as referenced in Draft Quality Assurance Rule (62-160 F.A.C.), September 17, 2007: Values 0 ≤ 34 are Category III; Values 35 < 67 are Category II; Values 68 ≤ 100 are Category I

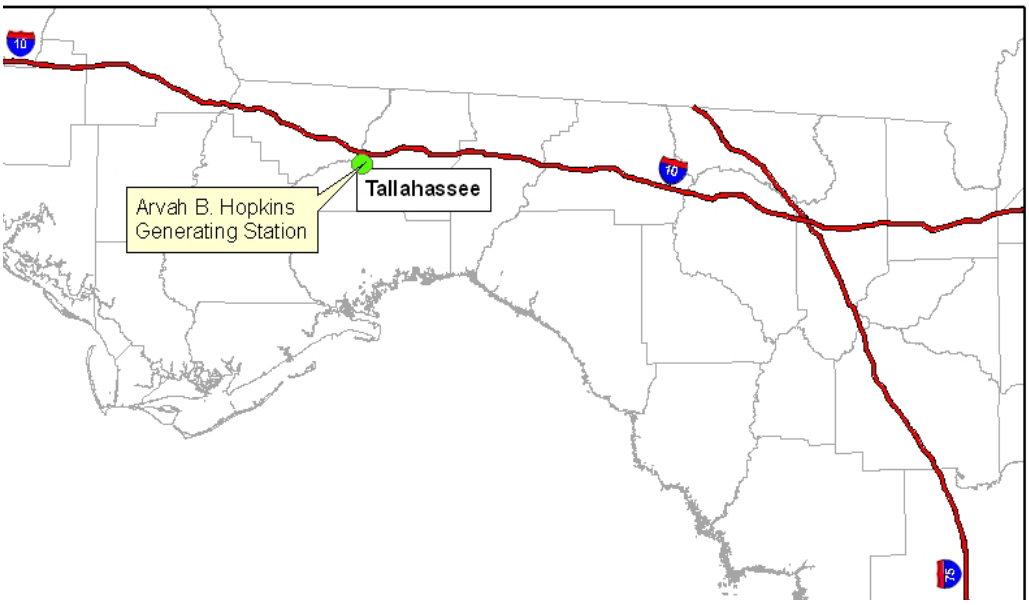
Appendices

- Appendix A. Map of facility
- Appendix B. Facility summary and DMR data
- Appendix C. Explanation of measurements
- Appendix D. Chain of Custody form
- Appendix E. Chemical analyses of effluent and receiving water.
- Appendix F. Additional physical, chemical, toxicological and microbiological results
- Appendix G. Standard Reference Toxicant test data
- Appendix H. Habitat Assessment field sheets
- Appendix I-1. Periphyton: Taxa list and number of individuals counted
- Appendix I-2. Periphyton: Diatom taxa list and number of individuals counted
- Appendix J-1. Hester-Dendy multi-plate samplers: Taxa list and macroinvertebrate density (average number of individuals per m^2)
- Appendix J-2. Hester-Dendy multi-plate samplers: Taxa list and total number of macroinvertebrates counted
- Appendix K1. Dipnet samples: Taxa list and number of macroinvertebrates counted (collapsed)
- Appendix K2. Dipnet samples: Taxa list and number of macroinvertebrates counted

Appendix A

Map of Facility





Appendix B

Facility Summary and DMR data

State of Florida
Department of Environmental Protection
Facility Introduction & Summary

Facility Name (as it appears on permit): Arvah B. Hopkins Generating Station **Email to which final report be sent:** allen.hubbard@dep.state.fl.us; david.morres@dep.state.fl.us		**Former Names:** N/A
Physical Address: County Road 1585-Geddie Road Tallahassee, FL 32304	**NPDES Permit No.:** FL0025518 **Expiration Date:** 10/1/08	**Prepared By:** Kim Allen
County: Leon County	**District:** NWD	**Facility Type:** IW (Power Plant)
Function of Facility: treat and dispose of industrial wastewater from a steam electric power generation plant		
Sampling Location (actual permit designation of permitted sampling point): D-001 **EFF-1** onsite man-made ditch, immediately upstream of the overflow weir, prior to mixing with the receiving water, Beaver Creek at the POD (final discharge) **EFF-1A** Within Beaver Creek approximately 650 meters downstream from the POD D-0171 (internal outfall), D-0172 (internal outfall) **EFF-2A** cooling tower conveyance pipe prior to mixing with any other waste stream(s) from unit 1 **EFF-2B** cooling tower conveyance pipe prior to mixing with any other waste stream(s) from unit 2 D-013(internal outfall), D-015 (internal outfall) **EFF-3** Discharge from treatment pond #2 or #3 prior to mixing with any other waste stream(s) D-015 Metal cleaning wastes **EFF-4** From the metal cleaning waste treatment prior to mixing with any other waste stream		
Description of permitted outfall: D-001 Final Discharge: weir at the downstream end of an on-site man-made drainage ditch to Beaver Creek D-0171 Cooling tower 1 blowdown; cooling tower conveyance pipe prior to mixing with any other waste stream(s) from unit1 D-0172 Cooling tower 2 blowdown; cooling tower conveyance pipe prior to mixing with any other waste stream(s) from unit 2 D-015 Metal Cleaning Waste (MCW): from the metal cleaning waste treatment prior to mixing with any other waste stream		
Description of treatment process (if multiple discharge points, include a map or diagram of facility): Mixing, flocculation and sedimentation of Low Volume Wastes and Metal Cleaning Waste. Additionally, pH adjustment of cooling tower blowdown and reduction of blowdown temperature with heat exchangers.		

Receiving Waters: Beaver Creek. (Beaver Creek flows through the Talquin Wildlife Management Area and is a trib of the Ochlockonee River, an OFW)	**Classification (indicate whether fresh or marine):**
Temperature (C):	**Design Flow:** 1.87 MGD average **;** 3.3 mgd max
pH (SU):	**Mean Flow (for previous 12 months):** The facility is only req'd to report the highest daily max for the month. The average of the max's from 12/06-11/07 is 2.35 mgd.
Conductivity (umhos/cm):	**Flow During Survey:**
Method of Chlorination: used on cooling towers	**Method of Dechlorination: N/A**
Dissolved Oxygen (mg/L):	**Total Residual Chlorine (mg/L) (after disinfection):**
Discharge is: ☒ **Continuous** ☐ **Intermittent** ☐ **Seasonal** ☐ **Rainfall Dependent** ☐ **Other**	
Toxicity Test Requirements (routine and/or additional test language test species, salinity adjustment, etc.): See Attached.	
Administrative or Consent Orders:	
Facility Mixing Zone Details: Total Recoverable Copper MZ. Permit Condition 1.A.4.h and footnote 1. Surface water samples collected in compliance with the monitoring requirements for total recoverable copper and hardness for D-001, Final Discharge to surface waters of the state, shall be obtained from the onsite, man-made ditch at monitoring location EFF-1 immediately upstream of the overflow weir, which is the POD, prior to mixing with Beaver Creek (the receiving water), and from Beaver Creek at monitoring location EFF-1A. An effluent limitation of 50 ug/L for total recoverable copper shall be achieved at EFF-1. Monitoring at EFF-1A shall be Report Only for total recoverable copper. Monitoring location EFF-1A is within Beaver Creek approximately 650 M downstream from the POD. Footnote 1: MZ for total recoverable copper of 330 M downstream from the Point of Discharge (POD) to Beaver Creek. Water Quality Standards shall be achieved at the downstream edge of the mixing zone. (I'm not sure why there is a discrepancy with the meters downstream. I have sent the Power Plant section in Tallahassee an email since they issued the permit.	
List permit violations (DMR data) and plant upsets that occurred at the plant within the last year: There were 2 copper vios reported for EFF-1A. However, the permit states that the copper limit at EFF-1A be report only. I emailed the power plant group in Tallahassee to see why a limit was put on the DMR and thus into PCS for EFF-1A.	
Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:	
Discuss MOR trends to prior data; is trend improving or declining:	

List Effluent Limits (include additional sheets as necessary):

Parameter and Units	Limit	Describe special permit conditions and permit modifications:
	See Attached.	

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. A list of the analytes tested for, results, data qualifiers, the minimum detection limit and the practical quantitation limit are given in Appendix E. The results from these analyses were compared with Water Quality Criteria (62-302 F.A.C.) and facility permit limits (Tables 1 and 2, Appendix B). Exceedances of Water Quality Criteria may be violations of specific provisions of Chapter 62-302 (F.A.C.) and/ or facility permit limits.

(3) Toxicity Bioassays

Acute screening toxicity bioassays were performed on the effluent sample using the water flea, *Ceriodaphnia dubia,* and the fish, *Cyprinella leedsi* following FDEP SOPs TA07_01 and TA07_02. Failure of toxicity testing may constitute a violation of 62-302.530(20), 62-302.530(61) and/or facility permit limits. Standard reference toxicant (SRT) tests are conducted monthly to ensure quality in toxicity testing.

(4) Bacteriological Testing

The effluent and water from control and test sites were analyzed for the presence and concentration of fecal coliform bacteria following FDEP SOP MB1_1. High levels of fecal coliform bacteria may constitute violation of 62-302.530(6) and/or facility permit limits.

(5) Habitat Assessment

Habitat assessment is used to evaluate the physical structure and extent of disturbance in a waterbody. 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 effluent and water from control and test sites are autoclaved, filtered (0.45μm), inoculated with the unicellular green alga, *Pseudokirchneriella subcapitata* (formerly *Selenastrum capricornutum,* USEPA 2002*),* and incubated for 14 days (FDEP SOP TA08_05). 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 one line of evidence for violation 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 be a violation of 62-302.530(61) F.A.C..

(7) Algal Phytoplankton and Periphyton Assemblages

Methods: Qualitative periphyton were sampled at both control and test sites by taking subsamples of algae from natural substrates throughout the sample reach (QA Rule FS7220). Phytoplankton were sampled using a 1 L grab sample (QA Rule SOP FS7100). Periphyton were subsampled and identified to the lowest practical level, usually species (FDEP SOPs AB03, AB03_1 and AB05). 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 measured in phytoplankton samples to estimate algal biomass (FDEP SOP BB05). High algal biomass implies nutrient stress (Stevenson and Bahls 1999) and may be a violation 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 violations 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

Methods: Benthic macroinvertebrates were collected using two methods. Quantitative samples were collected from Hester-Dendy multi-plate samplers incubated for 28 days (QA Rule SOP FS7430). 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 (FDEP SOP IZ06).

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 violations 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 violations 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..

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 constitutes a violation of 62-302.530(10) 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 (Karr and Chu 1998). Shifts in community composition related to a facility's effluent may constitute violations 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 (FDEP 1994) and shredders (EA Engineering 1994). Changes in the proportions of functional feeding groups related to a facility's effluent may constitute violations 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..

The Stream Condition Index (SCI): The SCI is a composite macroinvertebrate metric developed for Florida. 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. Scores are broken into three categories (I, II, and III). SCI 2007 categories are from Table LT 7200-2 of Draft DEP-SOP-002/01 as referenced in Draft Quality Assurance Rule (62-160 F.A.C.), September 17, 2007. 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 I, if it is shown to be related to a facility's effluent, may constitute violations 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(62) F.A.C..

(9) Statistical Comparisons

Statistical comparisons of the proportions of taxa, major groups or feeding groups were made using 95% confidence intervals on proportions. A 95% confidence interval is the range of values above and below a given proportion that has a 95% chance of containing the true proportion (Sokal and Rohlf 1995). If the 95% confidence intervals for two proportions do not overlap, then the proportion of X in sample 1 is significantly different from the proportion of X in sample 2 at $p<0.05$. A "$p<0.05$" level of significance means that there is less than a 5% chance that the true proportions in the two samples are the same. All comparisons that are labeled as significant in the text have a probability <0.05 that the proportions are the same.

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2008-02-04-40
Arvah B Hopkins Generating Station

Requester: Jennifer Paris
Field Report Prepared By:

Customer: NW-DIST
Collected By: Ken Espy, Blake Spencer, Cheryl Swanson
Send Final Report To Gerry Newbauer

Project ID: FYI5
Sampling Agency: Tallahassee DEP

PMAS: 1143

Lab ID *	Location / Field ID / Matrix / Temp (C) / pH / Latitude / Longitude	Comp / Grab / Collection (begin) Eastern Central / Collection (end) Eastern Central / Tot Res Chlorine (mg/L) / Diss Oxygen (mg/L) / Storet Station Number / Sample Depth m ft / Salinity (PPTh) / Sp Conductance (umho/cm) / NPDES Number / Comments	Bottle Group(s)**
	Location: Arvah Hopkins - Effluent Field ID: Arvah Hopkins Effluent Matrix: Fresh Temp (C): 20.58 pH: 7.77 Latitude: o ' " . Longitude: o ' " .	☐ Comp ☒ Grab Collection (begin) Date 2/4/08 Time 0824 Eastern Central Collection (end) Date Time Eastern Central Tot Res Chlorine (mg/L): Diss Oxygen (mg/L): 9.41 Storet Station Number: Sample Depth ☒ m ☐ ft: 0.2 ☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm): 702 NPDES Number: Comments:	A
	Location: Arvah Hopkins - Beyond Mixing Zone - 330m Field ID: Arvah Hopkins - Beyond Mixing Zone - 330m Matrix: Fresh Temp (C): 21.25 pH: 8.30 Latitude: o ' " . Longitude: o ' " .	☐ Comp ☒ Grab Collection (begin) Date 2/4/08 Time 1140 Eastern Central Collection (end) Date Time Eastern Central Tot Res Chlorine (mg/L): Diss Oxygen (mg/L): 9.33 Storet Station Number: Sample Depth ☒ m ☐ ft: 0.25 ☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm): 679 NPDES Number: Comments:	B
	Location: Arvah Hopkins Control Site Field ID: Arvah Hopkins Control Site Matrix: Fresh Temp (C): 11.68 pH: 8.00 Latitude: o ' " . Longitude: o ' " .	☐ Comp ☒ Grab Collection (begin) Date 2/4/08 Time 0933 Eastern Central Collection (end) Date Time Eastern Central Tot Res Chlorine (mg/L): Diss Oxygen (mg/L): 11.26 Storet Station Number: Sample Depth ☒ m ☐ ft: 0.2 ☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm): 648 NPDES Number: Comments:	B,C
	Location: Arvah Hopkins Test Site Field ID: Arvah Hopkins Test Site Matrix: Fresh Temp (C): 21.61 pH: 8.06 Latitude: o ' " . Longitude: o ' " .	☐ Comp ☒ Grab Collection (begin) Date 2/4/08 Time 1206 Eastern Central Collection (end) Date Time Eastern Central Tot Res Chlorine (mg/L): Diss Oxygen (mg/L): 9.48 Storet Station Number: Sample Depth ☒ m ☐ ft: 0.2 ☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm): 678 NPDES Number: Comments:	B,C

Relinquished By:	Date/Time	Shipping Method:	Received By	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
			(FL)	2/4/08 1452				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Appendix E

Chemical analysis of effluent and receiving water

Date Sampled	Field Sample ID	SCH_Group	Component	Result	Units	MDL	PQL
2/4/2008	Effluent	AGP/LN	Algal Growth Potential	10.9	mg DryWt/L	0.3	0.9
2/4/2008	Effluent	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.35 AI	ug/L	0.24	0.71
2/4/2008	Effluent	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	1.0 AI	ug/L	0.55	1.7
2/4/2008	Effluent	Microbiology	Fecal Coliforms-Membrane Filter	56 Q	#/100 mL	2	2
2/4/2008	Effluent	Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100 L	LC50		
2/4/2008	Effluent	Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100 L	LC50		
2/4/2008	Effluent	Metals	Zinc	5.0 U	ug/L	5	20
2/4/2008	Effluent	Metals	Aluminum	60 U	ug/L	60	240
2/4/2008	Effluent	Metals	Calcium	71	mg/L	0.075	0.3
2/4/2008	Effluent	Metals	Copper	16.3	ug/L	0.5	2
2/4/2008	Effluent	Metals	Chromium	1.0 U	ug/L	1	4
2/4/2008	Effluent	Metals	Cadmium	0.020 U	ug/L	0.02	0.08
2/4/2008	Effluent	Metals	Magnesium	20.4	mg/L	0.04	0.16
2/4/2008	Effluent	Metals	Silver	0.025 U	ug/L	0.025	0.1
2/4/2008	Effluent	Metals	Selenium	0.50 U	ug/L	0.5	2
2/4/2008	Effluent	Metals	Iron	36 I	ug/L	30	120
2/4/2008	Effluent	Metals	Nickel	2.38	ug/L	0.25	1
2/4/2008	Effluent	Metals	Arsenic	2.4	ug/L	0.5	2
2/4/2008	Effluent	Metals	Lead	0.20 U	ug/L	0.2	0.8
2/4/2008	Effluent	Nutrients	TSS	4 U	mg/L	4	16
2/4/2008	Effluent	Nutrients	Total-P	0.56	mg P/L	0.02	0.06
2/4/2008	Effluent	Nutrients	Kjeldahl Nitrogen	0.18 I	mg N/L	0.08	0.2
2/4/2008	Effluent	Nutrients	Ammonia-N	0.010 U	mg N/L	0.01	0.02
2/4/2008	Effluent	Nutrients	O-Phosphate-P	0.084	mg P/L	0.008	0.02
2/4/2008	Effluent	Nutrients	NO2NO3-N	0.065	mg N/L	0.004	0.01
2/4/2008	Effluent	Overflow	Oil and Grease	1.7 I	mg/L	1.7	5
2/4/2008	Effluent	Priority Organic Pollutants	2,6-Dinitrotoluene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Endosulfan sulfate	1.5 U	ug/L	1.5	5.8
2/4/2008	Effluent	Priority Organic Pollutants	2,4-Dichlorophenol	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	4,4'-DDD	1.5 U	ug/L	1.5	5.8
2/4/2008	Effluent	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	1.9 U	ug/L	1.9	7.7
2/4/2008	Effluent	Priority Organic Pollutants	Aldrin	1.5 U	ug/L	1.5	5.8
2/4/2008	Effluent	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	2.9 U	ug/L	2.9	12
2/4/2008	Effluent	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	14 U	ug/L	14	58
2/4/2008	Effluent	Priority Organic Pollutants	Hexachlorocyclopentadiene	2.9 U	ug/L	2.9	12
2/4/2008	Effluent	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	1.9 U	ug/L	1.9	7.7

Date_Sampled	Field Sample ID	SCH_Group	Component	Result	Units	MDL	PQL
2/4/2008	Effluent	Priority Organic Pollutants	Phenanthrene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Phenol	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Pyrene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	gamma-BHC	1.5 U	ug/L	1.5	5.8
2/4/2008	Effluent	Priority Organic Pollutants	4,4'-DDE	1.5 U	ug/L	1.5	5.8
2/4/2008	Effluent	Priority Organic Pollutants	4,4'-DDT	1.5 U	ug/L	1.5	5.8
2/4/2008	Effluent	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Benzidine	96 U	ug/L	96	380
2/4/2008	Effluent	Priority Organic Pollutants	2-Nitrophenol	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Acenaphthylene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Benzo(a)pyrene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Dieldrin	1.5 U	ug/L	1.5	5.8
2/4/2008	Effluent	Priority Organic Pollutants	Fluorene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Hexachlorobutadiene	2.9 U	ug/L	2.9	12
2/4/2008	Effluent	Priority Organic Pollutants	beta-BHC	1.5 U	ug/L	1.5	5.8
2/4/2008	Effluent	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	3,3'-Dichlorobenzidine	38 UJ	ug/L	38	150
2/4/2008	Effluent	Priority Organic Pollutants	Benzo(k)fluoranthene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Butyl benzyl phthalate	4.8 U	ug/L	4.8	19
2/4/2008	Effluent	Priority Organic Pollutants	Di-n-octyl phthalate	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Heptachlor	1.5 U	ug/L	1.5	5.8
2/4/2008	Effluent	Priority Organic Pollutants	Hexachlorobenzene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Isophorone	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Nitrobenzene	1.9 U	ug/L	1.9	7.7
2/4/2008	Effluent	Priority Organic Pollutants	Pentachlorophenol	2.9 U	ug/L	2.9	12
2/4/2008	Effluent	Priority Organic Pollutants	delta-BHC	1.5 U	ug/L	1.5	5.8
2/4/2008	Effluent	Priority Organic Pollutants	2,4-Dinitrotoluene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	4-Nitrophenol	14 U	ug/L	14	58
2/4/2008	Effluent	Priority Organic Pollutants	Acenaphthene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Anthracene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Benzo(a)anthracene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Di-n-butyl phthalate	4.8 U	ug/L	4.8	19
2/4/2008	Effluent	Priority Organic Pollutants	Diethyl phthalate	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	N-Nitrosodimethylamine	1.9 U	ug/L	1.9	7.7
2/4/2008	Effluent	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	2,4-Dimethylphenol	9.6 U	ug/L	9.6	38
2/4/2008	Effluent	Priority Organic Pollutants	2,4-Dinitrophenol	14 U	ug/L	14	58
2/4/2008	Effluent	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.96 U	ug/L	0.96	3.8

Date_Sampled	Field Sample ID	SCH_Group	Component	Result	Units	MDL	PQL
2/4/2008	Effluent	Priority Organic Pollutants	Dimethyl phthalate	9.6 U	ug/L	9.6	38
2/4/2008	Effluent	Priority Organic Pollutants	Endosulfan I	3.9 U	ug/L	3.9	16
2/4/2008	Effluent	Priority Organic Pollutants	Endosulfan II	3.9 U	ug/L	3.9	16
2/4/2008	Effluent	Priority Organic Pollutants	Endrin aldehyde	3.9 UJ	ug/L	3.9	16
2/4/2008	Effluent	Priority Organic Pollutants	Fluoranthene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	2.9 U	ug/L	2.9	12
2/4/2008	Effluent	Priority Organic Pollutants	2-Chloronaphthalene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	2-Chlorophenol	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	2.9 U	ug/L	2.9	12
2/4/2008	Effluent	Priority Organic Pollutants	Benzo(b)fluoranthene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Chrysene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	Endrin	1.5 U	ug/L	1.5	5.8
2/4/2008	Effluent	Priority Organic Pollutants	Heptachlor epoxide	1.5 U	ug/L	1.5	5.8
2/4/2008	Effluent	Priority Organic Pollutants	Hexachloroethane	2.9 U	ug/L	2.9	12
2/4/2008	Effluent	Priority Organic Pollutants	Naphthalene	0.96 U	ug/L	0.96	3.8
2/4/2008	Effluent	Priority Organic Pollutants	alpha-BHC	1.5 U	ug/L	1.5	5.8
2/4/2008	Effluent	Field Parameters	pH	7.77			
2/4/2008	Effluent	Field Parameters	Temperature	20.58	C		
2/4/2008	Effluent	Field Parameters	Sample Depth	0.2	m		
2/4/2008	Effluent	Field Parameters	Specific Conductance	702	umhos/cm		
2/4/2008	Effluent	Field Parameters	Dissolved Oxygen	9.41	mg/L		
2/4/2008	Control Site	AGP/LN	Algal Growth Potential	6.45	mg DryWt/L	0.3	0.9
2/4/2008	Control Site	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	1.0 I	ug/L	0.55	1.7
2/4/2008	Control Site	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.42 I	ug/L	0.24	0.71
2/4/2008	Control Site	Microbiology	Fecal Coliforms-Membrane Filter	150 BQ	#/100 mL	2	2
2/4/2008	Control Site	Metals	Silver	0.025 U	ug/L	0.025	0.1
2/4/2008	Control Site	Metals	Copper	5.2	ug/L	0.5	2
2/4/2008	Control Site	Metals	Lead	0.26 I	ug/L	0.2	0.8
2/4/2008	Control Site	Metals	Zinc	5.0 U	ug/L	5	20
2/4/2008	Control Site	Metals	Iron	280	ug/L	30	120
2/4/2008	Control Site	Metals	Nickel	1.83	ug/L	0.25	1
2/4/2008	Control Site	Metals	Magnesium	20.2	mg/L	0.04	0.16
2/4/2008	Control Site	Metals	Aluminum	320	ug/L	60	240
2/4/2008	Control Site	Metals	Arsenic	2.6	ug/L	0.5	2
2/4/2008	Control Site	Metals	Calcium	67.6	mg/L	0.075	0.3
2/4/2008	Control Site	Metals	Chromium	1.0 U	ug/L	1	4
2/4/2008	Control Site	Metals	Cadmium	0.020 U	ug/L	0.02	0.08
2/4/2008	Control Site	Metals	Selenium	0.50 U	ug/L	0.5	2
2/4/2008	Control Site	Nutrients	O-Phosphate-P	0.13	mg P/L	0.008	0.02
2/4/2008	Control Site	Nutrients	NO2NO3-N	0.013	mg N/L	0.004	0.01
2/4/2008	Control Site	Nutrients	Total-P	0.39	mg P/L	0.02	0.06

Date_Sampled	Field Sample ID	SCH_Group	Component	Result	Units	MDL	PQL
2/4/2008	Control Site	Nutrients	TSS	8 I	mg/L	4	16
2/4/2008	Control Site	Nutrients	Ammonia-N	0.050 U	mg N/L	0.05	0.1
2/4/2008	Control Site	Nutrients	Kjeldahl Nitrogen	0.3	mg N/L	0.08	0.2
2/4/2008	Control Site	Field Parameters	Specific Conductance	648	umhos/cm		
2/4/2008	Control Site	Field Parameters	pH	8			
2/4/2008	Control Site	Field Parameters	Temperature	11.68	C		
2/4/2008	Control Site	Field Parameters	Dissolved Oxygen	11.26	mg/L		
2/4/2008	Control Site	Field Parameters	Sample Depth	0.2	m		
2/4/2008	Test Site	AGP/LN	Algal Growth Potential	7.32 A	mg DryWt/L	0.3	0.9
2/4/2008	Test Site	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.24 U	ug/L	0.24	0.71
2/4/2008	Test Site	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	0.66 I	ug/L	0.55	1.7
2/4/2008	Test Site	Microbiology	Fecal Coliforms-Membrane Filter	34 B	#/100 mL	2	2
2/4/2008	Test Site	Metals	Arsenic	2.2	ug/L	0.5	2
2/4/2008	Test Site	Metals	Aluminum	120 I	ug/L	60	240
2/4/2008	Test Site	Metals	Calcium	68.9	mg/L	0.075	0.3
2/4/2008	Test Site	Metals	Silver	0.025 U	ug/L	0.025	0.1
2/4/2008	Test Site	Metals	Selenium	0.50 U	ug/L	0.5	2
2/4/2008	Test Site	Metals	Copper	15.2	ug/L	0.5	2
2/4/2008	Test Site	Metals	Nickel	2.31	ug/L	0.25	1
2/4/2008	Test Site	Metals	Lead	0.20 I	ug/L	0.2	0.8
2/4/2008	Test Site	Metals	Cadmium	0.020 U	ug/L	0.02	0.08
2/4/2008	Test Site	Metals	Magnesium	20.3	mg/L	0.04	0.16
2/4/2008	Test Site	Metals	Zinc	5.0 U	ug/L	5	20
2/4/2008	Test Site	Metals	Iron	77 I	ug/L	30	120
2/4/2008	Test Site	Metals	Chromium	1.0 U	ug/L	1	4
2/4/2008	Test Site	Nutrients	Kjeldahl Nitrogen	0.2	mg N/L	0.08	0.2
2/4/2008	Test Site	Nutrients	Total-P	0.6	mg P/L	0.02	0.06
2/4/2008	Test Site	Nutrients	Ammonia-N	0.050 U	mg N/L	0.05	0.1
2/4/2008	Test Site	Nutrients	TSS	4 I	mg/L	4	16
2/4/2008	Test Site	Nutrients	O-Phosphate-P	0.083	mg P/L	0.008	0.02
2/4/2008	Test Site	Nutrients	NO2NO3-N	0.057	mg N/L	0.004	0.01
2/4/2008	Test Site	Field Parameters	Temperature	21.61	C		
2/4/2008	Test Site	Field Parameters	Dissolved Oxygen	9.48	mg/L		
2/4/2008	Test Site	Field Parameters	Sample Depth	0.2	m		
2/4/2008	Test Site	Field Parameters	Specific Conductance	678	umhos/cm		
2/4/2008	Test Site	Field Parameters	pH	8.06			
2/4/2008	Beyond Mixing Zone	AGP/LN	Algal Growth Potential	8.52	mg DryWt/L	0.3	0.9
2/4/2008	Beyond Mixing Zone	Chlorophyll/Grain Size/BOD	Phaeophytin-a	0.24 I	ug/L	0.24	0.71
2/4/2008	Beyond Mixing Zone	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	0.91 I	ug/L	0.55	1.7
2/4/2008	Beyond Mixing Zone	Microbiology	Fecal Coliforms-Membrane Filter	39 B	#/100 mL	2	2
2/4/2008	Beyond Mixing Zone	Metals	Copper	16.4 A	ug/L	0.5	2

Date_Sampled	Field Sample ID	SCH_Group	Component	Result	Units	MDL	PQL
2/4/2008	Beyond Mixing Zone	Metals	Aluminum	140 I	ug/L	60	240
2/4/2008	Beyond Mixing Zone	Metals	Chromium	1.0 U	ug/L	1	4
2/4/2008	Beyond Mixing Zone	Metals	Zinc	5.0 U	ug/L	5	20
2/4/2008	Beyond Mixing Zone	Metals	Calcium	69.4 A	mg/L	0.075	0.3
2/4/2008	Beyond Mixing Zone	Metals	Nickel	2.40 A	ug/L	0.25	1
2/4/2008	Beyond Mixing Zone	Metals	Lead	0.20 U	ug/L	0.2	0.8
2/4/2008	Beyond Mixing Zone	Metals	Magnesium	20.6 A	mg/L	0.04	0.16
2/4/2008	Beyond Mixing Zone	Metals	Iron	93 I	ug/L	30	120
2/4/2008	Beyond Mixing Zone	Metals	Selenium	0.50 U	ug/L	0.5	2
2/4/2008	Beyond Mixing Zone	Metals	Cadmium	0.020 U	ug/L	0.02	0.08
2/4/2008	Beyond Mixing Zone	Metals	Arsenic	2.4 A	ug/L	0.5	2
2/4/2008	Beyond Mixing Zone	Metals	Silver	0.025 U	ug/L	0.025	0.1
2/4/2008	Beyond Mixing Zone	Nutrients	O-Phosphate-P	0.088	mg P/L	0.008	0.02
2/4/2008	Beyond Mixing Zone	Nutrients	NO2NO3-N	0.058	mg N/L	0.004	0.01
2/4/2008	Beyond Mixing Zone	Nutrients	Kjeldahl Nitrogen	0.18 I	mg N/L	0.08	0.2
2/4/2008	Beyond Mixing Zone	Nutrients	Ammonia-N	0.050 U	mg N/L	0.05	0.1
2/4/2008	Beyond Mixing Zone	Nutrients	TSS	4 I	mg/L	4	16
2/4/2008	Beyond Mixing Zone	Nutrients	Total-P	0.56	mg P/L	0.02	0.06
2/4/2008	Beyond Mixing Zone	Field Parameters	pH	8.3			
2/4/2008	Beyond Mixing Zone	Field Parameters	Temperature	21.25	C		
2/4/2008	Beyond Mixing Zone	Field Parameters	Specific Conductance	679	umhos/cm		
2/4/2008	Beyond Mixing Zone	Field Parameters	Sample Depth	0.25	m		
2/4/2008	Beyond Mixing Zone	Field Parameters	Dissolved Oxygen	9.33	mg/L		
2/4/2008	Field Blank	Metals	Arsenic	0.50 U	ug/L	0.5	2
2/4/2008	Field Blank	Metals	Aluminum	60 U	ug/L	60	240
2/4/2008	Field Blank	Metals	Lead	0.20 U	ug/L	0.2	0.8
2/4/2008	Field Blank	Metals	Copper	0.50 U	ug/L	0.5	2
2/4/2008	Field Blank	Metals	Chromium	1.0 U	ug/L	1	4
2/4/2008	Field Blank	Metals	Zinc	5.0 U	ug/L	5	20
2/4/2008	Field Blank	Metals	Magnesium	0.040 U	mg/L	0.04	0.16
2/4/2008	Field Blank	Metals	Selenium	0.50 U	ug/L	0.5	2
2/4/2008	Field Blank	Metals	Calcium	0.075 U	mg/L	0.075	0.3
2/4/2008	Field Blank	Metals	Cadmium	0.020 U	ug/L	0.02	0.08
2/4/2008	Field Blank	Metals	Silver	0.025 U	ug/L	0.025	0.1
2/4/2008	Field Blank	Metals	Iron	30 U	ug/L	30	120
2/4/2008	Field Blank	Metals	Nickel	0.25 U	ug/L	0.25	1
2/4/2008	Field Blank	Nutrients	O-Phosphate-P	0.004 U	mg P/L	0.004	0.01
2/4/2008	Field Blank	Nutrients	TSS	4 U	mg/L	4	16
2/4/2008	Field Blank	Nutrients	Kjeldahl Nitrogen	0.080 U	mg N/L	0.08	0.2
2/4/2008	Field Blank	Nutrients	Total-P	0.020 U	mg P/L	0.02	0.06
2/4/2008	Field Blank	Nutrients	NO2NO3-N	0.004 U	mg N/L	0.004	0.01

Date_Sampled	Field Sample ID	SCH_Group	Component	Result	Units	MDL	PQL
2/4/2008	Field Blank	Nutrients	Ammonia-N	0.010 U	mg N/L	0.01	0.02
2/4/2008	Field Blank	Overflow	Oil and Grease	1.7 U	mg/L	1.7	5
2/4/2008	Field Blank	Priority Organic Pollutants	2,6-Dinitrotoluene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Anthracene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Benzo(k)fluoranthene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Chrysene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Di-n-octyl phthalate	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Endosulfan I	3.8 U	ug/L	3.8	15
2/4/2008	Field Blank	Priority Organic Pollutants	Endosulfan II	3.8 U	ug/L	3.8	15
2/4/2008	Field Blank	Priority Organic Pollutants	Naphthalene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Pentachlorophenol	2.9 U	ug/L	2.9	12
2/4/2008	Field Blank	Priority Organic Pollutants	Phenanthrene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Pyrene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	2-Chloronaphthalene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	2.9 U	ug/L	2.9	12
2/4/2008	Field Blank	Priority Organic Pollutants	Di-n-butyl phthalate	4.8 U	ug/L	4.8	19
2/4/2008	Field Blank	Priority Organic Pollutants	Endrin	1.4 U	ug/L	1.4	5.8
2/4/2008	Field Blank	Priority Organic Pollutants	Hexachloroethane	2.9 U	ug/L	2.9	12
2/4/2008	Field Blank	Priority Organic Pollutants	N-Nitrosodimethylamine	1.9 U	ug/L	1.9	7.7
2/4/2008	Field Blank	Priority Organic Pollutants	gamma-BHC	1.4 U	ug/L	1.4	5.8
2/4/2008	Field Blank	Priority Organic Pollutants	2,4-Dichlorophenol	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	4,4'-DDE	1.4 U	ug/L	1.4	5.8
2/4/2008	Field Blank	Priority Organic Pollutants	Aldrin	1.4 U	ug/L	1.4	5.8
2/4/2008	Field Blank	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Endosulfan sulfate	1.4 U	ug/L	1.4	5.8
2/4/2008	Field Blank	Priority Organic Pollutants	Phenol	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	2,4-Dinitrophenol	14 U	ug/L	14	58
2/4/2008	Field Blank	Priority Organic Pollutants	2-Nitrophenol	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	4,4'-DDD	1.4 U	ug/L	1.4	5.8
2/4/2008	Field Blank	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	1.9 U	ug/L	1.9	7.7
2/4/2008	Field Blank	Priority Organic Pollutants	4-Nitrophenol	14 U	ug/L	14	58
2/4/2008	Field Blank	Priority Organic Pollutants	Benzidine	96 U	ug/L	96	380
2/4/2008	Field Blank	Priority Organic Pollutants	Dieldrin	1.4 U	ug/L	1.4	5.8
2/4/2008	Field Blank	Priority Organic Pollutants	Hexachlorobutadiene	2.9 U	ug/L	2.9	12
2/4/2008	Field Blank	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	2,4-Dinitrotoluene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Acenaphthene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Acenaphthylene	0.96 U	ug/L	0.96	3.8

Date_Sampled	Field Sample ID	SCH_Group	Component	Result	Units	MDL	PQL
2/4/2008	Field Blank	Priority Organic Pollutants	Benzo(a)pyrene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	14 U	ug/L	14	58
2/4/2008	Field Blank	Priority Organic Pollutants	Butyl benzyl phthalate	4.8 U	ug/L	4.8	19
2/4/2008	Field Blank	Priority Organic Pollutants	Fluorene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	2.9 U	ug/L	2.9	12
2/4/2008	Field Blank	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	2-Chlorophenol	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	4,4'-DDT	1.4 U	ug/L	1.4	5.8
2/4/2008	Field Blank	Priority Organic Pollutants	Hexachlorocyclopentadiene	2.9 U	ug/L	2.9	12
2/4/2008	Field Blank	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	2.9 U	ug/L	2.9	12
2/4/2008	Field Blank	Priority Organic Pollutants	3,3'-Dichlorobenzidine	38 UJ	ug/L	38	150
2/4/2008	Field Blank	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Benzo(a)anthracene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Diethyl phthalate	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Heptachlor epoxide	1.4 U	ug/L	1.4	5.8
2/4/2008	Field Blank	Priority Organic Pollutants	Hexachlorobenzene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Isophorone	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	1.9 U	ug/L	1.9	7.7
2/4/2008	Field Blank	Priority Organic Pollutants	Nitrobenzene	1.9 U	ug/L	1.9	7.7
2/4/2008	Field Blank	Priority Organic Pollutants	alpha-BHC	1.4 U	ug/L	1.4	5.8
2/4/2008	Field Blank	Priority Organic Pollutants	beta-BHC	1.4 U	ug/L	1.4	5.8
2/4/2008	Field Blank	Priority Organic Pollutants	delta-BHC	1.4 U	ug/L	1.4	5.8
2/4/2008	Field Blank	Priority Organic Pollutants	2,4-Dimethylphenol	9.6 U	ug/L	9.6	38
2/4/2008	Field Blank	Priority Organic Pollutants	Benzo(b)fluoranthene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Dimethyl phthalate	9.6 U	ug/L	9.6	38
2/4/2008	Field Blank	Priority Organic Pollutants	Endrin aldehyde	3.8 UJ	ug/L	3.8	15
2/4/2008	Field Blank	Priority Organic Pollutants	Fluoranthene	0.96 U	ug/L	0.96	3.8
2/4/2008	Field Blank	Priority Organic Pollutants	Heptachlor	1.4 U	ug/L	1.4	5.8

FDEP Biology Laboratory - Acute Screen Bioassay Bench Sheets

Facility: Arvah Hopkins Generating Station
Address: County Road 1585 - Geddie Road
City: Tallahassee County: Leon
Contact/District: Cheryl Swanson / BLABS
NPDES Permit #: FL 0025518
LIMS Job #: TLH-7008-02-04-07 LIMS Sample #: 1079681
Lims Data Entry: 2-13-08 MF Data Entry Verification: 2-14-08 BA

Sample Collection: Date: 2-4-08 Time: 8:24
Hold Time Start: Date: 2-4-08 Time: 8:24

Comments:

Instructions (for below): Circle appropriate wording. If yes is circled, complete blanks.

Test Type: Screen
Static / (Static Renewal) / Flow-through
Test Duration: 48 (96) Hours.

Test 1 validation: Test 1: SOP TA 07_01
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No

Test 2 validation: Test 2: SOP TA 07_02
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No

Initial sample handling:
PH adjustment : yes (no) Initial pH: ____ NaOH N HCl N ____ Drops mL Final pH: ____
Aeration : yes (no) Initial DO: ____mg/L Final DO: ____mg/L Duration: ____minutes Rate: ~____bubbles/min
Salinity adjusted (Test 1): yes (no) Initial Salinity: ____ Final Salinity: ____ Salts Hypersaline brine
Salinity adjusted (Test 2): yes (no) Initial Salinity: ____ Final Salinity: ____ Salts Hypersaline brine
Dechlorination: yes (no) ____mL of 0.025N Sodium Thiosulfate per liter of sample. Final TRC: ____

Sample Validation: MF
Temperature: Shipped ≤6°C (Yes) No (Hand Delivered) Cooling (received °C < collected °C) (Yes) No
Holding Time: ≤36 Hours (Yes) No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Light Intensity : 50 - 100 ft. candles
Photoperiod : 16 light 8 dark
Temperature Range °C:
Incubator # 2 min 25.6 max 26.4 mean 26.0
Incubator # ____ min. ____ max. ____ mean ____
Room B246 min 23.6 max 25.2 mean 24.4

Investigators' Signatures
Bruce Pollock
Marshall Lovelett
James Daniels

Loretta C. Wolfe
REVIEWER

Water Quality Parameters	20% DMW	Moderately Hard Water/ (Well Water)	Salt Water ASW NSW Test 1	Salt Water ASW NSW Test 2	Other:	Original Sample	Method	Measured by	Verified by
Field Total Residual Cl_2 (mg/L):	N/A	N/A	N/A	N/A		—	NOT MEASURED		MF
Lab Total Residual Cl_2 (mg/L):	<0.03	<0.03				<0.03	HACH	MF	BA
Alkalinity (mg/L as $CaCO_3$):	82	144				159	HACH	BA	MF
Hardness (mg/L as $CaCO_3$):	86	143				273	HACH	BA	MF
Total Ammonia (mg/L as N):	<0.017	<0.017				<0.017	DENVER	MF	BA
Salinity (ppth):	<1	<1				<1	YSI (Mettler)	BA	MF

V 1.4 9/12/05

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1079681 Test #: 1 SOP#:TA 07 01 Test Started: Date 2-5-08 Time: 13:00
Organism/Batch/Age: C.dubia/5-08/<24hr Test Ended: Date 2-9-08 Time: 0950
Chamber/Test Volume: 30 / 20 ml Diluent/ Batch: DMW / 1-31-08
Food/Batch: (YCT 2.26 TNTC P.sub) / 1-3-08 Artemia 0hr — 24hr — 48hr — 72hr — Artemia Lot# —
Feeding: Prior to Test (Prior to Renewal) Daily

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Ctrl	A	A	5	5	5	5	5	5
	B	B	5	5	5	5	5	5
	C	C	5	5	5	5	5	5
	D	D	5	5	5	5	5	5
100%	A	A	5	5	5	5	5	5
	B	B	5	5	5	5	5	5
	C	C	5	5	5	5	5	5
	D	D	5	5	5	5	5	5
			BA	MF	BA	BA	BA	MF

Loaded/Verified by: MF/BA Checked by:
m = missing d = dead BR/AR = Before/After Renewal

Test Results:
Screening Tests: Report LC50 as >100%, =100%, or <100%.
% mortality in 100% sample: 0 LC50: >100%
If Calculated: 95% CI_____ Method_____

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

Comments:

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1079681 Test #: 2 SOP#:TA 07 02 Test Started: Date 2-5-08 Time: 1325
Organism/Batch/Age: C. leeisi/2-5-08/10days Test Ended: Date 2-9-08 Time: 0955
Chamber/Test Volume: 1000 / 500 ml Diluent/ Batch: well H2O / 2-4-08
Food/Batch: YCT — P.sub — (Artemia) 0hr 20-08 24hr — 48hr 22-08 72hr — Artemia Lot# 651-536-90
Feeding: (Prior to Test Prior to Renewal) Daily

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Ctrl	A	A D9	5	5	4 1D	4	4	4
	B	B D10	5	5	5	5	5	5
	C	C D11	5	5	5	5	5	5
	D	D D12	5	5	5	5	5	5
100%	A	A D13	5	5	4 1D	4	4	4
	B	B D14	5	5	5	5	5	5
	C	C D15	5	5	5	5	5	5
	D	D D16	5	5	5	5	5	5
Loaded/Verified by: JD / MF		Checked by:	JD	JD	JD	JD	JD	MF

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

Comments:

Test Results:
Screening Tests: Report LC50 as >100%, =100%, or <100%.
% mortality in 100% sample: 5 LC50: >100%
If Calculated: 95% CI_____ Method_____

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

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FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 107981 **Test #:** 1 of 2

TEST SOP #: TA07_01 **Test Species:** (*Ceriodaphnia dubia*) *Cyprinella leedsi* *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

Concentration Ctrl	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	M		M	M		M
pH (S.U.)	8.0		8.0	8.1		8.2
Temperature °C	24.0		24.0	24.0		25.1
Dissolved Oxygen mg/L	7.8		7.6	7.9		8.4
Conductivity (µmhos) mmhos	180		196	175		194
(initials) Measured by:	BA		BA	BA		MF
(initials) Recorded by:	MA		BA	BA		MF

Comments: M = metal vial

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	M		M	M		M
pH (S.U.)	7.8		8.5	7.8		8.3
Temperature °C	24.0		24.0	24.9		25.1
Dissolved Oxygen mg/L	7.3		7.8	8.1		8.3
Conductivity (µmhos) mmhos	701		693	687		707
(initials) Measured by:	BA		BA	BA		MF
(initials) Recorded by:	BA		BA	BA		MF

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

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V 2.0 2/24/04

FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 1079681 **Test #:** 2 of 2

TEST SOP #: TA07_02 **Test Species:** *Ceriodaphnia dubia* ~~*Cyprinella leedsi*~~ *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

Concentration GR1	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	M	B	C	C	D	A
pH (S.U.)	8.1	8.2	8.2	8.1	8.1	8.2
Temperature °C	24.0	24.7	24.0	24.2	24.0	24.9
Dissolved Oxygen mg/L	7.7	6.6	7.1	7.4	6.7	7.5
Conductivity (µmhos) mmhos	286	282	297	279	281	285
(initials) Measured by:	BA	JD	JD	JD	JD	MF
(initials) Recorded by:	BA	JD	JD	JD	JD	MF

Comments: M = meter vial

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	M	B	C	C	D	A
pH (S.U.)	7.9	8.1	8.2	7.8	7.9	8.1
Temperature °C	24.0	24.9	24.3	25.5	24.0	25.5
Dissolved Oxygen mg/L	7.8	6.1	7.0	7.8	~~4.7~~ 7.7 BA	7.2
Conductivity (µmhos) mmhos	709	677	695	701	687	704
(initials) Measured by:	BA	JD	JD	JD	JD	MF
(initials) Recorded by:	BA	JD	JD	JD	JD	MF

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

MBL Aquaculture
4569 Samuel Street
Sarasota, Florida 34233
TEL: (800) 889-0384
FAX: (941) 922-3874
EMAIL: sales@mblaquaculture.com
WEB: www.MBLAquaculture.com

NELAC Accredited

Organism Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Date: 2/4/08

Shipped to: FDEP

P.O. No: N/A

Species	Quantity	Age	Brood Number	Temperature	Salinity
Mysidopsis bahia	150	4 DAYS	MS080131	25°C	20 ‰
Menidia beryllina	150	12 DAYS	SS080123	25°C	20 ‰
Cyprinella leedsi	200	9 DAYS	CL080126	25°C	
Pimephales promelas	150	10 days	FM080125	25°C	

Packed by: [signature]

Shipped Via: FedEx

Notes: _____

Thank you for your order.

Appendix G

Standard Reference Toxicant Data

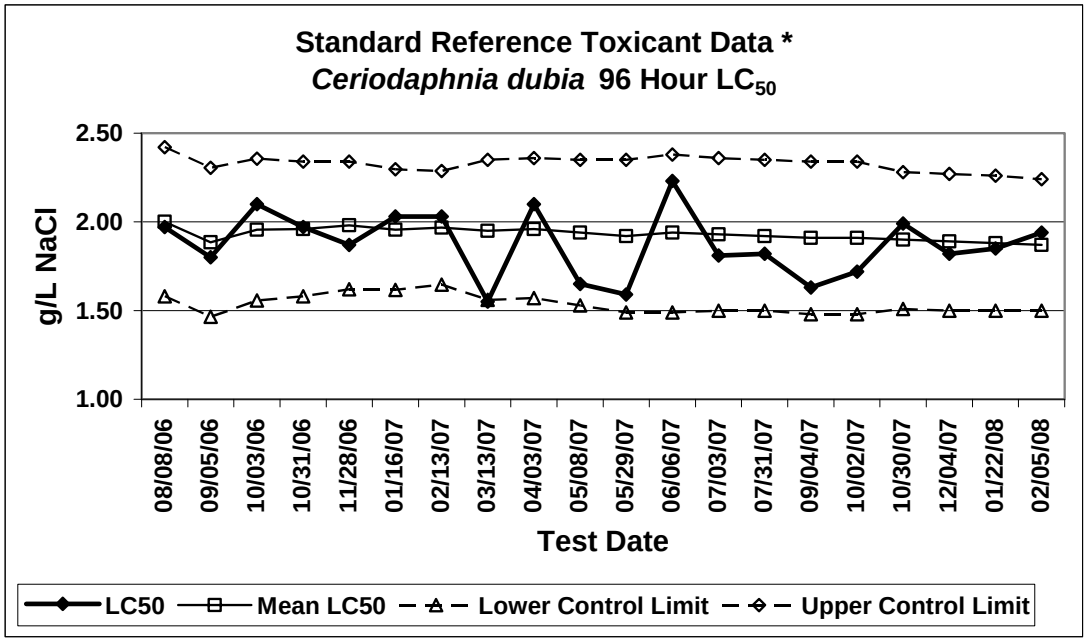
Florida Department of Environmental Protection
Bureau of Laboratories

Standard Reference Toxicant (SRT) Test Data - 96-hour Acute Toxicity
Ceriodaphnia dubia (water flea) - Sodium Chloride (NaCl)

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
08/08/06	1.97	2.00	0.21	1.58	2.42
09/05/06	1.80	1.89	0.21	1.47	2.31
10/03/06	2.10	1.96	0.20	1.56	2.36
10/31/06	1.97	1.96	0.19	1.58	2.34
11/28/06	1.87	1.98	0.18	1.62	2.34
01/16/07	2.03	1.96	0.17	1.62	2.30
02/13/07	2.03	1.97	0.16	1.65	2.29
03/13/07	1.55	1.95	0.20	1.56	2.35
04/03/07	2.10	1.96	0.19	1.57	2.36
05/08/07	1.65	1.94	0.20	1.53	2.35
05/29/07	1.59	1.92	0.22	1.49	2.35
06/06/07	2.23	1.94	0.22	1.49	2.38
07/03/07	1.81	1.93	0.22	1.50	2.36
07/31/07	1.82	1.92	0.21	1.50	2.35
09/04/07	1.63	1.91	0.22	1.48	2.34
10/02/07	1.72	1.91	0.21	1.48	2.34
10/30/07	1.99	1.90	0.19	1.51	2.28
12/04/07	1.82	1.89	0.19	1.50	2.27
01/22/08	1.85	1.88	0.19	1.50	2.26
02/05/08	1.94	1.87	0.18	1.50	2.24

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

CV = 9.86
EPA reference 75th quartile CV = 29%



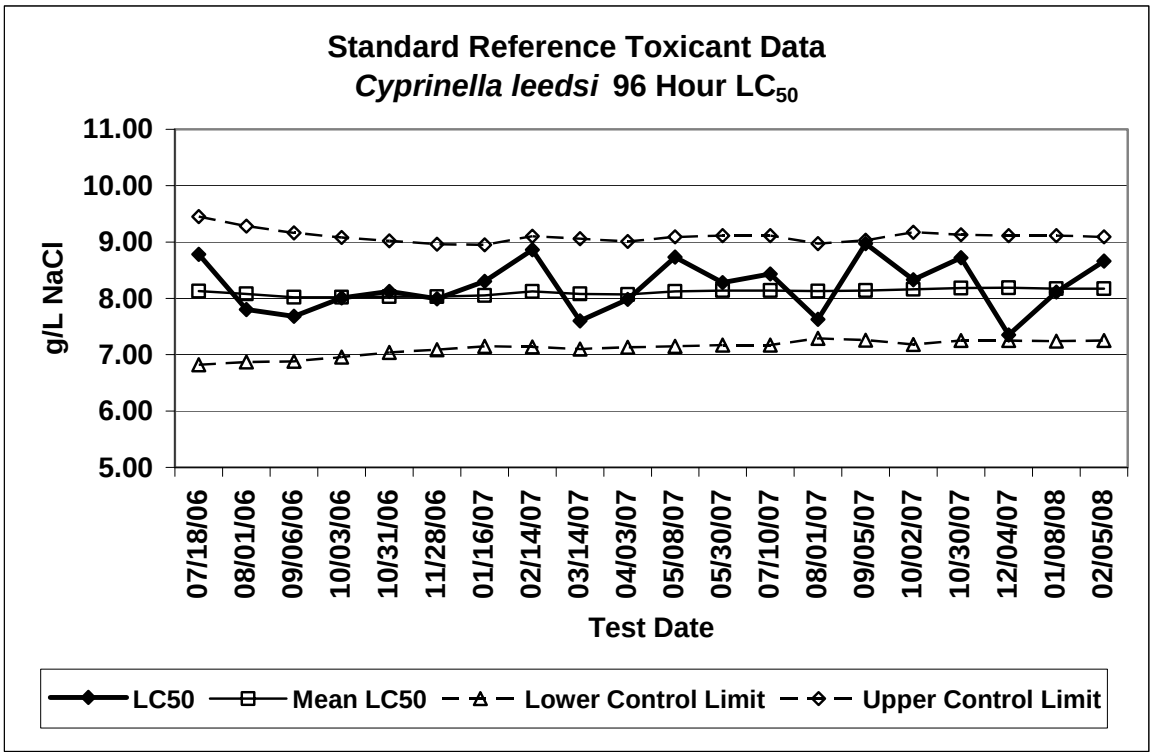
Florida Department of Environmental Protection
Bureau of Laboratories

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

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
07/18/06	8.78	8.13	0.66	6.82	9.45
08/01/06	7.80	8.08	0.60	6.87	9.28
09/06/06	7.68	8.02	0.57	6.88	9.16
10/03/06	8.01	8.02	0.53	6.96	9.08
10/31/06	8.12	8.03	0.49	7.04	9.02
11/28/06	7.99	8.03	0.47	7.09	8.96
01/16/07	8.30	8.05	0.45	7.15	8.95
02/14/07	8.86	8.12	0.49	7.14	9.10
03/14/07	7.60	8.08	0.49	7.10	9.06
04/03/07	7.98	8.07	0.47	7.13	9.01
05/08/07	8.73	8.12	0.48	7.15	9.09
05/30/07	8.28	8.14	0.48	7.17	9.11
07/10/07	8.43	8.14	0.48	7.17	9.11
08/01/07	7.63	8.13	0.42	7.29	8.97
09/05/07	8.97	8.14	0.44	7.26	9.03
10/02/07	8.33	8.16	0.50	7.18	9.17
10/30/07	8.72	8.18	0.47	7.25	9.13
12/04/07	7.35	8.19	0.47	7.25	9.11
01/08/08	8.11	8.17	0.47	7.24	9.11
02/05/08	8.66	8.17	0.47	7.25	9.09

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

CV = 5.71
EPA reference 75th quartile CV = 19%



FDEP Biology Laboratory - Acute SRT Bench Sheet

Test Organism: *Americamysis bahia* Method 2007.0 | *Menidia beryllina* Method 2006.0 | *Hyalella azteca* Method 100.1 EPA-600-R-99-064
Ceriodaphnia dubia Method 2002.0 | *Cyprinella leedsi* Method 2000.0 | *Pimephales promelas* Method 2000.0 | Other: _____

Method from EPA-821-R-02-012
Test Type: 48 hour non-renewal / 96 hour renewal
Test Page 1 of 2

Diluent/ Batch #: DMW 1-31-08
Toxicant/ Batch#: NaCl 12-4-08

Test Beginning: Date: 2-5-08 Time: 13:30
Test Ending: Date: 2-9-08 Time: 1000

Water Quality Parameters	Diluent	Method	Initials
Total Residual Cl_2 (mg/L):	<0.03	Hach	MF
Alkalinity (mg/L as $CaCO_3$):	82	Hach	BA
Hardness (mg.L as $CaCO_3$):	86	Hach	BA
Total Ammonia (mg/L as N):	<0.07	Denver	MF
Salinity (ppth):	<1	Mettler	BA

Organism Batch #/ Age: 5-08I <24hr
Feeding: Prior to test / Prior to renewal / Daily
Food: YCT / *P.subcapitata* Artemia: Lot #_____
Food Batch: 7-26-07 / 1-31-08 0hr — 24hr — 48hr — 72hr —
Chamber size: 30 mL
Test volume: 20 mL per replicate

Conc. µg/L mg/L	Rep.	Chamber #	Number Live 0 hr / 48 hr	24 hr / 72 hr	48 hr / 96 hr	pH (SU) 0 hr / 48 hr	24 hr / 72 hr	48 hr / 96 hr	Temperature (°C) 0 hr / 48 hr	24 hr / 72 hr	48 hr / 96 hr	D.O. (mg/L) 0 hr / 48 hr	24 hr / 72 hr	48 hr / 96 hr	Uncorrected Conductivity µmhos/cm / mmhos/cm 0 hr / 48 hr	24 hr / 72 hr	48 hr / 96 hr
Control	A	A	5	5	5	8.0		8.1	24.0		24.0	7.9		7.7	0.179		0.181
	B	B	5	5	5												
	C	C	5	5	5												
	D	D	5	5	5												
1.5	A	A	5	5	5	8.0		8.0	24.0		24.0	7.5		7.4	2.90		2.93
	B	B	5	5	5												
	C	C	5	5	5												
	D	D	5	5	5												
2.0	A	A	5	5	4 1D	8.0		8.0	24.1		24.0	7.5		7.3	3.94		4.14
	B	B	5	5	5												
	C	C	5	5	5												
	D	D	5	5	4 1D												
2.5	A	A	5	2 3D	1 1D	8.0		8.0	24.2		24.0	7.4		7.3	4.79		5.01
	B	B	5	4 1D	0 4D												
	C	C	5	5	0 5D												
	D	D	5	4 1D	0 4D												
3.0	A	A	5	2 3D	0 2D	8.0		8.0	24.0		24.0	7.4		7.3	5.65		5.62
	B	B	5	2 3D	0 2D												
	C	C	5	2 3D	0 2D												
	D	D	5	2 3D	0 2D												
4.0	A	A	5	0 5D	—	8.1	8.0	—	24.1	25.3	—	7.2	7.6	—	7.4	7.1	—
	B	B	5	0 5D	—												
	C	C	5	0 5D	—												
	D	D	5	0 5D	—												
	A																
	B																
	C																
	D																
Loaded / measured by:			MF	MF	BA	BA	MF	BA	BA	MF	BA	BA	MF	BA	BA	MF	BA
Recorded by:			BA	MF	BA	BA	MF	BA	BA	MF	BA	BA	MF	BA	BA	MF	BA

Investigators' Signatures
Bruce Adams
Marshall Fairchild
Jason Davis
Loretta C. Wolfe
REVIEWER

Concentrations prepared by: BA
Loading verified by: BA
Light Intensity: 50-100 Ft. candles
Photoperiod: 16 hours Light / 8 hours dark
Temperature Range °C:
Incubator # 2 min. 25.6 max. 26.6 mean 26.0
Incubator # ___ min. ___ max. ___ mean ___
Room B246 min. 23.6 max. 25.2 mean 24.4

Comments:

Statistics: Method: Spearman-Karber
48 / 96 hour LC_{50}: 2.25
95% Confidence Interval: lower 2.14 upper 2.36

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revised 08/24/06 SP

FDEP Biology Laboratory - Acute SRT Bench Sheet

Test Organism: *Americamysis bahia* Method 2007.0 | *Menidia beryllina* Method 2006.0 | *Hyalella azteca* Method 100.1 EPA-600-R-99-064
Ceriodaphnia dubia Method 2002.0 | *Cyprinella leedsi* Method 2000.0 | *Pimephales promelas* Method 2000.0 | Other: _____

Method from EPA-821-R-02-012
Test Type: 48 hour non-renewal / 96 hour renewal
Test Page 2 of 2

Diluent/ Batch #: DMW 1-31-08
Toxicant/ Batch#: NaCl 12-4-08

Test Beginning: Date: 2-5-08 Time: 13:30
Test Ending: Date: 2-9-08 Time: 1000

Water Quality Parameters	Diluent	Method	Initials
Total Residual Cl_2 (mg/L):	<0.03	Hach	MF
Alkalinity (mg/L as $CaCO_3$):	82	Hach	BA
Hardness (mg.L as $CaCO_3$):	86	Hach	BA
Total Ammonia (mg/L as N):	<0.07	Denver	MF
Salinity (ppth):	21	Mettler	BA

Organism Batch #/ Age: 5-081 <24hr
Feeding: Prior to test / Prior to renewal / Daily
Food: YCT / *P.subcapitata* Artemia: Lot # —
Food Batch: 7-26-07 1-31-08 0hr — 24hr — 48hr — 72hr —
Chamber size: 30 mL
Test volume: 20 mL per replicate

Conc. g/L µg/L mg/L	Rep.	Chamber #	Number Live 0 hr	Number Live 24 hr (72 hr)	Number Live 48 hr (96 hr)	pH (SU) 0 hr (48 hr)	pH (SU) 24 hr (72 hr)	pH (SU) 48 hr (96 hr)	Temperature (°C) 0 hr (48 hr)	Temperature (°C) 24 hr (72 hr)	Temperature (°C) 48 hr (96 hr)	D.O. (mg/L) 0 hr (48 hr)	D.O. (mg/L) 24 hr (72 hr)	D.O. (mg/L) 48 hr (96 hr)	Uncorrected Conductivity µmhos/cm (mmhos/cm) 0 hr (48 hr)	Uncorrected Conductivity 24 hr (72 hr)	Uncorrected Conductivity 48 hr (96 hr)
Control	A	A	5	5	5	7.9		8.2	24.0		24.2	7.6			0.172		0.195
	B	B	5	5	5												
	C	C	5	5	5												
	D	D	5	5	5												
1.5	A	A	5	5	5	8.0		8.1	24.0		24.7	7.5			2.85		2.95
	B	B	5	5	5												
	C	C	5	5	5												
	D	D	5	5	5												
2.0	A	A	4	4	3 1D	8.0		8.1	24.0		24.7	7.5			3.76		3.88
	B	B	5	4 1D	2 2D												
	C	C	5	4 1D	3 1D												
	D	D	4	3 1D	1 2D												
2.5	A	A	1	1	0 1D	8.0		8.1	24.0		24.9	7.5			4.60		4.66
	B	B	—	—	—												
	C	C	2	0 2D	—												
	D	D	—	—	—												
3.0	A	A	—	—	—	8.0			24.0			7.5			5.4		
	B	B	—	—	—												
	C	C	—	—	—												
	D	D	—	—	—												
4.0	A	A	—	—	—												
	B	B	—	—	—												
	C	C	—	—	—												
	D	D	—	—	—												
	A																
	B																
	C																
	D																
Loaded / measured by:			BA	BA	MF	BA		MF	BA		MF	BA			BA		MF
Recorded by:			BA	BA	MF	BA		MF	BA		MF	BA			BA		MF

Investigators' Signatures
Bec Marshall Faircloth James Davis
Loretta C Wolfe
REVIEWER

Concentrations prepared by: BA
Loading verified by: BA
Light Intensity: 50-100 Ft. candles
Photoperiod: 16 hours Light / 8 hours dark
Temperature Range °C:
Incubator # 2 min 25.6 max 26.6 mean 26.0
Incubator # ___ min ___ max ___ mean ___
Room B246 min 23.6 max 25.2 mean 24.4

Comments:

Statistics: Method: Spearman-Karber
48 / 96 hour LC_{50}: 1.94
95% Confidence Interval: lower 1.84 upper 2.06

FDEP Biology Laboratory - Acute SRT Bench Sheet

Test Organism: *Americamysis bahia* Method 2007.0 | *Menidia beryllina* Method 2006.0 | *Hyalella azteca* Method 100.1 EPA-600-R-99-064
Ceriodaphnia dubia Method 2002.0 | *Cyprinella leedsi* Method 2000.0 | *Pimephales promelas* Method 2000.0 | Other: _____

Method from EPA-821-R-02-012
Test Type: 48 hour non-renewal / 96 hour renewal
Test Page 1 of 2

Diluent/ Batch #: Well 12-4-08
Toxicant/ Batch#: NaCl 12-4-08

Test Beginning: Date: 2-5-08 Time: 1320
Test Ending: Date: 2-9-08 Time: 1010

Water Quality Parameters	Diluent	Method	Initials
Total Residual Cl_2 (mg/L):	<0.03	Hach	MF
Alkalinity (mg/L as $CaCO_3$):	144	Hach	BA
Hardness (mg.L as $CaCO_3$):	143	Hach	BA
Total Ammonia (mg/L as N):	<0.07	Denver	MF
Salinity (ppth):	<1	Mettler	BA

Organism Batch #/ Age: 2-5-08 / 10 day
Feeding: Prior to test / Prior to renewal / Daily
Food: YCT *P.subcapitata* Artemia; Lot # GSL536 90
Food Batch: — —
0hr 2.08 24hr — 48hr 2.08 72hr —
Chamber size: 1000 mL
Test volume: 500 mL per replicate

Conc. µg/L mg/L	Rep.	Chamber #	Number Live 0 hr / 48 hr	24 hr / 72 hr	48 hr / 96 hr	pH (SU) 0 hr / 48 hr	24 hr / 72 hr	48 hr / 96 hr	Temperature (°C) 0 hr / 48 hr	24 hr / 72 hr	48 hr / 96 hr	D.O. (mg/L) 0 hr / 48 hr	24 hr / 72 hr	48 hr / 96 hr	Uncorrected Conductivity µmhos/cm mmhos/cm 0 hr / 48 hr	24 hr / 72 hr	48 hr / 96 hr
Control	A	B13	(A)5/10	10	10	7.8		8.2	24.1		24.0	7.1		7.0	0.285		0.290
	B	B14	5/10	10	10		7.9			24.5			6.3			0.284	
	C		5														
	D		5														
6.0	A	B15	5/10	10	10	7.8		8.0	24.7		24.0	7.2		6.4	10.73		10.3
	B	B16	5/10	8/20	8		7.8			24.9			6.1			10.0	
	C		5														
	D		5														
7.0	A	B17	5/10	10	10	7.8		8.0	25.0		24.0	7.3		6.5	12.54		11.8
	B	B18	5/10	9/10	9		7.8			24.8			5.7			11.7	
	C		5														
	D		5														
8.0	A	B19	5/10	9/10	9	7.8		8.0	25.2		24.0	7.4		6.5	14.07		13.5
	B	B20	5/10	8/20	8		7.9			24.6			6.2			13.1	
	C		5														
	D		5														
9.0	A	B21	5/10	6/10	4/20	7.8		8.0	25.2		24.0	7.3		6.5	15.64		15.0
	B	B22	5/10	8/20	7/10		7.9			24.3			6.2			14.8	
	C		5														
	D		5														
10.0	A	B23	5/10	1/10	0/10	7.8		8.1	25.3		24.0 / 26.5	7.3		6.5	17.28		16.4
	B	B24	5/10	2/10	1/10		7.9			24.2			6.2			16.1	
	C		5														
	D		5														
	A																
	B																
	C																
	D																
Loaded / measured by:			JD	JD	JD	BA	JD	JD	BA	JD	JD	BA	JD	JD	BA	JD	JD
Recorded by:			BA	JD	JD	BA	JD	JD	BA	JD	JD	BA	JD	JD	BA	JD	JD

Investigators' Signatures
Bruce Atkinson
Marshall Faircloth
James Daniels
Loretta C. Wolfe
REVIEWER

Concentrations prepared by: MF
Loading verified by: MF
Light Intensity: 50-100 Ft. candles
Photoperiod: 16 hours Light / 8 hours dark
Temperature Range °C:
Incubator # 2 min 25.6 max 26.6 mean 26.0
Incubator # ___ min ___ max ___ mean ___
Room B246 min 23.6 max 25.2 mean 24.4

000033 PAGE

Comments:
(A) Wrong number transcribed BA 2-5-08

Statistics: Method: Spearman-Karber
48/ 96 hour LC_{50}: 8.92
95% Confidence Interval: lower 8.58 upper 9.27

revised 08/24/06 SP

FDEP Biology Laboratory - Acute SRT Bench Sheet

Test Organism: *Americamysis bahia* Method 2007.0 | *Menidia beryllina* Method 2006.0 | *Hyalella azteca* Method 100.1 EPA-600-R-99-064
Ceriodaphnia dubia Method 2002.0 | *Cyprinella leedsi* Method 2000.0 | *Pimephales promelas* Method 2000.0 | Other: _____

Method from EPA-821-R-02-012
Test Type: 48 hour non-renewal / 96 hour renewal
Test Page 2 of 2

Diluent/ Batch #: well 12-4-08
Toxicant/ Batch#: NaCl 12-4-08

Test Beginning: Date: 2-5-08 Time: 1340 MF
Test Ending: Date: 2-9-08 Time: 1010

Water Quality Parameters	Diluent	Method	Initials
Total Residual Cl_2 (mg/L):	<0.03	Hach	MF
Alkalinity (mg/L as $CaCO_3$):	144	Hach	BA
Hardness (mg.L as $CaCO_3$):	143	Hach	BA
Total Ammonia (mg/L as N):	<0.07	Denver	MF
Salinity (ppth):	<1	Mettler	BA

Organism Batch #/ Age: 2-5-08 10 days
Feeding: Prior to test / Prior to renewal / Daily
Food: YCT P.subcapitata Artemia: Lot # GSL-576-90
Food Batch: _____ _____ 0hr 20-22 24hr - 48hr 22-26 72hr —
Chamber size: 1000 mL
Test volume: 500 mL per replicate

Conc. ‰ µg/L mg/L	Rep.	Chamber #	Number Live 0 hr / 24 hr / 48 hr	pH (SU) 0 hr / 24 hr / 48 hr	Temperature (°C) 0 hr / 24 hr / 48 hr	D.O. (mg/L) 0 hr / 24 hr / 48 hr	Uncorrected Conductivity µmhos/cm mmhos/cm 0 hr / 24 hr / 48 hr
Control	A	B13	10 / 10 / 10	8.1 / — / 8.2	24.0 / — / 24.9	7.5 / — / 7.5	0.279 (A) / — / 0.295
	B	B14	10 / 10 / 10	— / 8.1 / —	— / 24.0 / —	— / 6.0 / —	— / 0.280 / —
	C						
	D						
6.0	A	B15	10 / 9 / 9	8.0 / — / 8.0	24.0 / — / 24.9	7.1 / — / 7.1	10.1 / — / 10.3
	B	B16	8 / 8 / 8	— / 8.0 / —	— / 24.0 / —	— / 6.1 / —	— / 10.2 / —
	C						
	D						
7.0	A	B17	10 / 10 / 10	8.0 / — / 8.0	24.0 / — / 25.0	7.1 / — / 7.1	12.1 / — / 12.3
	B	B18	9 / 9 / 9	— / 7.9 / —	— / 24.1 / —	— / 6.1 / —	— / 13.0 / —
	C						
	D						
8.0	A	B19	9 / 8 (D) / 8	8.0 / — / 8.0	24.0 / — / 25.2	7.1 / — / 7.0	13.9 / — / 14.0
	B	B20	8 / 8 / 8	— / 7.9 / —	— / 24.0 / —	— / 5.9 / —	— / 13.6 / —
	C						
	D						
9.0	A	B21	4 / 4 / 4	8.0 / — / 7.9	24.1 / — / 25.0	7.1 / — / 6.7	15.6 / — / 15.8
	B	B22	7 / 6 (D) / 4 (D)	— / 7.8 / —	— / 24.1 / —	— / 5.8 / —	— / 15.3 / —
	C						
	D						
10.0	A		— / — / —	8.0 / — / —	— / — / —	— / — / —	— / — / —
	B	B24	1 / 0 (D) / —	— / 7.9 / —	24.2 / 24.1 / —	7.0 / 5.9 / —	10.9 / 16.6 / —
	C						
	D						
	A						
	B						
	C						
	D						
Loaded / measured by:			JD / JD / MF	JD / JD / MF	JD / JD / MF	JD / JD / MF	JD / JD / MF
Recorded by:			JD / JD / MF	JD / JD / MF	JD / JD / MF	JD / JD / MF	JD / JD / MF

Investigators' Signatures
Marshall Faircloth
Jason Farmer
Loretta C. Wolfe
REVIEWER

Concentrations prepared by: JD
Loading verified by: MF
Light Intensity: 50-100 Ft. candles
Photoperiod: 16 hours Light / 8 hours dark
Temperature Range °C:
Incubator # 2 min 25.6 max 26.6 mean 26.0
Incubator # ___ min ___ max ___ mean ___
Room B248 min 23.6 max 25.2 mean 24.4

000034

Comments: (A) 0.279 MF 2-7-08 for JD

Statistics: Method: Spearman-Karber
48 / 96 hour LC_{50}: 8.66
95% Confidence Interval: lower 8.32 upper 9.01

Appendix H

Habitat Assessment Field Sheets

DEP-SOP-001/01: Form FD 9000-3 (draft Sept 30, 2005) ELFS

PHYSICAL/CHEMICAL CHARACTERIZATION ELECTRONIC FIELD SHEET

SAMPLE ID : _____ ORG ID : _____
COUNTY : Leon STORET # : _____
DATE : 3/14/12 TIME : 0933
Latitude : (degrees) (minutes) (seconds) Longitude : (degrees) (minutes) (seconds)
SITE NAME : Control Site - Arvah Hopkins SAMPLE COMPLETE ? Yes
FIELD ID/NAME : Brewer Creek RECEIVING BODY OF WATER : ~~Ochlockonee~~ Ochlockonee River

RIPARIAN ZONE / STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category) :
Forest/Natural | silviculture | Field/Pasture | Agricultural | Residential | Commercial | Industry | Other (Specify)

Local Watershed Erosion (select one) : ☒ None ☐ Slight ☐ Moderate ☐ Heavy
Local Watershed NPS Pollution : ☒ No evidence ☐ Slight ☐ Moderate ☐ Heavy
Width of Riparian Vegetation (m) on Each Buffer Side
Left Bank : >18 Right Bank : >18
High Water Mark: 0.5 (m) + 0.2 (above present water level) = 0.7 (present depth) (above bed)
Artificially Impounded ☐ Yes ☒ No
Artificially Channelized : ☒ No ☐ Some recovery ☐ Mostly recovered, more sinuous ☐ Recent, severe
Canopy Cover % : ☐ Open ☒ Heavily Shaded ☐ Lightly Shaded (11-45%) ☐ Moderate Shaded (46-80%)

Typical Width (m) Depth (m)/Velocity (m/sec) Transect
3 m wide
[ ] m/s 0.2 m/s [ ] m/s
[ ] m deep 0.2 m deep [ ] m deep

SEDIMENT / SUBSTRATE

Sediment Oils : ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse
Sediment Odors : ☒ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other (Specify) :
Sediment Deposition : ☐ Sludge ☐ Other (Specify) :
Sand Smothering : None (Slight) Moderate Severe
Silt Smothering : None (Slight) Moderate Severe

SUBSTRATE TYPE
Assessment Tool: ☒ SCI ☐ BioRecon ☐ LCI ☐ LVI

	% Coverage	INVERT # Times Sampled	PERI # Times Sampled
Woody Debris (Snags)	3	3	3
Undercut Banks / Roots	4	4	4
Leaf Packs or Mat	5	5	5
Aquatic Vegetation			
Rock or Shell Rubble..			
Sand.....			
Mud / Muck / Silt			
Other			
Other			

WATER QUALITY

	Depth (M)	Temp. (°C)	pH (SU)	D.O. (MG/L)	Cond. (UMHOS/CM)	Salinity (PPT)	SECCHI (M)
Top :	.2	11.83	8.00	11.26	640		
Mid-Depth :							☐ VOB
Bottom :							

Water Surface Oils : ☒ None ☐ Sheen ☐ Globs ☐ Slick
Water Odors : ☒ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Other (Specify) :
Water Sample Taken ? ☒ Yes ☐ No
Algae Sample Taken ? ☒ Yes ☐ No
SYSTEM TYPE ☒ Stream ☐ Lake ☐ Wetland ☐ Estuary ☐ Other (Specify) :
Clarity : ☒ Clear ☐ Slightly Turbid ☐ Turbid ☐ Opaque
Color : ☐ Tannic ☐ Green (Algae) ☒ Clear ☐ Other (Specify) :

WEATHER CONDITIONS / NOTES : Sunny, cool
H_2S smell
Left 1st 06/4/12

ABUNDANCE

	Absent	Rare	Common	Abundant
Periphyton :	☐	☐	☐	☐
Fish :	☐	☒	☐	☐
Aquatic Macrophytes :	☐	☐	☐	☐
Iron/Sulfur Bacteria :	☒	☐	☐	☐

☒ The antecedent hydrologic conditions have been met to my best knowledge.
Water samples preserved ? ☐ Yes ☐ pH<2 ☐ No Algae samples preserved ? ☒ Yes ☐ No

SAMPLING TEAM : Ken Espy, Blake [illegible], Chad Sweatman
SIGNATURE : [signature]
DATE : 3/14/12

ELFS Version 1.0

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (MM/DD/YY): 2/4/08	RECEIVING BODY OF WATER: Ochlockonee River
REMARKS:	COUNTY: Leon	LOCATION: control site A. Hopkins SYR	FIELD ID/NAME: Beaver Creek

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components 28 **Substrate Diversity** 15	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 9 13	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 14 Primary Score 52	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** 20	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 10 Left Bank 10	Bankfull > 60% of bank height. Slope of bank ≤ 60°. Bankfull is 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 10 Left Bank 10	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 10 Left Bank 10 Secondary Score 80	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

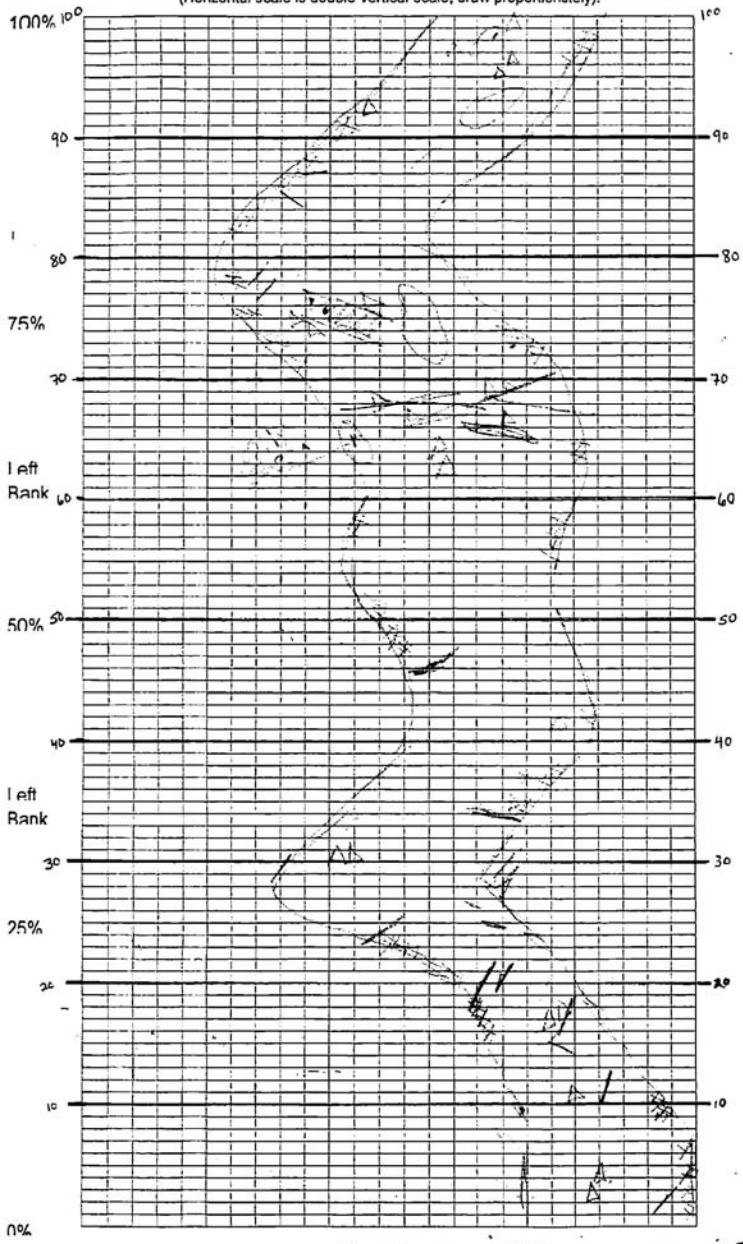
132 **TOTAL SCORE**

ANALYSIS DATE: 2/4/08	ANALYST: Ken Espy	SIGNATURE:

DEP-SOP-001/01: Form FD 9000-6

Stream/River Habitat Sketch Sheet

Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).



Substrates: Code key, draw proportionate habitat abundance.

- / Snags
- X Roots/undercut banks
- A Leaf Packs (or mats)
- ☐ Macrophytes
- D exposed Sand
- ☐ _____
- ☐ _____

Velocity:

Note where velocity measures were taken.

Habitat Smothering:

Note areas (on map) where sand or silt is smothering substrates, limiting habitability.

Bank Stability:

Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:

Note areas (on map) where natural vegetation is altered or eliminated.

Plants observed/other notes:

Arvah Hopkins Control Site

A. Hopkins FYI 2/4/08

Revision Date: February 1, 2004

DEP-SOP-001/01: Form FD 9000-3 (draft Sept 30, 2005) ELFS

PHYSICAL/CHEMICAL CHARACTERIZATION ELECTRONIC FIELD SHEET

SAMPLE ID : _____ ORG ID : _____
COUNTY : _____ STORET # : _____
DATE : 2/4/08 TIME : 1326

Latitude : (degrees) (minutes) (seconds) Longitude : (degrees) (minutes) (seconds)

SITE NAME : Arvain Hopkins - TEST Site SAMPLE COMPLETE ? YES
FIELD ID/NAME : Bear creek headwaters RECEIVING BODY OF WATER : Ochlockonee River

RIPARIAN ZONE / STREAM FEATURES

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

Forest/Natural	silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industry	Other (Specify)
75				10	5	10	

Local Watershed Erosion (select one) : ☐ None ☒ Slight ☐ Moderate ☐ Heavy
Local Watershed NPS Pollution : ☐ No evidence ☒ Slight ☐ Moderate ☐ Heavy

Width of Riparian Vegetation (m) on Each Buffer Side
Left Bank : <6 Right Bank : >8

High Water Mark: 0.5 (m) + 0.15 (above present water level) = 0.65 (present depth) (above bed)

Artificially Impounded ☐ Yes ☑ No

Typical Width (m) Depth (m)/Velocity (m/sec) Transect
2 m wide

m/s	0.25 m/s	m/s
	4s	
m deep	0.15 m deep	m deep

Artificially Channelized : ☐ No ☑ Mostly recovered, more sinuous ☐ Some recovery ☐ Recent, severe

Canopy Cover % : ☐ Open ☑ Lightly Shaded (11-45%) ☐ Heavily Shaded ☐ Moderate Shaded (46-80%)

SEDIMENT / SUBSTRATE

Sediment Oils : ☑ Absent ☐ Slight ☐ Moderate ☐ Profuse

Sediment Odors : ☐ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☑ Anaerobic ☐ Other (Specify) :

Sediment Deposition : ☐ Sludge ☐ Other (Specify) :
Sand Smothering : None Slight (Moderate) Severe
Silt Smothering : None Slight (Moderate) Severe

SUBSTRATE TYPE
Assessment Tool: ☐ SCI ☐ BioRecon ☐ LCI ☐ LVI

	% Coverage	INVERT # Times Sampled	PERI # Times Sampled
Woody Debris (Snags)	3.0 (3.5)	10	8
Undercut Banks / Roots	.5		1
Leaf Packs or Mat	.5		1
Aquatic Vegetation			
Rock or Shell Rubble..	.5		10
Sand.....		10	
Mud / Muck / Silt			
Other			
Other			

WATER QUALITY

	Depth (M)	Temp. (°C)	pH (SU)	D.O. (MG/L)	Cond. (UMHO/CM)	Salinity (PPT)	SECCHI (M)
Top :	0.2	21.1	8.06	9.48	678		☒ VOB
Mid-Depth :							
Bottom :							

Water Surface Oils : ☑ None ☐ Sheen ☐ Globs ☐ Slick

Water Odors : ☑ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Other (Specify) :

Water Sample Taken ? ☑ Yes ☐ No

Algae Sample Taken ? ☑ Yes ☐ No

SYSTEM TYPE ☑ Stream ☐ Lake ☐ Wetland ☐ Estuary ☐ Other (Specify) :

Clarity : ☑ Clear ☐ Slightly Turbid ☐ Turbid ☐ Opaque

Color : ☐ Tannic ☐ Green (Algae) ☑ Clear ☐ Other (Specify) :

WEATHER CONDITIONS / NOTES :
Sunny warm
Water or stream bottom appear grey-ish color

☑ The antecedent hydrologic conditions have been met to my best knowledge.
Water samples preserved ? ☑ Yes ☑ pH<2 ☐ No Algae samples preserved ? ☑ Yes ☐ No

ABUNDANCE

	Absent	Rare	Common	Abundant
Periphyton :	☐	☑	☐	☐
Fish :	☑	☐	☐	☐
Aquatic Macrophytes :	☑	☐	☐	☐
Iron/Sulfur Bacteria :	☑	☐	☐	☐

SAMPLING TEAM : Ken Espy, Blake Spencer, Cheryl Swanson SIGNATURE DATE : 2/4/08

ELFS Version 1.0

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (MMDDYY):	RECEIVING BODY OF WATER:
		2/4/08	Ochlockonee R.W.S

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Leon	Arvah Hopkins Test Site	

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 3	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 3	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 15	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 6 Primary Score 27	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** 7	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 8 Left Bank X	Bankfull > 60% of bank height. Slope of bank ≤ 60°. Bankfull is 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 10 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 10 Left Bank 5 Secondary Score 50	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

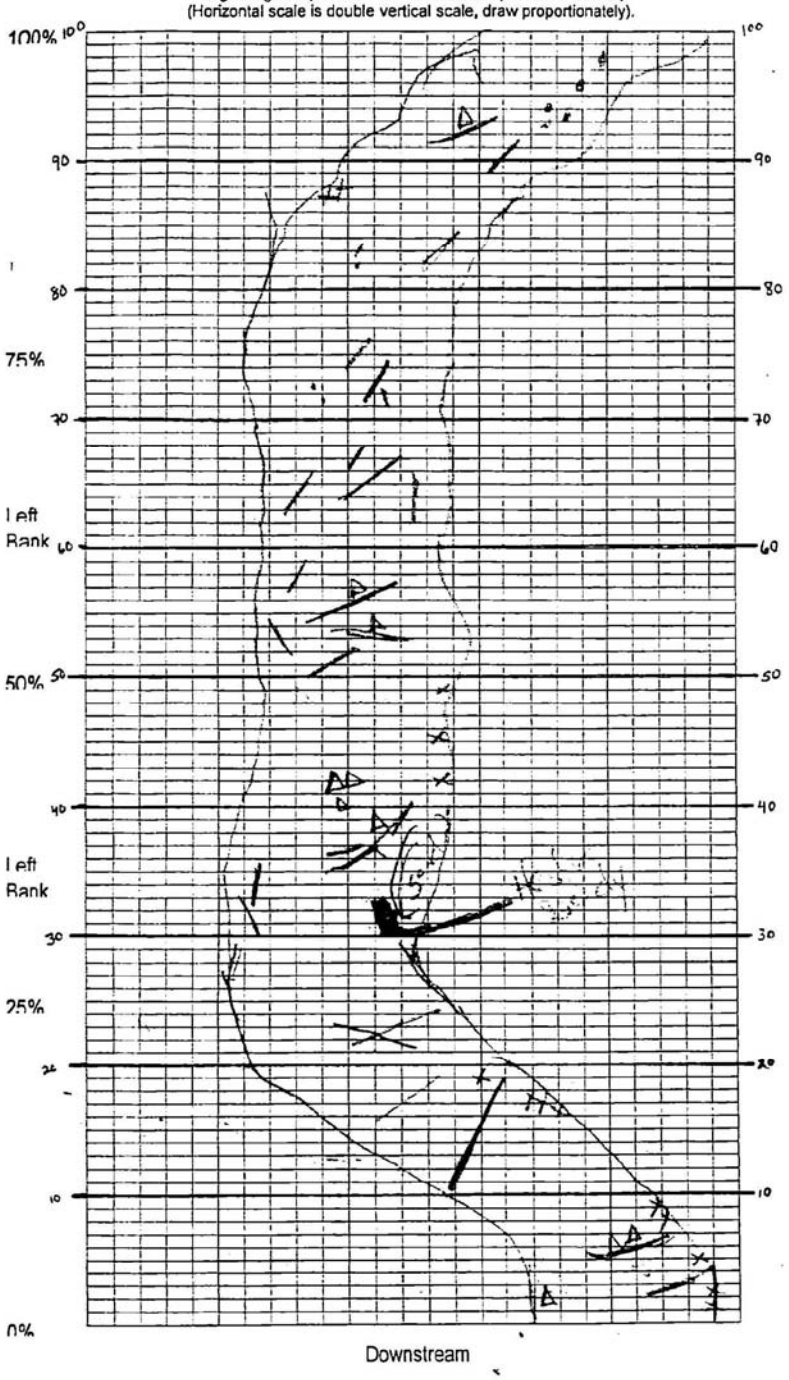
77 **TOTAL SCORE**

ANALYSIS DATE:	ANALYST:	SIGNATURE:
2/4/08	Ken Espy Cheryl Swanson, Blake Spencer	

DEP-SOP-001/01: Form FD 9000-6

Stream/River Habitat Sketch Sheet

Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).



Substrates: Code key, draw proportionate habitat abundance.

- Snags
- Roots/undercut banks
- Leaf Packs (or mats)
- Macrophytes
- Sand Spot
- rubble
- _____

Velocity:

Note where velocity measures were taken.

Habitat Smothering:

Note areas (on map) where sand or silt is smothering substrates, limiting habitability.

Bank Stability:

Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:

Note areas (on map) where natural vegetation is altered or eliminated.

Plants observed/other notes:

Aruah Hopkins Test Site

Beaver Creek

*This is taped c.s (Test site 2)

Revision Date: February 1, 2004

DEP-SOP-001/01: Form FD 9000-3 (draft Sept 30, 2005) ELFS

PHYSICAL/CHEMICAL CHARACTERIZATION ELECTRONIC FIELD SHEET

SAMPLE ID : _____ ORG ID : _____

COUNTY : Leon STORET # : _____

DATE : 2/4/08 TIME : ~~0900~~ 0834

Latitude : [ ] (degrees) [ ] (minutes) [ ] (seconds)

Longitude : [ ] (degrees) [ ] (minutes) [12.6] (seconds)

SITE NAME : Arvah Hopkins Effluent SAMPLE COMPLETE ? yes

FIELD ID/NAME : _____ RECEIVING BODY OF WATER : Ochlockonee River

RIPARIAN ZONE / STREAM FEATURES

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

Forest/Natural [ ] silviculture [ ] Field/Pasture [ ] Agricultural [ ] Residential [ ] Commercial [ ] Industry [ ] Other (Specify) [ ]

Local Watershed Erosion (select one) : ☐ None ☐ Slight ☐ Moderate ☐ Heavy

Local Watershed NPS Pollution : ☐ No evidence ☐ Slight ☐ Moderate ☐ Heavy

Width of Riparian Vegetation (m) on Each Buffer Side

Left Bank : [ ] Right Bank : [ ]

High Water Mark: [ ] (m) + [ ] (above present water level) = [ ] (present depth) (above bed)

Artificially Impounded ☐ Yes ☐ No

Typical Width (m) Depth (m)/Velocity (m/sec) Transect

[ ] m wide

[ ] m/s [ ] m/s [ ] m/s

[ ] m deep [ ] m deep [ ] m deep

Artificially Channelized : ☐ No ☐ Some recovery ☐ Mostly recovered, more sinuous ☐ Recent, severe

Canopy Cover % : ☐ Open ☐ Lightly Shaded (11-45%) ☐ Heavily Shaded ☐ Moderate Shaded (46-80%)

SEDIMENT / SUBSTRATE

Sediment Oils ☐ Absent ☐ Slight ☐ Moderate ☐ Profuse

Sediment Odors ☐ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other (Specify) :

Sediment Deposition ☐ Sludge ~~Sand Smothering~~ None Slight Moderate Severe

Silt Smothering : None Slight Moderate Severe

☐ Other (Specify) :

SUBSTRATE TYPE

Assessment Tool: ☐ SCI ☐ BioRecon ☐ LCI ☐ LVI

	% Coverage	INVERT # Times Sampled	PERI # Times Sampled
Woody Debris (Snags)			
Undercut Banks / Roots			
Leaf Packs or Mat			
Aquatic Vegetation			
Rock or Shell Rubble..			
Sand.....			
Mud / Muck / Silt			
Other			
Other			

WATER QUALITY

	Depth (M)	Temp. (°C)	pH (SU)	D.O. (MG/L)	Cond (UMHO/CM)	Salinity (PPT)	SECCHI (M)
Top :	0.2		7.77				
Mid-Depth :							☐ VOB
Bottom :							

Water Surface Oils : ☒ None ☐ Sheen ☐ Globs ☐ Slick

Water Odors : ☒ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Other (Specify) :

Water Sample Taken ? ☒ Yes ☐ No

Algae Sample Taken ? ☐ Yes ☒ No

SYSTEM TYPE ☐ Stream ☐ Lake ☐ Wetland ☐ Estuary ☐ Other (Specify) :

Clarity ☒ Clear ☐ Slightly Turbid ☐ Turbid ☐ Opaque

Color ☐ Tannic ☐ Green (Algae) ☒ Clear ☒ Other (Specify) : grayish color

WEATHER CONDITIONS / NOTES :

Collected effluent water at weir.

ABUNDANCE

	Absent	Rare	Common	Abundant
Periphyton :	☐	☐	☐	☐
Fish :	☐	☐	☐	☐
Aquatic Macrophytes :	☐	☐	☐	☐
Iron/Sulfur Bacteria :	☐	☐	☐	☐

☒ The antecedent hydrologic conditions have been met to my best knowledge.

Water samples preserved ? ☒ Yes ☒ pH<2 ☐ No Algae samples preserved ? ☐ Yes ☐ No

SAMPLING TEAM : [illegible]

SIGNATURE : [signature]

DATE : 2/4/08

ELFS Version 1.0

DEP-SOP-001/01: Form FD 9000-3 (draft Sept 30, 2005) ELFS

PHYSICAL/CHEMICAL CHARACTERIZATION ELECTRONIC FIELD SHEET

SAMPLE ID : _____ ORG ID : _____

COUNTY : Leon STORET # : _____

DATE : 2/4/08 TIME : 1140

Latitude : 84 (degrees) 24 (minutes) 24.3 (seconds)

Longitude : 50 (degrees) 27 (minutes) 07 (seconds)

SITE NAME : Aivah Hopkins - 330m SAMPLE COMPLETE ? Yes

FIELD ID/NAME : _____ RECEIVING BODY OF WATER : Ochlockonee River

RIPARIAN ZONE / STREAM FEATURES

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

Forest/Natural	silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industry	Other (Specify)
90				5	5	5	

Local Watershed Erosion (select one) : ☒ None ☐ Slight ☐ Moderate ☐ Heavy

Local Watershed NPS Pollution : ☒ No evidence ☐ Slight ☐ Moderate ☐ Heavy

Width of Riparian Vegetation (m) on Each Buffer Side

Left Bank : 718 Right Bank : 718

High Water Mark: .3 (m) + .3 (above present water level) = .6 (present depth) (above bed)

Artificially Impounded ☐ Yes ☐ No

Typical Width (m) Depth (m)/Velocity (m/sec) Transect

1.5 m wide

X m/s X m/s X m/s

m deep .3 m deep m deep

Artificially Channelized : ☐ No ☐ Some recovery ☒ Mostly recovered, more sinuous ☐ Recent, severe

Canopy Cover % : ☐ Open ☒ Lightly Shaded (11-45%) ☐ Heavily Shaded ☐ Moderate Shaded (46-80%)

SEDIMENT / SUBSTRATE

Sediment Oils ☐ Absent ☐ Slight ☐ Moderate ☐ Profuse

Sediment Odors ☐ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other (Specify) :

Sediment Deposition ☐ Sludge ☐ Other (Specify) :

Sand Smothering : None Slight Moderate Severe

Silt Smothering : None Slight Moderate Severe

SUBSTRATE TYPE

Assessment Tool: ☐ SCI ☐ BioRecon ☐ LCI ☐ LVI

	% Coverage	INVERT # Times Sampled	PERI # Times Sampled
Woody Debris (Snags)			
Undercut Banks / Roots			
Leaf Packs or Mat			
Aquatic Vegetation			
Rock or Shell Rubble..			
Sand.....			
Mud / Muck / Silt			
Other			
Other			

WATER QUALITY

	Depth (M)	Temp. (°C)	pH (SU)	D.O. (MG/L)	Cond. (UMHOS/CM)	Salinity (PPT)	SECCHI (M)
Top :	0.33	21.85	8.30	9.33	679		
Mid-Depth :							☑ VOB
Bottom :							

Water Surface Oils : ☒ None ☐ Sheen ☐ Globs ☐ Slick

Water Odors : ☒ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Other (Specify) :

Water Sample Taken ? ☑ Yes ☐ No

Algae Sample Taken ? ☐ Yes ☑ No

SYSTEM TYPE ☒ Stream ☐ Lake ☐ Wetland ☐ Estuary ☐ Other (Specify) :

Clarity ☒ Clear ☐ Slightly Turbid ☐ Turbid ☐ Opaque

Color ☐ Tannic ☐ Green (Algae) ☒ Clear ☒ Other (Specify) : grayish

WEATHER CONDITIONS / NOTES : Sunny warm

Water has or stream bottom has grayish hue

☒ The antecedent hydrologic conditions have been met to my best knowledge.

Water samples preserved ? ☒ Yes ☒ pH<2 ☐ No Algae samples preserved ? ☐ Yes ☐ No

ABUNDANCE

	Absent	Rare	Common	Abundant
Periphyton :	☒	☐	☐	☐
Fish :	☒	☐	☐	☐
Aquatic Macrophytes :	☒	☐	☐	☐
Iron/Sulfur Bacteria :	☒	☐	☐	☐

SAMPLING TEAM : KC, Eq, Blue Spruce, Cheryl Swanson SIGNATURE : [signature] DATE : 2/4/08

ELFS Version 1.0

Appendix I-1

Taxa list and number of individuals counted for qualitative natural periphyton collections made from Arvah B. Hopkins facility on February 4, 2008.

	Control Site	Test Site
Bacillariophyta		
Bacillariophyta	282	262
Chlorophycota		
Chlorella sp.	-	1
Chlorophyceae	1	1
Cyanophycota		
Aphanizomenon sp.	-	2
Cyanobium parvum	1	2
Jaaginema sp.	8	4
Oscillatoria sp.	-	4
Planktothrix sp.	2	8
Pseudanabaena sp.	-	1
Schizothrix calcicola	3	1
Synechocystis sp.	3	15

Appendix I-2

Diatom taxa list and number of individuals counted for qualitative natural periphyton collections made from Arvah B. Hopkins facility on February 4, 2008.

	Control Site	Test Site
Bacillariophyceae		
Achnanthes sp.	28	119
Achnanthes exigua	78	30
Achnanthes hungarica	4	-
Achnanthes lanceolata	17	-
Achnanthes lanceolata apiculata	1	-
Achnanthes rupestoides	7	-
Amphora sp.	2	17
Amphora veneta	1	2
Bacillaria paxillifer	29	3
Bacillariophyceae	2	7
Caloneis sp.	2	21
Caloneis bacillum	1	6
Cocconeis placentula	10	-
Cymbellaceae	2	-
Diadesmis confervacea	56	2
Diadesmis contenta	1	3
Epithemia sp.	2	-
Eunotia sp.	11	2
Gomphonema parvulum	1	-
Hippodonta sp.	2	-
Hippodonta hungarica	2	-
Luticola sp.	1	-
Luticola mutica	-	2
Navicula sp.	36	24
Navicula constans	2	-
Navicula cryptocephala	3	1
Navicula cryptotenella	3	-
Navicula germainii	3	-
Navicula minima	12	7
Navicula schroeteri	5	-
Navicula seminulum	7	14
Navicula symmetrica	-	2
Naviculaceae	17	90
Nitzschia sp.	50	41
Nitzschia amphibia	2	16
Nitzschia amphibioides	-	2
Nitzschia clausii	-	2
Nitzschia dissipata	3	-
Nitzschia gracilis	3	-
Nitzschia liebethruthii	1	-
Nitzschia palea	7	11
Pinnularia sp.	5	1
Planothidium sp.	-	3
Planothidium delicatulum	3	-
Rhopalodia sp.	6	3
Rhopalodia gibba	2	-

Appendix I-2 (continued)

Sellaphora pupula	1	1
Stauroneis smithii	1	-
Surirella angusta	1	4
Tryblionella sp.	3	5
Coscinodiscophyceae		
Aulacoseira sp.	4	-
Coscinodiscophyceae	-	1
Cyclotella sp.	1	-
Cyclotella meneghiniana	1	-
Melosira sp.	1	-
Fragilariophyceae		
Ctenophora pulchella	1	-
Fragilaria sp.	4	6
Fragilaria pinnata	2	7
Fragilariaceae	38	24
Opephora sp.	-	23
Synedra parasitica	8	-
Synedra ulna	4	-

Appendix J-1

Benthic macroinvertebrates collapsed taxa list and density (average number of individuals/m^2 rounded to the nearest individual, n = 3 samples) from Hester-Dendy artificial substrates incubated for 28 days downstream of the Arvah B. Hopkins facility and collected on February 19, 2008. See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site	Test Site
Annelida		
Oligochaeta		
Naididae	-	27
Arthropoda		
Crustacea		
Amphipoda		
Hyalella azteca	5	-
Insecta		
Coleoptera		
Neoporus sp.	5	-
Diptera		
Ablabesmyia sp.	3	-
Ablabesmyia mallochi	-	3
Corynoneura sp. B Epler	27	-
Corynoneura sp. C Epler	-	47
Corynoneura sp. H Epler	7	20
Hemerodromia sp.	3	11
Labrundinia pilosella	3	-
Paracladopelma undine	-	3
Pentaneura inconspicua	3	6
Polypedilum fallax	-	34
Rheotanytarsus exiguus grp.	3	-
Stempellina sp. A Epler	3	-
Stempellinella fimbriata	3	-
Stempellinella leptocelloides	6	-
Tanytarsus sp. A Epler	18	-
Tanytarsus sp. C Epler	4	-
Tanytarsus sp. L Epler	4	-
Tanytarsus sp. E Epler	4	-
Thienemanniella lobapodema	8	-
Thienemanniella xena	-	25
Ephemeroptera		
Baetis intercalaris	5	196
Megaloptera		
Corydalus cornutus	-	3
Odonata		
Calopteryx maculata	-	3
Plecoptera		
Perlesta placida complex	79	-
Trichoptera		
Cheumatopsyche sp.	5	56

…

Appendix J-2

Benthic macroinvertebrates taxa list and counts (number of individuals counted) collected from Hester-Dendy artificial substrates (n= 3 samples) incubated downstream of the Arvah B. Hopkins facility for 28 days and collected on February 19, 2008.

	Control Site	Test Site
Annelida		
Oligochaeta		
Naididae	-	10
Arthropoda		
Crustacea		
Hyalella azteca	2	-
Insecta		
Coleoptera		
Neoporus sp.	2	-
Diptera		
Ablabesmyia sp.	1	-
Ablabesmyia mallochi	-	1
Chironomidae	2	7
Corynoneura sp.	7	5
Corynoneura sp. B Epler	4	-
Corynoneura sp. C Epler	-	12
Corynoneura sp. H Epler	1	5
Hemerodromia sp.	1	4
Labrundinia pilosella	1	-
Paracladopelma undine	-	1
Pentaneura inconspicua	1	2
Polypedilum fallax	-	11
Rheotanytarsus exiguus grp.	1	-
Stempellina sp. A Epler	1	-
Stempellinella fimbriata	1	-
Stempellinella leptocelloides	2	-
Tanytarsus sp.	4	-
Tanytarsus sp. A Epler	4	-
Tanytarsus sp. C Epler	1	-
Tanytarsus sp. L Epler	1	-
Tanytarsus sp. M Epler	1	-
Thienemanniella sp.	2	-
Thienemanniella lobapodema	1	-
Thienemanniella xena	-	8
Ephemeroptera		
Baetis intercalaris	2	74
Megaloptera		
Corydalus cornutus	-	1
Odonata		
Calopteryx maculata	-	1
Plecoptera		
Perlesta placida complex	30	-
Trichoptera		
Cheumatopsyche sp.	2	13
Undetermined Trichoptera	-	8

Appendix K-1

Qualitative benthic macroinvertebrate collapsed taxa list and number of individuals counted from 20-discrete-dipnet sweeps conducted downstream of Arvah B. Hopkins facility on February 4, 2008. See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site		Test Site	
	Rep 1	Rep 2	Rep 1	Rep 2
Annelida				
Oligochaeta				
Limnodrilus profundicola	-	-	7	-
Lumbriculus variegatus	-	-	1	2
Megascolecidae	-	-	1	-
Naididae	-	-	1	-
Tubificidae	2	-	-	4
Arthropoda				
Crustacea				
Amphipoda				
Hyalella azteca	8	9	-	-
Decapoda				
Cambaridae	1	1	-	-
Palaemonetes sp.	16	13	-	-
Insecta				
Coleoptera				
Dineutus sp.	-	-	1	-
Dineutus discolor	1	-	-	-
Dubiraphia vittata	-	2	-	-
Helocombus sp.	1	-	-	-
Microcylloepus pusillus	3	5	1	-
Neoporus sp.	1	-	-	-
Stenelmis sp.	-	-	-	2
Diptera				
Atrichopogon sp.	-	-	1	2
Corynoneura sp.	-	2	-	-
Cricotopus bicinctus	-	-	2	4
Endotribelos hesperium	-	-	-	1
Hemerodromia sp.	4	2	6	12
Limonia sp.	-	-	-	1
Orthocladius dubitatus	-	-	3	-
Parametriocnemus sp.	-	2	-	-
Paratanytarsus sp.	-	-	-	1
Pentaneura inconspicua	-	-	1	-
Polypedilum aviceps	-	1	-	-
Polypedilum fallax	5	4	3	2
Polypedilum illinoense grp.	1	-	-	2
Rheocricotopus robacki	1	-	-	-
Rheotanytarsus exiguus grp.	-	1	2	2
Rheotanytarsus pellucidus	-	1	-	-
Simulium sp.	10	12	-	-
Stempellinella fimbriata	4	3	-	-
Stenochironomus sp.	-	-	-	1
Tanytarsus sp. A Epler	-	2	-	-
Tanytarsus sp. C Epler	8	8	-	-
Tipula sp.	-	-	1	-
Tribelos fuscicornis	2	-	-	-
Xestochironomus sp.	-	-	25	20
Xylotopus par	-	-	13	10

Appendix K-1 (continued)

Ephemeroptera				
Baetis intercalaris	52	62	59	72
Caenis sp.	6	2	-	-
Heteroptera				
Mesovelia amoena	-	-	1	-
Rhagovelia sp.	-	-	1	-
Odonata				
Boyeria vinosa	1	-	-	-
Progomphus sp.	-	-	3	1
Plecoptera				
Perlesta placida complex	9	8	-	-
Trichoptera				
Cheumatopsyche sp.	6	3	10	10
Chimarra sp.	-	-	1	-
Hydropsyche sp.	-	-	-	2
Neotrichia sp.	-	-	1	-
Mollusca				
Bivalvia				
Bivalvia	-	2	-	-
Corbicula fluminea	1	-	-	-
Gastropoda				
Hydrobiidae	-	1	-	-

Appendix K-2

Qualitative benthic macroinvertebrate taxa list and number of individuals counted from 20-discrete-dipnet sweeps conducted downstream of Arvah B. Hopkins facility on February 4, 2008.

	Control Site		Test Site	
	Rep 1	Rep 2	Rep 1	Rep 2
Annelida				
Oligochaeta				
Limnodrilus profundicola	-	-	1	-
Lumbriculus variegatus	-	-	1	2
Megascolecidae	-	-	1	-
Naididae	-	-	1	-
Tubificidae	2	-	6	4
Arthropoda				
Crustacea				
Amphipoda				
Hyalella azteca	8	9	-	-
Decapoda				
Cambaridae	1	1	-	-
Palaemonetes sp.	16	13	-	-
Insecta				
Coleoptera				
Dineutus sp.	-	-	1	-
Dineutus discolor	1	-	-	-
Dubiraphia vittata	-	2	-	-
Helocombus sp.	1	-	-	-
Microcylloepus pusillus	3	5	1	-
Neoporus sp.	1	-	-	-
Stenelmis sp.	-	-	-	2
Diptera				
Atrichopogon sp.	-	-	1	2
Chironomidae	3	2	4	4
Corynoneura sp.	-	2	-	-
Cricotopus sp.	-	-	-	2
Cricotopus bicinctus	-	-	2	2
Empididae	-	-	-	1
Endotribelos hesperium	-	-	-	1
Hemerodromia sp.	4	2	6	11
Limonia sp.	-	-	-	1
Orthocladius dubitatus	-	-	3	-
Parametriocnemus sp.	-	2	-	-
Paratanytarsus sp.	-	-	-	1
Pentaneura inconspicua	-	-	1	-
Polypedilum aviceps	-	1	-	-
Polypedilum fallax	4	4	3	2
Polypedilum illinoense grp.	1	-	-	2
Rheocricotopus robacki	1	-	-	-
Rheotanytarsus sp.	-	-	1	-
Rheotanytarsus exiguus grp.	-	1	1	2
Rheotanytarsus pellucidus	-	1	-	-

Appendix K-2 (continued)

Simulium sp.	10	12	-	-
Stempellinella fimbriata	3	3	-	-
Stenochironomus sp.	-	-	-	1
Tanytarsus sp. A Epler	-	2	-	-
Tanytarsus sp. C Epler	7	6	-	-
Tipula sp.	-	-	1	-
Tribelos sp.	1	-	-	-
Tribelos fuscicornis	1	-	-	-
Xestochironomus sp.	-	-	22	17
Xylotopus par	-	-	12	9
Ephemeroptera				
Baetidae	3	-	6	7
Baetis intercalaris	49	62	53	65
Caenis sp.	6	2	-	-
Heteroptera				
Mesovelia amoena	-	-	1	-
Rhagovelia sp.	-	-	1	-
Odonata				
Boyeria vinosa	1	-	-	-
Progomphus sp.	-	-	3	1
Plecoptera				
Perlesta placida complex	9	8	-	-
Trichoptera				
Cheumatopsyche sp.	6	3	10	6
Chimarra sp.	-	-	1	-
Hydropsyche sp.	-	-	-	1
Hydropsychidae	-	-	-	5
Neotrichia sp.	-	-	1	-
Mollusca				
Bivalvia				
Bivalvia	-	2	-	-
Corbicula fluminea	1	-	-	-
Gastropoda				
Hydrobiidae	-	1	-	-

The Bioassay of the Arvah B. Hopkins Generating Station effluent sampled on February 4, 2008, NPDES #FL0025581

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 5 5 8 1 11	12 0 8 0 2 4 6	18 B	19 S	20 1

Remarks

66

The Priority Pollutants Analysis for Bioassay of the Arvah B. Hopkins Generating Station effluent sampled on February 4, 2008, NPDES #FL0025581

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 5 5 8 1 11	12 0 8 0 2 0 4	18 X	19 S	20 1

Remarks

66

Biological Analyses of the Arvah B. Hopkins Generating Station effluent sampled on February 4, 2008, NPDES #FL0025581

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 5 5 8 1 11	12 0 8 0 2 0 4	18 S	19 S	20 1

Remarks

66