

Biological Assessment of

Blountstown Wastewater Treatment Plant

Calhoun County

NPDES #FL0026867

Sampled January 2003

July 2003

Biology Section

Bureau of Laboratories

Division of Resource Assessment and Management

Quality Manual No. 870346G

NELAC Certification No. E31780

Florida Department of Environmental Protection

Fifth Year Inspection Summary

Discharger:	Blountstown Wastewater Treatment Plant
County:	Calhoun
NPDES Number:	FL0026867
Permit Expiration:	October 1, 2003

Toxics Sampling Inspection **(XSI)**

Date Sampled: January 6, 2003

Results: Aluminum, copper, iron, lead, and zinc were detected in the effluent at levels that complied with Class III Surface Water Quality Criteria. Silver was detected in the effluent at a level (0.22 ug/L) more than three times the Class III criterion of 0.07 ug/L (62-302.530(60) F.A.C.). No organic pollutants were detected in the effluent sample.

Compliance Biomonitoring Inspection **(CBI)**

Date Sampled: January 6, 8, & 10, 2003

Results: The effluent sample was not toxic to the fish, *Pimephales promelas,* or to the water flea, *Ceriodaphnia dubia,* during the 7-day, chronic screening bioassays.

Water Quality Inspection **(WQI)**

Date Sampled: January 6, 2003

Results: Fecal and total coliform samples were not collected. Total phosphorus, ammonia, nitrate+nitrite, and total Kjeldahl nitrogen were all slightly higher at the Test Site compared to the Control Site as a result of the elevated concentrations in the effluent. The effluent AGP value (22.6 mg dry wt/L) was more than 4 times the "problem" threshold. The AGP values at the upstream Control Site (0.1 mg dry weight/L) and the downstream Test Site (3.4 mg dry weight/L) were below this threshold.

Impact Bioassessment Inspection **(IBI)**

Date Sampled: January 6, 2003

Results: Quantitative measures of benthic macroinvertebrate assemblages from Hester-Dendy samplers showed similar community composition at the Test Site compared to the Control Site. Results from qualitative benthic macroinvertebrate samples placed the Control Site in the "excellent" category, and the Test Site in the "good" category. The Control Site received an SCI score of 27 points and the Test Site received an SCI score of 23 points.

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 Blountstown Wastewater Treatment Plant is located in Calhoun County, Florida (Appendix 1). This facility underwent construction to change the treatment activities in 1998. It is now an advanced wastewater treatment facility, and has been operating under this system since 1999. Treatment activities at this plant include influent screening, dual sequential batch reactors, post equalization, phosphorus removal using alum feed, dual cloth disk filters with six disks per unit for a total surface area of 646 SF per unit, and disinfection by a dual channel ultraviolet light (UV) system. Residuals are aerobically digested, dewatered using a belt filter press, and disposed of in a Class I solid waste landfill (see Facility Summary in Appendix 2). After UV treatment, the effluent flows into a holding tank and the facility releases the treated water in batches two to three times a day. The effluent is discharged into the Class III fresh waters of Sutton Creek, and eventually flows into the Apalachicola River. The design flow of the wastewater system is 1.5 million gallons per day (MGD). The mean flow during the preceding year was 0.51 MGD (phone conversation, Keith Butchikas, 4/15/03), and flow on January 6, 2003 was 0.613 MGD.

Surface Water Quality Criteria and facility permit limits are listed in Table 1. According to the facility's monthly discharge monitoring reports, the plant has complied with these limits over the previous one-year period (Appendix 2). In 1994, there was a biological assessment performed to address previous problems related to the effects of the discharge in Sutton Creek. The assessment was part of an ongoing action to bring the plant into compliance. Results from this assessment showed a moderately impaired biological community downstream of the discharge, but the facility was not in violation of the Class III Water Quality Criteria (62-302.530(11) F.A.C.) (See results in Appendix 8).

Methods

The purpose of this investigation was to determine the discharger's effects on the biota of the receiving waters. Chemical and biological comparisons were made between a control site (located approximately 20 meters upstream of the discharge in Sutton Creek) and a test site (located in Sutton Creek approximately 10 meters downstream of the discharge). All water samples and physical/chemical measurements for the receiving waters were collected while the plant was discharging. Detailed methods are given in Appendix 3.

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: Keith Butchikas (FDEP Northwest District-Panama City), and FDEP Central Laboratory in Tallahassee. The report was reviewed by District representatives and the Point Source Studies Review Committee (Wayne Magley, Chuck Ziegmont and Michael Tanski).

Results and Discussion

- Specific chemical results are reported in Table 1, and a complete list of chemical analytes can be reviewed in Appendix 4. Aluminum, copper, iron, lead, and zinc were detected in the effluent at levels that complied with Class III Water Quality Criteria (FAC 62-302.530) and facility permit limits. However, silver was detected in the effluent at a level (0.22 ug/L) that exceeded the Class III Water Quality Criterion (0.07 ug/L, 62-302.530(60) F.A.C.). No organic pollutants were detected in the effluent. Bis(2-ethylhexyl)phthalate was detected in the equipment blank above the practical quantitation limit, but was not detected in the effluent sample.
- Effluent conductivity (umhos/cm), pH (Standard Units) and dissolved oxygen (mg/L) complied with Class III Water Quality Criteria (62-302.530 F.A.C.) and facility permit limits. Although effluent conductivity was elevated, the discharge is intermittent throughout the day and did not affect conductivity levels at the Test Site during this sampling event.
- Habitat assessment scores were 100 at the Control Site and 101 at the Test Site (Table 1, data sheets in Appendix 8). Both sites were heavily shaded. The Control Site appeared to have been channelized some time in the past. The Test Site had more shifting sand, causing sandbars to form and altering the flow of the water in this portion of the stream. The source of the sand is likely from the surrounding floodplain. The flow at the Test Site averaged 0.17 m/s, while the flow at the Control Site averaged 0.07 m/s.
- Dissolved oxygen (DO as mg/L), water temperature (degrees Celsius), and conductivity (umhos/cm) at the Test and Control Sites complied with Class III Water Quality Criteria (Table 1, 62-302.530 F.A.C.) and were within acceptable ranges. The pH measured at both the Control and Test sites (5.8 and 5.5 SU, respectively) was within the normal range for a tannic stream such as Sutton Creek.

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

Blountstown WWTP	Class III Criteria	Effluent Limits	Effluent Samples	Control Site	Test Site
Organic Constituents (ug/L)					
none detected	-	-	-	-	-
Metals (ug/L unless otherwise noted, Class III Criteria are less than or equal to the value given)					
Aluminum	-	-	196 A	-	-
Arsenic	50	-	3 U	-	-
Cadmium	1.09 b	-	0.025 U	-	-
Calcium (mg/L)	-	-	21.3 A	-	-
Chromium	82.8 b	-	2 U	-	-
Copper	8.94 b	-	1.3 I	-	-
Iron	1000	-	107 A	-	-
Lead	2.99 b	-	0.31 I	-	-
Magnesium (mg/L)	-	-	10.2 A	-	-
Nickel	50.0 b	-	2 U	-	-
Selenium	5.0	-	1 U	-	-
Silver	0.07	-	0.22 A	-	-
Zinc	115 b	-	35 A	-	-
Nutrients (mg/L)					
Ortho-phosphate	-	-	0.01 I	0.004 U	0.004 I
Total Phosphorus	-	2 s	0.078 J	0.015 U	0.025 I
Ammonia	-	-	0.1	0.018 I	0.033
Un-ionized Ammonia	≤ 0.02 s	≤ 0.02 s	<0.02	<0.02	<0.02
Nitrate and Nitrite	-	-	0.38	0.073	0.1
Total Kjeldahl Nitrogen	-	-	0.64	0.38	0.48
Organic Nitrogen	-	-	0.54	0.362	0.447
Total Nitrogen	-	6 s	1.02	0.453	0.58
General Physical and Chemical Parameters					
Habitat Assessment	-	-	-	100	101
Dissolved Oxygen (mg/L)	≥ 5.0 s	6 s	10.4	12.3	11.6
pH (SU)	6.0-8.5 s	6.0-8.5 s	7	5.8	5.5
Conductivity (µmhos/cm)	1275 s	-	464	33	35
Temperature (°C)	-	-	17.2	9.6	9.3
Total Suspended Solids (mg/L)	-	10 s	4 U	-	-
Residual Chlorine (mg/L)	≤ 0.01	-	<0.03	-	-
BOD, 5 day (mg/L)	-	10 s	0.44 I	-	-
Chlorophyll *a*- water(ug/L)	-	-	0.85 U	0.85 U	0.85 U
Phaeophytin-water(ug/L)	-	-	0.85 U	0.85 U	0.85 U
Flow (MGD)	-	1.5	0.51 a	-	-
Hardness (mg $CaCO_3$)	-	-	95.19	-	-
Toxicity (7-day chronic, screening bioassay, NOEC)					
Bioassay - Water flea survival and reproduction	-	-	100%	-	-
Bioassay - Fish survival and growth	-	-	100%	-	-

a - Annual average

b - Value is calculated based on hardness

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

I - Value reported is < the minimum quantitation limit, and ≥ the minimum detection limit

J - Estimated value

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

s - Single sample

NOEC - A no observed effect concentration less than 100% effluent will constitute a violation of this permit

Table 2. Measured and predicted algal growth potential (AGP) for orthophosphate (OP) limitation

Location	AGP (measured)	Predicted AGP (OP) ± 20%	Inorganic N:P ratio
Control (mg dry wt/L)	0.1	0.0 ± 0.0	NC
Test (mg dry wt/L)	3.4	0.0 ± 0.0	NC
Effluent (mg dry wt/L)	22.6	4.3 ± 0.9	48.0

NC - Not calculated, Orthophosphate was non-detectable

- The effluent sample was not acutely or chronically toxic to the fish, *Pimephales promelas,* or to the water flea, *Ceriodaphnia dubia,* during the 7-day chronic screening bioassays (See Table 1 for the no observed effect concentration and Appendix 7 for bioassay bench sheets). To accommodate the requirements for this analysis, effluent samples were collected on alternating days. The bioassay sample collected on January 8 measured 0.04 mg/L residual chlorine (see Appendix 7), since the facility does not chlorinate for disinfection, this is likely due to some interference.
- Fecal and total coliform samples were not collected.
- The effluent total nitrogen concentration was 1.02 mg/L (Table 1). Effluent total phosphorus (0.078 mg/L), nitrate+nitrite (0.38 mg/L), and ammonia concentrations (0.1 mg/L, Table 1) contributed to levels at the Test Site. Ammonia, nitrate+nitrite, and TKN were about 1.5 times higher at the Test Site compared to Control Site levels. Test Site levels were below the 60th percentile when compared with levels typical of Florida streams (Appendix 6) and Control Site levels were below the 50th percentile.
- 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 represent a "problem" threshold for fresh receiving waters, implying nutrient enrichment. The AGP values at the upstream Control Site (0.1 mg dry weight/L) and the downstream Test Site (3.4 mg dry weight/L) were below this threshold (Table 2), however the raised level at the Test Site does indicate some nutrient enrichment attributable to the facility's discharge. The AGP value of the effluent (22.6 mg dry wt/L) was above the "problem" threshold. It was also four times greater than the expected value (Table 2). This suggests the presence of additional nutrients in the water column in the form of phyto- and zooplankton. These nutrients are released when the water samples are autoclaved prior to inoculation. The autoclaving lyses the cells in the sample and releases the nutrients they contain. This is the most likely explanation for the higher than expected production. There was no evidence of growth inhibition in AGP data (Table 2).
- There were small differences between the Test and Control Site algal community measures (Table 3, Appendix 9). The Test Site had a few more taxa and a higher Shannon-Weaver diversity score. Periphyton chlorophyll *a* concentration at the Control Site was 11 mg/m2 compared to 8.6 mg/m2 at the Test Site. Both measures are greater than 60% of typical values in Florida waters.
- Quantitative measures of benthic macroinvertebrate assemblages from Hester-Dendy samplers showed no strong differences between the Test Site and the Control Site (Table 4, Appendix 10).
- Qualitative measures of benthic macroinvertebrate assemblages from dipnet samples are summarized in Tables 5 and 6 and in Appendix 11. The qualitative dipnet samples show a shift in the macro-

Table 3. Periphyton composition at control and test sites.

Blountstown WWTP	Control Site	Test Site
Number of Taxa	46	43
Shannon-Weaver Diversity	3.09	3.56
Chlorophyll *a* (mg/m^2)	11	8.6 A
Phaeophytin (mg/m^2)	0	0 A
Algal Density (number/cm^2)	44,663	108,180
Percent Dominant Taxon	57.7	45.5
Dominant Taxon (name)	*Eunotia sp.*	*Eunotia sp.*
Number of Algal Units Identified	298	308
Percentage Composition:		
Blue-green algae	8.1	12.0
Green algae	9.7	10.1
Diatoms	81.9	77.3
Other	0.34	0.65

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

Table 4. Macroinvertebrate Hester-Dendy Samples - Quantitative

Blountstown WWTP	Control Site	Test Site
Summary Statistics		
Shannon-Weaver Diversity	3.63	3.71
Number of Taxa	16	18
Florida Index	9	4
Number of EPT Taxa	3	3
Percent Dominant Taxon	18.74	17.04
Dominant Taxon (name)	*Ablabesmyia mallochi*	*Hyalella azteca*
Total Number of Individuals (counted)	32	88
Total Number of Individuals (per m2)	88	234
Community Composition: Percent of total		
Diptera	59.4	43.2
Ephemeroptera	3.1	15.9
Gastropoda	15.6	2.3
Amphiopda	3.1	17.0
Oligochaeta	6.3	19.3
Plecoptera	0.0	0.0
Trichoptera	9.4	0.0
Other	3.1	2.3
Functional Feeding Groups: Percent of total		
Burrowing Deposit Feeders	3.1	17.1
Predators	14.1	3.4
Surface Deposit Feeders	31.3	25.0
Suspension Feeders	10.9	18.8
Scrapers	17.2	10.2
Shredders	14.1	9.7
Unknown	9.4	15.9

invertebrate community from one dominated by Dipterans (flies) at the Control Site to one dominated by Oligochaetes (worms) at the Test Site. This type of community shift is usually associated with degradation. The Control Site SCI score of 27 placed it in the "excellent" category, and the Test Site SCI score of 23 placed it in the "good" category. The Control Site received higher Florida Index points and had more total taxa and Chironomid taxa compared to the Test Site.

Summary

The effluent sample exceeded the Class III Water Quality Criterion for silver. Nutrient levels were higher at the Test Site compared to the Control Site and can be attributed to the facility's discharge. In addition to the nutrient contributions from the effluent at the downstream Test Site, the periphyton chlorophyll-*a* concentration and level of organic nitrogen at the Control Site indicate a possible nutrient source upstream of the discharge.

Although the macroinvertebrate data did not exceed any of the criteria, there were some signs of degradation downstream of the effluent. In comparing results from the 1994 biological assessment to this assessment, changes made to the treatment process at the plant appear to have reduced, but not eliminated, impacts on the biological communities in Sutton Creek. While the downstream Test Site macroinvertebrate community is improved from "moderately impaired" to "good", based upon the 20-dipnet sweeps, pollution-tolerant worms are still present in some abundance (19% in qualitative samples and 45% in quantitative samples) indicating that the receiving water should continue to be monitored for biological effects.

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Table 5. Macroinvertebrate Dipnet Samples - Qualitative

Blountstown WWTP	Control Site	Test Site
Stream Condition Index (value)	27	23
Stream Condition Index (word)	excellent	good
Stream Condition Index Metrics		
Florida Index	20	9
Number of EPT Taxa	2	3
Number of Taxa	34	20
Number of Chironomid Taxa	22	8
Percent Dominant Taxon	12.1	24.0
Percent Dipterans	56.6	25
Percent Suspension Feeders and Filterers	9.6	12.5
Total Number of Individuals	99	96
Community Composition: Percent of total		
Dominant Taxon (name)	*Amnicola* sp.	*Stylaria lacustris*
Amphipoda	7.1	12.5
Coleoptera	7.1	2.1
Decapoda	4.0	0.0
Trichoptera	2.0	8.3
Diptera	56.6	25.0
Gastropoda	12.1	0.0
Oligochaeta	6.1	44.8
Pelecypoda	2.0	2.1
Other	3.0	5.2
Functional Feeding Groups: Percent of total		
Burrowing Deposit Feeders	6.1	26.0
Browser-grazer	2.0	0.0
Predators	12.6	8.3
Surface Deposit Feeders	36.9	20.8
Suspension Feeders and Filterers	9.6	12.5
Scavenger	2.0	0.0
Scrapers	17.2	2.6
Shredders	9.6	8.9
Unknown	4.0	20.8

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Blounstown WWTP: Control Site

Table 6. Stream Condition Index Metrics: Panhandle, Winter Index					
Metric:	Value	5	3	1	Score
Total Number of Taxa	34	≥27	26-14	<14	5
Number of EPT Taxa	2	≥6	5-3	<3	1
Number of Chironomid Taxa	22	≥9	8-5	<5	5
Percent Contribution of Dominant Taxon	12.1	≤25	26-62	>62	5
Percent Diptera	56.6	-	≤60	>60	3
Florida Index	20	≥13	12-7	<7	5
Percent Suspension Feeders and Filterers	9.6	≥13	12-7	<7	3
Total Score		Blounstown WWTP Control Site			**27**
Interpretation of Scores		**Excellent**			**27-33**
		Good			21-26
		Poor			14-20
		Very Poor			7-13

Blounstown WWTP: Test Site

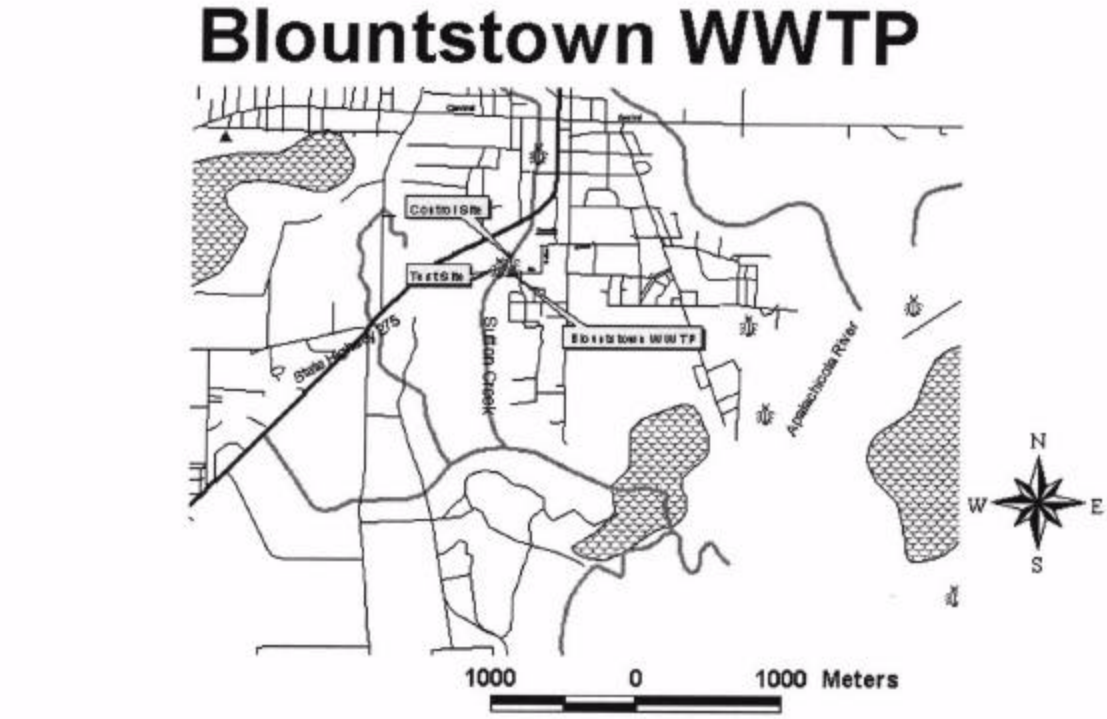
Table 6. Stream Condition Index Metrics: Panhandle, Winter Index					
Metric:	Value	5	3	1	Score
Total Number of Taxa	20	≥27	26-14	<14	3
Number of EPT Taxa	3	≥6	5-3	<3	3
Number of Chironomid Taxa	8	≥9	8-5	<5	3
Percent Contribution of Dominant Taxon	24.0	≤25	26-62	>62	5
Percent Diptera	25	-	≤60	>60	3
Florida Index	9	≥13	12-7	<7	3
Percent Suspension Feeders and Filterers	12.5	≥13	12-7	<7	3
Total Score		Blounstown WWTP Test Site			**23**
Interpretation of Scores		Excellent			27-33
		Good			**21-26**
		Poor			14-20
		Very Poor			7-13

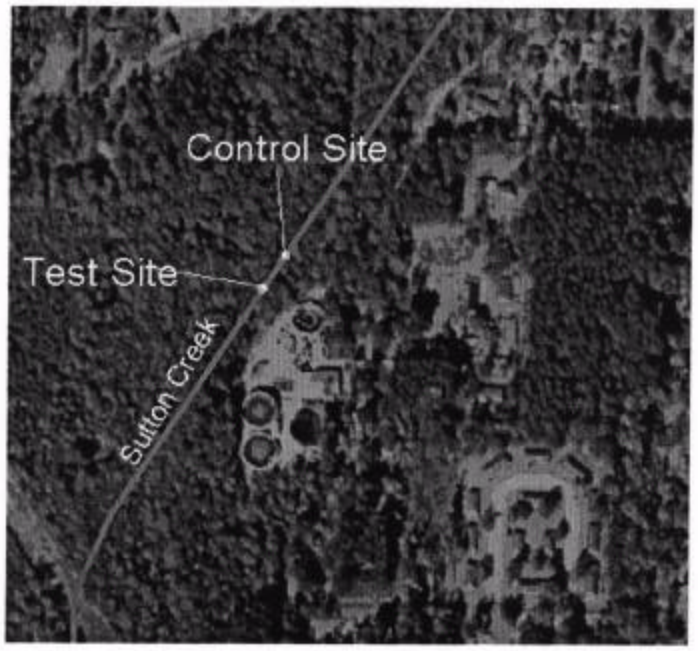
Appendices

- Appendix 1. Map of facility
- Appendix 2. Facility summary
- Appendix 3. Methods
- Appendix 4. Chemical analyses of effluent and receiving water.
- Appendix 5. Explanation of biological measurements
- Appendix 6. Typical values for selected parameters in Florida waters
- Appendix 7. Additional physical, chemical, toxicological and microbiological results
- Appendix 8. Habitat Assessment field sheets
- Appendix 9a. Periphyton: Taxa list and density (number of individuals per cm^2)
- Appendix 9b. Periphyton: Taxa list and number of individuals counted
- Appendix 10a. Hester-Dendy multi-plate samplers: Taxa list and macroinvertebrate density (average number of individuals per m^2)
- Appendix 10b. Hester-Dendy multi-plate samplers: Taxa list and total number of macroinvertebrates counted
- Appendix 11a. Dipnet samples: Taxa list and number of macroinvertebrates counted (collapsed)
- Appendix 11b. Dipnet samples: Taxa list and number of macroinvertebrates counted

Appendix 1

Map of Facility







Fifth Year Inspection Program
FDEP - Bureau of Laboratories
Created on: April 17, 2003
Created by: Julie Riley

Appendix 2

Facility Summary

State of Florida
Department of Environmental Protection
Facility Summary

Facility Name: Blountstown Wastewater Treatment Plant		**Prepared By: Keith Butchikas**
Location: Blountstown, FL	**County: Calhoun**	**District: NW-Panama City**
Federal Permit No.: **Expiration Date:**	**State Permit No.: FL0026867** **Expiration Date: Oct. 1, 2003**	**Facility Type: Domestic**
Function of Facility:		
Description of treatment process: The system consists of influent screening, dual sequential batch reactors, post equalization, phosphorus removal using an Alum feed, dual cloth disk filters, and a dual channel ultraviolet light (UV) system for disinfection. Residuals are aerobically digested, dewatered, and disposed of in a Class I solid waste landfill.		
Receiving Waters: Sutton Creek to Apalachicola River		**Classification: Class III**
Design Flow: 1.5 MGD, max monthly average	**Mean Flow: 1/2002 – 12/2002** **0.51 MGD**	**Flow During Survey:**
Discharge is: Continuous X Intermittent Seasonal Rainfall Dependent Other		
Facility Mixing Zone Details: N/A		

List Effluent Limits:	**Monthly Limits**	
Parameter and Units		**Describe special permit conditions and permit modifications:**
Flow, in conduit thru treatment plant.	**1.5 MGD**	
BOD, Carbonaceous 5 day, 20C.	**6.25 mg/l**	
Total Suspended Solids	**6.25 mg/l**	
Total Nitrogen as N.	**3.75 mg/l**	
Total Phosphorus as P.	**1.25 mg/l** **6.0 mg/l (single sample)**	
Dissolved Oxygen.	**85.0 %**	
Percent Remonal. Suspended Solids.	**6.0 to 8.5 (daily)**	
PH.	**see Permit Conditions**	
Coliform, Fecal	**see Permit Conditions**	
Whole Chronic Effluent Toxicity.	**4760 Mw/cm2 (min.)**	
Ultraviolet Light Intensity		

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Description of permitted outfall:		
List permit violations (DMR data) and plant upsets that occurred at the plant within the last year: **None**		
Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:		
Discuss MOR trends to prior data; is trend improving or declining:		
Additional Information:		

Appendix 3

Methods

The purpose of this investigation was to determine the discharger's effects on the biota of the receiving waters. Chemical and biological comparisons were made between a control site and a test site. A habitat assessment was performed *in situ* to compare biological conditions at the control and test sites. The resulting scores were based upon the examinations of the physical structure and extent of disturbance at the study sites and aid in the interpretation of biological community data. Supplemental physical and chemical data were collected on the effluent and at both study sites.

The effluent was analyzed for nutrients, metals, organic constituents (base, neutral, and acid extractables) and pesticides. The results from these analyses were compared with Water Quality Limits (62-302 F.A.C.) and facility permit limits (Table 1, Appendix 2). A list of the analytes tested for, the minimum detection limit and the practical quantitation limit are given in Appendix 4. Methods used for all chemical analyses are on file at the FDEP Central Chemistry Laboratory in Tallahassee and may be viewed on the web at http://www.floridadep.org/labs/sop/index.htm.

7-day chronic screening toxicity bioassays were performed on the effluent sample using the water flea, *Ceriodaphnia dubia,* and the fish, *Pimephales promelas* (Weber 1993). The effluent and water from control and test sites were not analyzed for the presence and concentration of total and fecal coliform bacteria (APHA 1992, methods 9222 B, 9222 D).

An effluent sample and water samples from the control and test sites were autoclaved, filtered (0.45 μm), inoculated with the unicellular green alga, *Pseudokirchneriella subcapitata* (formerly *Selenastrum capricornutum*, USEPA 2002), and incubated for 14 days (Miller et al. 1978). The algal growth potential (AGP) value is the peak growth of the alga within that 14-day period, recorded as mg dry weight/L (Miller et al. 1978). To measure possible inhibition of algal growth based on possible toxicants in effluent or site water, AGP results were compared to expected levels of dry weight production based on the nutrient content of the water (Miller et al. 1978, Appendix 5).

Periphyton were sampled at both control and test sites by incubating glass microscope slides in a standard periphytometer for 28 days (APHA 1992, Method 1033). Periphyton were subsampled and identified to the lowest practical level, usually species. Periphyton assemblages were examined for (1) cell density, (2) community composition, (3) taxa richness, and (4) Shannon-Weaver Diversity Index. To estimate periphyton biomass, chlorophyll *a* concentration was measured on a subsample of the slides (APHA 1992, Method 10200H).

Benthic macroinvertebrates were collected from multiple substrates (*e.g.* snags, leaf packs, vegetation) using discrete dipnet sweeps (qualitative samples, method modified from Plafkin *et al.* 1989). Collections were also made with Hester-Dendy multi-plate samplers incubated for 28 days (quantitative samples, method modified from APHA 1992, method 10500.5). Benthic macroinvertebrates were sorted and identified to the lowest practical taxonomic level, usually species. Eight measures were calculated from benthic macroinvertebrate data to determine the effects of the discharge on receiving waters. These measures included: (1) taxa richness, (2) community composition, (3) functional feeding groups, (4) percent dominant taxon, (5) Shannon-Weaver Diversity Index, (6) the Florida Index, (7) the number of Ephemeroptera, Plecoptera and Trichoptera (EPT) taxa, and (8) the Stream Condition Index (SCI). For a discussion of each biological measure and its potential relationship to Florida Administrative Code, see Appendix 5.

Appendix 4

Chemical analysis of effluent and receiving water

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
1/6/2003 10:30	EFFLUENT	BNA-Water	1,2,4,5-Tetrachlorobenzene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	1,2,4-Trichlorobenzene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	1,2-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	1,3,5-Trinitrobenzene	3.8	ug/L	U	3.8	15
1/6/2003 10:30	EFFLUENT	BNA-Water	1,3-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	1,3-Dinitrobenzene	1.9	ug/L	U	1.9	7.6
1/6/2003 10:30	EFFLUENT	BNA-Water	1,4-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	1,4-Naphthoquinone	19	ug/L	UJ	19	76
1/6/2003 10:30	EFFLUENT	BNA-Water	1-Naphthylamine	9.5	ug/L	UJ	9.5	38
1/6/2003 10:30	EFFLUENT	BNA-Water	2,3,4,6-Tetrachlorophenol	1.9	ug/L	U	1.9	7.6
1/6/2003 10:30	EFFLUENT	BNA-Water	2,4,5-Trichlorophenol	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	2,4,6-Trichlorophenol	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	2,4-Dichlorophenol	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	2,4-Dimethylphenol	48	ug/L	U	48	190
1/6/2003 10:30	EFFLUENT	BNA-Water	2,4-Dinitrophenol	14	ug/L	U	14	57
1/6/2003 10:30	EFFLUENT	BNA-Water	2,4-Dinitrotoluene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	2,6-Dichlorophenol	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	2,6-Dinitrotoluene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	2-Acetylaminofluorene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	2-Chloronaphthalene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	2-Chlorophenol	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	ug/L	U	2.9	11
1/6/2003 10:30	EFFLUENT	BNA-Water	2-Methylnaphthalene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	2-Naphthylamine	9.5	ug/L	UJ	9.5	38
1/6/2003 10:30	EFFLUENT	BNA-Water	2-Nitroaniline	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	2-Nitrophenol	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	2-Picoline	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	3,3'-Dichlorobenzidine	38	ug/L	U	38	150
1/6/2003 10:30	EFFLUENT	BNA-Water	3,3'-Dimethylbenzidine	19	ug/L	UJ	19	76
1/6/2003 10:30	EFFLUENT	BNA-Water	3-Methylcholanthrene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	3-Nitroaniline	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	4,4'-DDD	1.4	ug/L	U	1.4	5.7
1/6/2003 10:30	EFFLUENT	BNA-Water	4,4'-DDE	1.4	ug/L	U	1.4	5.7
1/6/2003 10:30	EFFLUENT	BNA-Water	4,4'-DDT	1.4	ug/L	U	1.4	5.7
1/6/2003 10:30	EFFLUENT	BNA-Water	4-Aminobiphenyl	3.8	ug/L	UJ	3.8	15
1/6/2003 10:30	EFFLUENT	BNA-Water	4-Bromophenyl phenyl ether	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	4-Chloro-3-methylphenol	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	4-Chloroaniline	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	4-Chlorophenyl phenyl ether	1.9	ug/L	U	1.9	7.6
1/6/2003 10:30	EFFLUENT	BNA-Water	4-Nitroaniline	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	4-Nitrophenol	14	ug/L	U	14	57
1/6/2003 10:30	EFFLUENT	BNA-Water	5-Nitro-o-toluidine	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	7,12-Dimethylbenz(a)anthracene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Acenaphthene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Acenaphthylene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Acetophenone	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Aldrin	1.4	ug/L	U	1.4	5.7
1/6/2003 10:30	EFFLUENT	BNA-Water	Aniline	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Anthracene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Azobenzene/1,2-Diphenylhydrazine	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Benzidine	95	ug/L	U	95	380
1/6/2003 10:30	EFFLUENT	BNA-Water	Benzo(a)anthracene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Benzo(a)pyrene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Benzo(b)fluoranthene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Benzo(g,h,i)perylene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Benzo(k)fluoranthene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Benzyl alcohol	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Bis(2-chloroethoxy)methane	0.95	ug/L	UJ	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Bis(2-chloroethyl)ether	0.95	ug/L	U	0.95	3.8

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
1/6/2003 10:30	EFFLUENT	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	ug/L	U	2.9	11
1/6/2003 10:30	EFFLUENT	BNA-Water	Bis(2-ethylhexyl)phthalate	36	ug/L	U	14	57
1/6/2003 10:30	EFFLUENT	BNA-Water	Butyl benzyl phthalate	4.8	ug/L	U	4.8	19
1/6/2003 10:30	EFFLUENT	BNA-Water	Chrysene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Di-n-butyl phthalate	4.8	ug/L	U	4.8	19
1/6/2003 10:30	EFFLUENT	BNA-Water	Di-n-octyl phthalate	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Dibenzo(a,h)anthracene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Dibenzofuran	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Dieldrin	1.4	ug/L	U	1.4	5.7
1/6/2003 10:30	EFFLUENT	BNA-Water	Diethyl phthalate	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Dimethyl phthalate	48	ug/L	U	48	190
1/6/2003 10:30	EFFLUENT	BNA-Water	Dimethylaminoazobenzene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Dinoseb	3.8	ug/L	U	3.8	15
1/6/2003 10:30	EFFLUENT	BNA-Water	Diphenylamine	2.9	ug/L	U	2.9	11
1/6/2003 10:30	EFFLUENT	BNA-Water	Endosulfan I	3.8	ug/L	U	3.8	15
1/6/2003 10:30	EFFLUENT	BNA-Water	Endosulfan II	3.8	ug/L	U	3.8	15
1/6/2003 10:30	EFFLUENT	BNA-Water	Endosulfan sulfate	1.4	ug/L	U	1.4	5.7
1/6/2003 10:30	EFFLUENT	BNA-Water	Endrin	1.4	ug/L	U	1.4	5.7
1/6/2003 10:30	EFFLUENT	BNA-Water	Endrin aldehyde	3.8	ug/L	U	3.8	15
1/6/2003 10:30	EFFLUENT	BNA-Water	Ethyl methanesulfonate	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Fluoranthene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Fluorene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Heptachlor	1.4	ug/L	U	1.4	5.7
1/6/2003 10:30	EFFLUENT	BNA-Water	Heptachlor epoxide	1.4	ug/L	U	1.4	5.7
1/6/2003 10:30	EFFLUENT	BNA-Water	Hexachlorobenzene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Hexachlorobutadiene	2.9	ug/L	U	2.9	11
1/6/2003 10:30	EFFLUENT	BNA-Water	Hexachlorocyclopentadiene	2.9	ug/L	U	2.9	11
1/6/2003 10:30	EFFLUENT	BNA-Water	Hexachloroethane	2.9	ug/L	U	2.9	11
1/6/2003 10:30	EFFLUENT	BNA-Water	Hexachloropropene	1.9	ug/L	U	1.9	7.6
1/6/2003 10:30	EFFLUENT	BNA-Water	Indeno(1,2,3-cd)pyrene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Isophorone	0.95	ug/L	UJ	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Isosafrole	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Methapyrilene	3.8	ug/L	UJ	3.8	15
1/6/2003 10:30	EFFLUENT	BNA-Water	Methyl methanesulfonate	0.95	ug/L	UJ	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	N-Nitrosodi-n-butylamine	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	N-Nitrosodi-n-propylamine	1.9	ug/L	U	1.9	7.6
1/6/2003 10:30	EFFLUENT	BNA-Water	N-Nitrosodiethylamine	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	N-Nitrosodimethylamine	1.9	ug/L	U	1.9	7.6
1/6/2003 10:30	EFFLUENT	BNA-Water	N-Nitrosodiphenylamine	2.9	ug/L	U	2.9	11
1/6/2003 10:30	EFFLUENT	BNA-Water	N-Nitrosomethylethylamine	1.9	ug/L	U	1.9	7.6
1/6/2003 10:30	EFFLUENT	BNA-Water	N-Nitrosomorpholine	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	N-Nitrosopiperidine	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	N-Nitrosopyrrolidine	1.9	ug/L	U	1.9	7.6
1/6/2003 10:30	EFFLUENT	BNA-Water	Naphthalene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Nitrobenzene	1.9	ug/L	U	1.9	7.6
1/6/2003 10:30	EFFLUENT	BNA-Water	Nitroquinoline-1-oxide	19	ug/L	U	19	76
1/6/2003 10:30	EFFLUENT	BNA-Water	Pentachlorobenzene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Pentachloroethane	48	ug/L	U	48	190
1/6/2003 10:30	EFFLUENT	BNA-Water	Pentachloronitrobenzene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Pentachlorophenol	2.9	ug/L	U	2.9	11
1/6/2003 10:30	EFFLUENT	BNA-Water	Phenacetin	3.8	ug/L	U	3.8	11
1/6/2003 10:30	EFFLUENT	BNA-Water	Phenanthrene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Phenol	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Pyrene	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	Pyridine	3.8	ug/L	U	3.8	15
1/6/2003 10:30	EFFLUENT	BNA-Water	Safrole	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	BNA-Water	alpha-BHC	1.4	ug/L	U	1.4	5.7
1/6/2003 10:30	EFFLUENT	BNA-Water	beta-BHC	1.4	ug/L	U	1.4	5.7
1/6/2003 10:30	EFFLUENT	BNA-Water	delta-BHC	1.4	ug/L	U	1.4	5.7

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
1/6/2003 10:30	EFFLUENT	BNA-Water	gamma-BHC	1.4	ug/L	U	1.4	5.7
1/6/2003 10:30	EFFLUENT	BNA-Water	m,p-Cresols	1.9	ug/L	U	1.9	7.6
1/6/2003 10:30	EFFLUENT	BNA-Water	o-Cresol	1.9	ug/L	U	1.9	7.6
1/6/2003 10:30	EFFLUENT	BNA-Water	o-Toluidine	0.95	ug/L	U	0.95	3.8
1/6/2003 10:30	EFFLUENT	Bio-AGP/LimNut	Algal Growth Potential	22.6	mg DryWt/L		0.1	0.3
1/6/2003 10:30	EFFLUENT	Bio-BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	0.44	mg/L	I		
1/6/2003 10:30	EFFLUENT	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
1/6/2003 10:30	EFFLUENT	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
1/6/2003 10:30	EFFLUENT	Bio-Toxicology	Bioassay-Chronic-Scrn-FW-C.dubia, NOEC	100	NOEC			
1/6/2003 10:30	EFFLUENT	Bio-Toxicology	Bioassay-Chronic-Scrn-FW-Fish, NOEC	100	NOEC			
1/6/2003 10:30	EFFLUENT	GC-Water	Alachlor	0.57	ug/L	UJ	0.57	2.28
1/6/2003 10:30	EFFLUENT	GC-Water	Ametryn	0.047	ug/L	U	0.047	0.188
1/6/2003 10:30	EFFLUENT	GC-Water	Atrazine	0.047	ug/L	U	0.047	0.188
1/6/2003 10:30	EFFLUENT	GC-Water	Azinphos Methyl	0.047	ug/L	U	0.047	0.188
1/6/2003 10:30	EFFLUENT	GC-Water	Bromacil	0.19	ug/L	U	0.19	0.76
1/6/2003 10:30	EFFLUENT	GC-Water	Butylate	0.19	ug/L	UJ	0.19	0.76
1/6/2003 10:30	EFFLUENT	GC-Water	Chlorpyrifos Ethyl	0.047	ug/L	U	0.047	0.188
1/6/2003 10:30	EFFLUENT	GC-Water	Chlorpyrifos Methyl	0.094	ug/L	U	0.094	0.376
1/6/2003 10:30	EFFLUENT	GC-Water	Diazinon	0.047	ug/L	U	0.047	0.188
1/6/2003 10:30	EFFLUENT	GC-Water	Ethion	0.047	ug/L	U	0.047	0.188
1/6/2003 10:30	EFFLUENT	GC-Water	Ethoprop	0.094	ug/L	U	0.094	0.376
1/6/2003 10:30	EFFLUENT	GC-Water	Fenamiphos	0.19	ug/L	U	0.19	0.76
1/6/2003 10:30	EFFLUENT	GC-Water	Fonofos	0.094	ug/L	U	0.094	0.376
1/6/2003 10:30	EFFLUENT	GC-Water	Hexazinone	0.094	ug/L	U	0.094	0.376
1/6/2003 10:30	EFFLUENT	GC-Water	Malathion	0.14	ug/L	U	0.14	0.56
1/6/2003 10:30	EFFLUENT	GC-Water	Metalaxyl	0.24	ug/L	UJ	0.24	0.96
1/6/2003 10:30	EFFLUENT	GC-Water	Metolachlor	0.47	ug/L	UJ	0.47	1.88
1/6/2003 10:30	EFFLUENT	GC-Water	Metribuzin	0.094	ug/L	U	0.094	0.376
1/6/2003 10:30	EFFLUENT	GC-Water	Mevinphos	0.19	ug/L	U	0.19	0.76
1/6/2003 10:30	EFFLUENT	GC-Water	Naled	0.75	ug/L	UJ	0.75	3
1/6/2003 10:30	EFFLUENT	GC-Water	Norflurazon	0.094	ug/L	U	0.094	0.376
1/6/2003 10:30	EFFLUENT	GC-Water	Parathion Ethyl	0.14	ug/L	U	0.14	0.56
1/6/2003 10:30	EFFLUENT	GC-Water	Parathion Methyl	0.094	ug/L	U	0.094	0.376
1/6/2003 10:30	EFFLUENT	GC-Water	Phorate	0.047	ug/L	U	0.047	0.188
1/6/2003 10:30	EFFLUENT	GC-Water	Prometryn	0.14	ug/L	UJ	0.14	0.56
1/6/2003 10:30	EFFLUENT	GC-Water	Simazine	0.047	ug/L	U	0.047	0.188
1/6/2003 10:30	EFFLUENT	Metals-Water	Aluminum	196	ug/L	A	10	40
1/6/2003 10:30	EFFLUENT	Metals-Water	Arsenic	3	ug/L	U	3	12
1/6/2003 10:30	EFFLUENT	Metals-Water	Cadmium	0.025	ug/L	U	0.025	0.1
1/6/2003 10:30	EFFLUENT	Metals-Water	Calcium	21.3	mg/L	A	0.05	0.2
1/6/2003 10:30	EFFLUENT	Metals-Water	Chromium	2	ug/L	U	2	8
1/6/2003 10:30	EFFLUENT	Metals-Water	Copper	1.3	ug/L	I	0.75	3
1/6/2003 10:30	EFFLUENT	Metals-Water	Iron	107	ug/L	A	7	28
1/6/2003 10:30	EFFLUENT	Metals-Water	Lead	0.31	ug/L	I	0.1	0.4
1/6/2003 10:30	EFFLUENT	Metals-Water	Magnesium	10.2	mg/L	A	0.01	0.04
1/6/2003 10:30	EFFLUENT	Metals-Water	Nickel	2	ug/L	U	2	8
1/6/2003 10:30	EFFLUENT	Metals-Water	Selenium	1	ug/L	U	1	4
1/6/2003 10:30	EFFLUENT	Metals-Water	Silver	0.22	ug/L	A	0.02	0.08
1/6/2003 10:30	EFFLUENT	Metals-Water	Zinc	35	ug/L	A	4	16
1/6/2003 10:30	EFFLUENT	Nutrients-Liquid	Ammonia-N	0.1	mg N/L		0.01	0.02
1/6/2003 10:30	EFFLUENT	Nutrients-Liquid	NO2NO3-N	0.38	mg N/L		0.004	0.01
1/6/2003 10:30	EFFLUENT	Nutrients-Liquid	N_KJEL_TOT	0.64	mg N/L		0.06	0.2
1/6/2003 10:30	EFFLUENT	Nutrients-Liquid	O-Phosphate-P	0.01	mg P/L	I	0.004	0.01
1/6/2003 10:30	EFFLUENT	Nutrients-Liquid	TSS	4	mg/L	U	4	16
1/6/2003 10:30	EFFLUENT	Nutrients-Liquid	Total-P	0.078	mg P/L	J	0.015	0.04
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	1,2,4,5-Tetrachlorobenzene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	1,2,4-Trichlorobenzene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	1,2-Dichlorobenzene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	1,3,5-Trinitrobenzene	3.9	ug/L	U	3.9	16
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	1,3-Dichlorobenzene	0.97	ug/L	U	0.97	3.9

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	1,3-Dinitrobenzene	1.9	ug/L	U	1.9	7.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	1,4-Dichlorobenzene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	1,4-Naphthoquinone	19	ug/L	UJ	19	78
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	1-Naphthylamine	9.7	ug/L	UJ	9.7	39
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2,3,4,6-Tetrachlorophenol	1.9	ug/L	U	1.9	7.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2,4,5-Trichlorophenol	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2,4,6-Trichlorophenol	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2,4-Dichlorophenol	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2,4-Dimethylphenol	49	ug/L	U	49	190
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2,4-Dinitrophenol	15	ug/L	U	15	58
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2,4-Dinitrotoluene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2,6-Dichlorophenol	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2,6-Dinitrotoluene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2-Acetylaminofluorene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2-Chloronaphthalene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2-Chlorophenol	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	ug/L	U	2.9	12
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2-Methylnaphthalene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2-Naphthylamine	9.7	ug/L	UJ	9.7	39
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2-Nitroaniline	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2-Nitrophenol	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	2-Picoline	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	3,3'-Dichlorobenzidine	39	ug/L	U	39	160
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	3,3'-Dimethylbenzidine	19	ug/L	UJ	19	78
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	3-Methylcholanthrene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	3-Nitroaniline	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	4,4'-DDD	1.5	ug/L	U	1.5	5.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	4,4'-DDE	1.5	ug/L	U	1.5	5.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	4,4'-DDT	1.5	ug/L	U	1.5	5.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	4-Aminobiphenyl	3.9	ug/L	UJ	3.9	16
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	4-Bromophenyl phenyl ether	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	4-Chloro-3-methylphenol	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	4-Chloroaniline	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	4-Chlorophenyl phenyl ether	1.9	ug/L	U	1.9	7.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	4-Nitroaniline	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	4-Nitrophenol	15	ug/L	U	15	58
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	5-Nitro-o-toluidine	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	7,12-Dimethylbenz(a)anthracene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Acenaphthene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Acenaphthylene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Acetophenone	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Aldrin	1.5	ug/L	U	1.5	5.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Aniline	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Anthracene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Azobenzene/1,2-Diphenylhydrazine	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Benzidine	97	ug/L	U	97	390
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Benzo(a)anthracene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Benzo(a)pyrene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Benzo(b)fluoranthene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Benzo(g,h,i)perylene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Benzo(k)fluoranthene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Benzyl alcohol	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Bis(2-chloroethoxy)methane	0.97	ug/L	UJ	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Bis(2-chloroethyl)ether	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	ug/L	U	2.9	12
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Bis(2-ethylhexyl)phthalate	86	ug/L		15	58
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Butyl benzyl phthalate	4.9	ug/L	U	4.9	19
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Chrysene	0.97	ug/L	U	0.97	3.9

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Di-n-butyl phthalate	4.9	ug/L	U	4.9	19
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Di-n-octyl phthalate	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Dibenzo(a,h)anthracene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Dibenzofuran	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Dieldrin	1.5	ug/L	U	1.5	5.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Diethyl phthalate	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Dimethyl phthalate	49	ug/L	U	49	190
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Dimethylaminoazobenzene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Dinoseb	3.9	ug/L	U	3.9	16
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Diphenylamine	2.9	ug/L	U	2.9	12
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Endosulfan I	3.9	ug/L	U	3.9	16
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Endosulfan II	3.9	ug/L	U	3.9	16
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Endosulfan sulfate	1.5	ug/L	U	1.5	5.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Endrin	1.5	ug/L	U	1.5	5.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Endrin aldehyde	3.9	ug/L	U	3.9	16
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Ethyl methanesulfonate	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Fluoranthene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Fluorene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Heptachlor	1.5	ug/L	U	1.5	5.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Heptachlor epoxide	1.5	ug/L	U	1.5	5.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Hexachlorobenzene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Hexachlorobutadiene	2.9	ug/L	U	2.9	12
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Hexachlorocyclopentadiene	2.9	ug/L	U	2.9	12
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Hexachloroethane	2.9	ug/L	U	2.9	12
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Hexachloropropene	1.9	ug/L	U	1.9	7.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Indeno(1,2,3-cd)pyrene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Isophorone	0.97	ug/L	UJ	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Isosafrole	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Methapyrilene	3.9	ug/L	U	3.9	16
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Methyl methanesulfonate	0.97	ug/L	UJ	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	N-Nitrosodi-n-butylamine	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	N-Nitrosodi-n-propylamine	1.9	ug/L	U	1.9	7.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	N-Nitrosodiethylamine	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	N-Nitrosodimethylamine	1.9	ug/L	U	1.9	7.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	N-Nitrosodiphenylamine	2.9	ug/L	U	2.9	12
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	N-Nitrosomethylethylamine	1.9	ug/L	U	1.9	7.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	N-Nitrosomorpholine	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	N-Nitrosopiperidine	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	N-Nitrosopyrrolidine	1.9	ug/L	U	1.9	7.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Naphthalene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Nitrobenzene	1.9	ug/L	U	1.9	7.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Nitroquinoline-1-oxide	19	ug/L	U	19	78
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Pentachlorobenzene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Pentachloroethane	49	ug/L	U	49	190
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Pentachloronitrobenzene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Pentachlorophenol	2.9	ug/L	U	2.9	12
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Phenacetin	3.9	ug/L	U	3.9	12
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Phenanthrene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Phenol	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Pyrene	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Pyridine	3.9	ug/L	U	3.9	16
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	Safrole	0.97	ug/L	U	0.97	3.9
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	alpha-BHC	1.5	ug/L	U	1.5	5.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	beta-BHC	1.5	ug/L	U	1.5	5.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	delta-BHC	1.5	ug/L	U	1.5	5.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	gamma-BHC	1.5	ug/L	U	1.5	5.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	m,p-Cresols	1.9	ug/L	U	1.9	7.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	o-Cresol	1.9	ug/L	U	1.9	7.8
1/6/2003 9:40	EQUIPMENT BL	BNA-Water	o-Toluidine	0.97	ug/L	U	0.97	3.9

ate Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Alachlor	0.58	ug/L	UJ	0.58	2.32
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Ametryn	0.048	ug/L	U	0.048	0.192
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Atrazine	0.048	ug/L	U	0.048	0.192
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Azinphos Methyl	0.048	ug/L	U	0.048	0.192
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Bromacil	0.19	ug/L	U	0.19	0.76
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Butylate	0.19	ug/L	UJ	0.19	0.76
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Chlorpyrifos Ethyl	0.048	ug/L	U	0.048	0.192
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Chlorpyrifos Methyl	0.097	ug/L	U	0.097	0.388
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Diazinon	0.048	ug/L	U	0.048	0.192
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Ethion	0.048	ug/L	U	0.048	0.192
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Ethoprop	0.097	ug/L	U	0.097	0.388
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Fenamiphos	0.19	ug/L	U	0.19	0.76
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Fonofos	0.097	ug/L	U	0.097	0.388
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Hexazinone	0.097	ug/L	U	0.097	0.388
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Malathion	0.14	ug/L	U	0.14	0.56
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Metalaxyl	0.24	ug/L	UJ	0.24	0.96
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Metolachlor	0.48	ug/L	UJ	0.48	1.92
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Metribuzin	0.097	ug/L	U	0.097	0.388
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Mevinphos	0.19	ug/L	U	0.19	0.76
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Naled	0.78	ug/L	UJ	0.78	3.12
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Norflurazon	0.097	ug/L	U	0.097	0.388
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Parathion Ethyl	0.14	ug/L	U	0.14	0.56
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Parathion Methyl	0.097	ug/L	U	0.097	0.388
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Phorate	0.048	ug/L	U	0.048	0.192
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Prometryn	0.14	ug/L	UJ	0.14	0.56
1/6/2003 9:40	EQUIPMENT BLANK	GC-Water	Simazine	0.048	ug/L	U	0.048	0.192
1/6/2003 9:40	EQUIPMENT BLANK	Metals-Water	Aluminum	10	ug/L	U	10	40
1/6/2003 9:40	EQUIPMENT BLANK	Metals-Water	Arsenic	3	ug/L	U	3	12
1/6/2003 9:40	EQUIPMENT BLANK	Metals-Water	Cadmium	0.025	ug/L	U	0.025	0.1
1/6/2003 9:40	EQUIPMENT BLANK	Metals-Water	Calcium	0.05	mg/L	U	0.05	0.2
1/6/2003 9:40	EQUIPMENT BLANK	Metals-Water	Chromium	2	ug/L	U	2	8
1/6/2003 9:40	EQUIPMENT BLANK	Metals-Water	Copper	0.75	ug/L	U	0.75	3
1/6/2003 9:40	EQUIPMENT BLANK	Metals-Water	Iron	7	ug/L	U	7	28
1/6/2003 9:40	EQUIPMENT BLANK	Metals-Water	Lead	0.1	ug/L	U	0.1	0.4
1/6/2003 9:40	EQUIPMENT BLANK	Metals-Water	Magnesium	0.01	mg/L	U	0.01	0.04
1/6/2003 9:40	EQUIPMENT BLANK	Metals-Water	Nickel	2	ug/L	U	2	8
1/6/2003 9:40	EQUIPMENT BLANK	Metals-Water	Selenium	1	ug/L	U	1	4
1/6/2003 9:40	EQUIPMENT BLANK	Metals-Water	Silver	0.02	ug/L	U	0.02	0.08
1/6/2003 9:40	EQUIPMENT BLANK	Metals-Water	Zinc	4	ug/L	U	4	16
1/6/2003 9:40	EQUIPMENT BLANK	Nutrients-Liquid	Ammonia-N	0.01	mg N/L	U	0.01	0.02
1/6/2003 9:40	EQUIPMENT BLANK	Nutrients-Liquid	NO2NO3-N	0.004	mg N/L	U	0.004	0.01
1/6/2003 9:40	EQUIPMENT BLANK	Nutrients-Liquid	N_KJEL_TOT	0.06	mg N/L	U	0.06	0.2
1/6/2003 9:40	EQUIPMENT BLANK	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	U	0.004	0.01
1/6/2003 9:40	EQUIPMENT BLANK	Nutrients-Liquid	Total-P	0.015	mg P/L	U	0.015	0.04
/6/2003 13:30	SUTTON CREEK - CONTROL SITE	Bio-AGP/LimNut	Algal Growth Potential	0.1	mg DryWt/L	I	0.1	0.3
/6/2003 13:30	SUTTON CREEK - CONTROL SITE	Bio-Chl-a	Chlorophyll-A, Monochromatic, Periphyton	11	mg/m2		0.46	1.4
/6/2003 13:30	SUTTON CREEK - CONTROL SITE	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
/6/2003 13:30	SUTTON CREEK - CONTROL SITE	Bio-Chl-a	Phaeophytin-A, Monochromatic, Periphyton	0	mg/m2		0.46	1.4
/6/2003 13:30	SUTTON CREEK - CONTROL SITE	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
/6/2003 13:30	SUTTON CREEK - CONTROL SITE	Bio-Invertebrates	Macroinvert-FW-Qual-Dipnetx20-# Taxa	35	# Taxa			
/6/2003 13:30	SUTTON CREEK - CONTROL SITE	Bio-Peri/Phyto	Periphyton-Quantitative-# Diatom Taxa	28	#Taxa			
/6/2003 13:30	SUTTON CREEK - CONTROL SITE	Bio-Peri/Phyto	Periphyton-Quantitative-# Wet Taxa	18	#Taxa			
/6/2003 13:30	SUTTON CREEK - CONTROL SITE	Nutrients-Liquid	Ammonia-N	0.018	mg N/L	I	0.01	0.02
/6/2003 13:30	SUTTON CREEK - CONTROL SITE	Nutrients-Liquid	NO2NO3-N	0.073	mg N/L		0.004	0.01
/6/2003 13:30	SUTTON CREEK - CONTROL SITE	Nutrients-Liquid	N_KJEL_TOT	0.38	mg N/L		0.06	0.2
/6/2003 13:30	SUTTON CREEK - CONTROL SITE	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	U	0.004	0.01
/6/2003 13:30	SUTTON CREEK - CONTROL SITE	Nutrients-Liquid	Total-P	0.015	mg P/L	U	0.015	0.04
1/6/2003 9:40	SUTTON CREEK - TEST SITE	Bio-AGP/LimNut	Algal Growth Potential	3.43	mg DryWt/L		0.1	0.3
1/6/2003 9:40	SUTTON CREEK - TEST SITE	Bio-Chl-a	Chlorophyll-A, Monochromatic, Periphyton	8.6	mg/m2	A	0.76	2.3

ate Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
1/6/2003 9:40	SUTTON CREEK - TEST SITE	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
1/6/2003 9:40	SUTTON CREEK - TEST SITE	Bio-Chl-a	Phaeophytin-A, Monochromatic, Periphyton	0	mg/m2	A	0.76	2.3
1/6/2003 9:40	SUTTON CREEK - TEST SITE	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
1/6/2003 9:40	SUTTON CREEK - TEST SITE	Bio-Invertebrates	Macroinvert-FW-Qual-Dipnetx20-# Taxa	22	# Taxa			
1/6/2003 9:40	SUTTON CREEK - TEST SITE	Bio-Peri/Phyto	Periphyton-Quantitative-# Diatom Taxa	26	#Taxa			
1/6/2003 9:40	SUTTON CREEK - TEST SITE	Bio-Peri/Phyto	Periphyton-Quantitative-# Wet Taxa	17	#Taxa			
1/6/2003 9:40	SUTTON CREEK - TEST SITE	Nutrients-Liquid	Ammonia-N	0.033	mg N/L		0.01	0.02
1/6/2003 9:40	SUTTON CREEK - TEST SITE	Nutrients-Liquid	NO2NO3-N	0.1	mg N/L		0.004	0.01
1/6/2003 9:40	SUTTON CREEK - TEST SITE	Nutrients-Liquid	N_KJEL_TOT	0.48	mg N/L		0.06	0.2
1/6/2003 9:40	SUTTON CREEK - TEST SITE	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	I	0.004	0.01
1/6/2003 9:40	SUTTON CREEK - TEST SITE	Nutrients-Liquid	Total-P	0.025	mg P/L	I	0.015	0.04
1/6/2003 9:40	SUTTON CREEK - TEST SITE REP. 1	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	8	# Taxa			
1/6/2003 9:40	SUTTON CREEK - TEST SITE REP. 2	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	10	# Taxa			
1/6/2003 9:40	SUTTON CREEK - TEST SITE REP. 3	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	13	# Taxa			
1/6/2003 9:40	SUTTON CREEK CONTROL SITE REP. 1	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	6	# Taxa			
1/6/2003 9:40	SUTTON CREEK CONTROL SITE REP. 2	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	3	# Taxa			
1/6/2003 9:40	SUTTON CREEK CONTROL SITE REP. 3	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	12	# Taxa			

Appendix 5

Explanation of Biological Measures

(1) Habitat Assessment:

Eight aspects of the physical structure and extent of disturbance are ranked, with 20 possible points for each factor (FDEP SOP FT 3100, based on Plafkin *et al.*, 1989 and Barbour and Stribling, 1994). 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).

(2) Effluent and Water Samples from Control and Test Sites

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. The algal growth potential (AGP) value is the peak growth of the alga within that 14-day period, recorded as mg dry weight/L (Miller *et al.* 1978). 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(47) F.A.C., 62-302.530(48)(a) F.A.C. and/or 62-302.530(48)(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 11:1, nitrogen limitation of algal production is likely. When the N:P ratio is above 11:1, phosphorus limitation is likely. 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(62) F.A.C..

(3) Algal Phytoplankton and Periphyton Assemblages

Chlorophyll *a* Content: Chlorophyll *a* content is measured in both phytoplankton and periphyton samples to estimate algal biomass (APHA 1992, modified from *Standard Methods* 10200H). High algal biomass implies nutrient stress (Stevenson and Bahls 1999) and may be a violation of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C. and/or 62-302.530(48)(b) F.A.C..

Cell Density: Cell density is estimated as number/ml for phytoplankton samples and number/cm^2 for periphyton samples (APHA 1992, modified from *Standard Methods* 10200F and 10900G).

Taxa richness: Taxa richness is the number of distinct algal taxa present in a sample. Stress tends to reduce the number of different types of algae present in a sample, but moderate nutrient enrichment of nutrient poor waters may sometimes be correlated with increased algal taxa richness (Stevenson and Bahls 1999).

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(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) 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 with more equitable abundance among taxa (Magurran 1988). Low diversity scores related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

(4) Benthic Macroinvertebrate Assemblages

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(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) 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(47) F.A.C., 62-302.530(48)(a) F.A.C. and/or 62-302.530(48)(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(11) F.A.C..

The Florida Index: Some organisms become rare or absent as the intensity or duration of disturbance increases. The Florida Index assigns points to stream-dwelling macroinvertebrates based on their ranked sensitivity to pollution (Beck 1954). A site with a high Florida Index score is considered healthy (Ross 1990). Decreases in Florida Index points related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

Ephemeroptera/Plecoptera/Trichoptera (EPT) Taxa: This value is the number of EPT taxa present. More EPT taxa are usually present in unpolluted waters (Plafkin *et al.*, 1989, Wallace *et al.*, 1996). Decreases in the number of EPT taxa related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) 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(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) 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(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

The Stream Condition Index (SCI): The SCI is a composite macroinvertebrate metric (Barbour *et al.* 1996a, b) developed for Florida. Using data from qualitative dipnet samples, the SCI assigns points to seven parameters, depending on how closely each parameter approaches an expected reference condition (Barbour *et al.* 1996a, b and FDEP SOP FS 7420, LT 7200). Points are summed to yield a final SCI score (range 7-33, depending on region and index period). Included in the calculation of SCI are taxa richness, number of EPT taxa, number of Chironomid taxa, percent contribution of the dominant taxon, the Florida Index, percent contribution of Diptera, and the percent contribution of suspension and filter feeders. Scores are broken into four ordinal groups: Excellent, Good, Poor and Very Poor. 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 of "Poor" or "Very Poor" related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

Appendix 6

Typical Values for Selected Parameters in Florida Waters

Percentile Distribution (1617 stations)

CONTROL SITE

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	Measured
Periphyton Chlorophyll *a* (mg/m^2)	0.31	0.43	0.77	1.04	2.16	2.94	6.45	**10.51**	17.0	39.51	60.85	**11**
Hester-Dendy Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	**3.52**	3.76	3.90	**3.63**
Hester-Dendy Taxa Richness	6	6.5	9	11.5	13	**15**	17	21.5	26	29	32	**16**
Dipnet Taxa Richness	9	12	17	20	22	24.5	26	28	**31**	37	53	**34**
Total Kjeldahl Nitrogen	**0.30**	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80	**0.38**
Ammonia	**0.02**	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60	**0.018**
Nitrate plus nitrite	0.01	0.01	0.03	0.05	**0.07**	0.10	0.14	0.20	0.32	0.64	1.05	**0.073**
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51	**0.015**
Orthophosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37	**0.004**
Turbidity (NTU)	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30	**NA**

TEST SITE

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	Measured
Periphyton Chlorophyll *a* (mg/m^2)	0.31	0.43	0.77	1.04	2.16	2.94	**6.45**	10.51	17.00	39.51	60.85	**8.6**
Hester-Dendy Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	**3.52**	3.76	3.90	**3.71**
Hester-Dendy Taxa Richness	6	6.5	9	11.5	13	15	**17**	21.5	26	29	32	**18**
Dipnet Taxa Richness	9	12	17	**20**	22	24.5	26	28	31	37	53	**20**
Total Kjeldahl Nitrogen	0.30	**0.39**	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80	**0.48**
Ammonia	0.02	**0.02**	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60	**0.033**
Nitrate plus nitrite	0.01	0.01	0.03	0.05	0.07	**0.10**	0.14	0.20	0.32	0.64	1.05	**0.1**
Total Phosphorus	**0.02**	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51	**0.025**
Orthophosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37	**0.004**
Turbidity (NTU)	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30	**NA**

Taxa richness and diversity values are for benthic macroinvertebrates. Hester-Dendy sample= benthic macroinvertebrates collected from a standardized multi-plate sampler. Dipnet taxa richness = number of taxa collected in standardized dipnet sweep samples. Diversity = Shannon-Weaver H'. NTU = Nephelometric turbidity units. Adapted from Joe Hand, FDER, personal communication, 1991 (data collected 1980-1989). ND = No data.

Appendix 7

Additional physical, chemical, toxicological and microbiological results

DEP-SOP-001/01: Form FD 9000-3 (December 11, 2001)

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y): 1/6/02	TIME: EST 1010	RECEIVING BODY OF WATER: Apalachicola River
REMARKS: 1010 plant not discharging samples collected @ point from clear well of collection	COUNTY: Calhoun	LOCATION: Blountstown WWTP	FIELD ID/NAME: Effluent	

RIPARIAN ZONE/STREAM FEATURES

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

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)

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

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

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

LIST & MAP DOMINANT VEGETATION ON BACK

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

ARTIFICIALLY IMPOUNDED ☐ yes

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

TYPICAL WIDTH (M) DEPTH (M)/VELOCITY (M/SEC) TRANSECT

m wide		
m/s	m/s	m/s
m deep	m deep	m deep

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

SEDIMENT/SUBSTRATE

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

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

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

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

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP	0.61	17.24	6.98	10.41	464			
MID-DEPTH	↓	17.18	6.94	10.33	464			
BOTTOM	↓	17.15	6.92	10.31	465			

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

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

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

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

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

WEATHER CONDITIONS/NOTES:
Equip Blank Collected @ 0940 EST
metal pH = <2 nutrient pH = <2

Bottle collection @ 1030 – plant discharging

ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☐	☐	☑ IN CLEAR WELL
FISH	☑	☐	☐	☐
AQUATIC MACROPHYTES (DUCK WEED)	☐	☐	☑	☐
IRON/SULFUR BACTERIA	☑	☐	☐	☐

SAMPLING TEAM: RILEY, RICHARDSON

SIGNATURE: Julie

DATE:

TEST SITE BBI 9882
each had 1-2 physella

Data recorded during the chronic screening bioassays of a sample of effluent from City of Blountstown WWTF, West Iola Street, Blountstown, Calhoun County, Florida, NPDES# FL0026867, performed from 7 to 13 January 2003.

Facility:	City of Blountstown WWTF			NPDES #:	FL0026867	Facility Type: WWTF	Analysts: Marshall Faircloth
Location:	West Iola Street, Blountstown			Contact/District:	Riley/ NW		Joshua Ayres
County:	Calhoun			Test type:	chronic renewal screen		James Daniels
Sample #1 Collection Date:	1/6/2003	Time:	1030	# tests:	2	Receiving Water: Sutton Creek to Apalachicola River	Jacquelyn Brynda
Sample #2 Collection Date:	1/8/2003	Time:	0700	Chlorination Type:	dechlorinated		Christa Pierini
Sample #3 Collection Date:	1/10/2003	Time:	0700				
Test Beginning Date:	1/7/2003	Time:	1400				
Test Ending Date:	1/13/2003	Time:	1000	FDEP SOP#:	TA07 05		Reviewer: David Whiting

Organism: ***Ceriodaphnia dubia*** Life stage: <24 hrs [A]Feeding: YCT/Algae
Chamber size: 30mL Food Batch #: 5 / 10

	Sample/Diluent	# Young							
Concentrations	Volume(mL)	0 hr	24 hr	48 hr	72 hr	96 hr	120 hr	144 hr[D]	Total
Control A	0/20	0	0	0	0	6	0	8	14
Control B	0/20	0	0	0	0	4	0	8	12
Control C	0/20	0	0	0	0	6	12	0	18
Control D	0/20	0	0	0	0	6	8	9	23
Control E	0/20	0	0	0	0	4	8	10	22
Control F	0/20	0	0	0	0	6	8	13	27
Control G	0/20	0	0	0	0	6	9	12	27
Control H	0/20	0	0	0	0	5	11	12	28
Control I	0/20	0	0	0	0	6[X]	-	-	6
Control J	0/20	0	0	0	5	0	10	13	28
100% A	20/0	0	0	0	0	6	10	0	16
100% B	20/0	0	0	0	0	6	11	0	17
100% C	20/0	0	0	0	0	6	10	12	28
100% D	20/0	0	0	0	0	6	10	0	16
100% E	20/0	0	0	0	0	7	8	13	28
100% F	20/0	0	0	0	0	6	10	12	28
100% G	20/0	0	0	0	0	6	9	13	28
100% H	20/0	0	0	0	0	0	12	12	24
100% I	20/0	0	0	0	0	7	10	13	30
100% J	20/0	0	0	0	5	0	9	16	30

Total Young	Young	Young per Adult
Control	205	22.6
100%	245	24.5

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 20.0-25.0°C.
Incubator #3 temperature range for the test period was 28.0-33.0°C.
[B] Organisms were fed daily.
Light Intensity during the test was 50-100 foot candles.
Photoperiod during the test was 16 hours of light : 8 hours of dark.
[C] Test ended due to sufficient amount of control births.
[X] Organism dead.

LIMS	
Job number 1:	TLH-2003-01-07-02
sample number 1:	645771
Job number 2:	TLH-2003-01-09-20
sample number 2:	646586
Job number 3:	TLH-2003-01-10-46
sample number 3:	647167

Data Transcription Verification	
date:	3/26/2003
by:	James Daniels
	Josh Ayres

Total Residual CL2[C]	mg/L	Method
Field:	-	-
Lab Sample 1:	<0.03	Hach
Lab Sample 2:	0.04	Hach
Lab Sample 3:	<0.03	Hach

Ammonia	Total (mg/L)	Unionized (mg/L)
Control water :	<0.017	<0.017
100% Sample 1:	<0.15	<0.017
100% Sample 2:	0.893	0.013
100% Sample 3:	2.00	0.023

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control water:	79	81
100% Sample 1:	77	98
100% Sample 2:	78	99
100% Sample 3:	91	115

Ceriodaphnia dubia			After Renewal			Conductivity Uncorrected	Before Renewal	
Concentrations	Replicate	Hour	pH	Temperature	Dissolved Oxygen	umhos/cm	pH	Dissolved Oxygen
Control	A	0	8.1	24.6	7.6	185	-	-
100%			7.5	24.5	7.7	495	-	-
Control	B	24	8.1	23.5	7.4	175	8.1	7.8
100%			7.1	23.4	7.7	445	8.1	7.7
Control	C	48	8.2	24.2	8.7	175	7.3	8.1
100%			7.3	25.5	8.6	535	8.0	8.2
Control	D	72	7.9	24.7	7.9	170	8.2	7.9
100%			7.4	25.2	7.8	560	8.2	8.1
Control	E	96	7.8	24.3	8.1	165	8.1	8.3
100%			7.2	25.8	7.7	570	8.2	8.0
Control	F	120	7.7	25.9	8.2	175	7.6	7.7
100%			7.4	25.0	7.6	595	8.2	7.7
Control	G	144	-	-	-	-	7.8	7.8
100%			-	-	-	-	8.1	8.0

Data recorded during the chronic screening bioassays of a sample of effluent from City of Blountstown WWTF, West Iola Street, Blountstown, Calhoun County, Florida, NPDES# FL0026867, performed from 7 to 14 January 2003.

Facility:	City of Blountstown WWTF		NPDES #:	FL0026867	Facility Type:	WWTF	Analysts: Marshall Faircloth
Location:	West Iola Street, Blountstown		Contact/District:	Riley/ NW			Joshua Ayres
County:	Calhoun		Test type:	chronic renewal screen			James Daniels
Sample #1 Collection Date:	1/6/2003	Time: 1030	# tests:	2	Receiving Water:	Sutton Creek to Apalachicola River	Jacquelyn Brynda
Sample #2 Collection Date:	1/8/2003	Time: 0700	Chlorination Type:	dechlorinated			Christa Pierini
Sample #3 Collection Date:	1/10/2003	Time: 0700					
Test Beginning Date:	1/7/2003	Time: 1330					
Test Ending Date:	1/14/2003	Time: 1300	FDEP SOP#:	TA07_09			Reviewer: David Whiting

Organism: *Pimephales promelas* Life stage: 24 hrs [a]Feeding: Artemia
Chamber size: 1L Food Batch #: 01940425G

Concentrations	Sample/Diluent Volume(mL)	Survival # Alive							
		0 hr	24 hr	48 hr	72 hr	96 hr	120 hr	144 hr	168 hr
Control A	0/500	10	10	10	10	10	10	8	6
Control B	0/500	10	10	10	10	10	10	10	10
Control C	0/500	10	10	10	10	10	10	10	10
Control D	0/500	10	10	10	10	10	10	10	7
100% A	500/0	10	10	10	10	10	8	7	6
100% B	500/0	10	10	10	10	10	10	10	10
100% C	500/0	10	10	10	9	9	9	9	9
100% D	500/0	10	10	10	10	8	8	8	8

[a] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 20.0-25.0°C.
Incubator #3 temperature range for the test period was 28.0-33.0°C.
[b] Organisms were fed daily.

Concentrations	Mean Dry Weight
Control A	0.88
Control B	0.608
Control C	0.57
Control D	0.481
100% A	0.487
100% B	0.667
100% C	0.568
100% D	0.519

Light Intensity during the test was 50-100 foot candles.
Photoperiod during the test was 16 hours of light : 8 hours of dark.

LIMS	
Job number 1:	TLH-2003-01-07-02
sample number 1:	645771
Job number 2:	TLH-2003-01-09-20
sample number 2:	646586
Job number 3:	TLH-2003-01-10-46
sample number 3:	647167

Data Transcription Verification	
date:	3/26/2003
by:	James Daniels
	Josh Ayres

Total Residual CL2	mg/L	Method
Field:	-	-
Lab Sample 1:	<0.03	Hach
Lab Sample 2:	0.04	Hach
Lab Sample 3:	<0.03	Hach

Ammonia	Total (mg/L)	Unionized (mg/L)
Control water :	<0.017	<0.017
100% Sample 1:	<0.15	<0.017
100% Sample 2:	0.893	0.013
100% Sample 3:	2.00	0.023

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control water:	77	87
100% Sample 1:	77	98
100% Sample 2:	78	99
100% Sample 3:	91	115

			Before Renewal			Conductivity Uncorrected	After Renewal			Conductivity Uncorrected
Concentrations	Replicate	Hour	pH	Temperature	Dissolved Oxygen	umhos/cm	pH	Temperature	Dissolved Oxygen	umhos/cm
Control	A	0	8.2	23.7	7.6	290	-	-	-	-
100%			7.2	24.0	7.8	485	-	-	-	-
Control	B	24	7.9	23.6	7.5	310	8.1	24.6	7.2	330
100%			7.8	23.2	7.6	475	7.2	24.4	7.4	480
Control	C	48	7.7	24.7	6.1	327	7.4	24.6	8.2	316
100%			7.6	24.6	6.3	506	7.3	25.0	8.2	539
Control	D	72	7.6	24.4	5.8	340	8.1	24.2	7.7	310
100%			7.6	24.5	5.8	550	7.4	25.2	7.8	560
Control	A	96	7.8	24.8	5.6	319	7.6	24.3	7.8	309
100%			7.6	24.6	5.3	534	7.4	25.1	7.9	578
Control	B	120	7.3	24.6	6.5	330	7.4	24.3	7.6	320
100%			7.6	25.4	6.4	635	7.3	25.0	7.2	595
Control	C	144	7.5	23.6	8.0	320	7.7	24.0	7.7	315
100%			7.9	24.3	7.0	610	7.4	24.0	7.1	590
Control	D	168	7.7	24.8	6.6	340	-	-	-	-
100%			7.6	25.2	6.6	610	-	-	-	-

Appendix 8

Habitat Assessment Field Sheets

DEP-SOP-001/01: Form FD 9000-3 (December 11, 2001)

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME EST	RECEIVING BODY OF WATER:
		1/6/03	1130	

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Calhoun	Blountstown WWTP	Sutton Cr. - Control

RIPARIAN ZONE/STREAM FEATURES

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

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
				✓	✓		

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

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

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side: 718

LIST & MAP DOMINANT VEGETATION ON BACK

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

ARTIFICIALLY IMPOUNDED ☐ yes

HIGH WATER MARK: 1.5 (m above present water level) + 1.5 (present depth in m) = 3.0 (m above bed)

TYPICAL WIDTH (M) DEPTH (M)/VELOCITY (M/SEC) TRANSECT ~8 m wide

0.07 m/s	0.07 m/s	0.06 m/s
82 sec	76 sec	95 sec
1.0 m deep	1.5 m deep	1.5 m deep

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

SEDIMENT/SUBSTRATE

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

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

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

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	2	5		SAND	92	5	
LEAF PACKS OR MATS	1	5		MUD/MUCK/SILT			
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE				OTHER:			
UNDERCUT BANKS/ROOTS	5	4		DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION			

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP	0.2	9.58	5.80	12.27	33			
MID-DEPTH	0.7	9.55	5.72	11.73	32			
BOTTOM	0.2	9.55	5.65	11.20	32			

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

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

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

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

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

WEATHER CONDITIONS/NOTES:

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

SAMPLING TEAM: Heyn, Springer, Riley, Richardson

SIGNATURE:

DATE: 1/6/03

DEP-SOP-001/01: Form FD 9000-3 (December 11, 2001)

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):	RECEIVING BODY OF WATER:

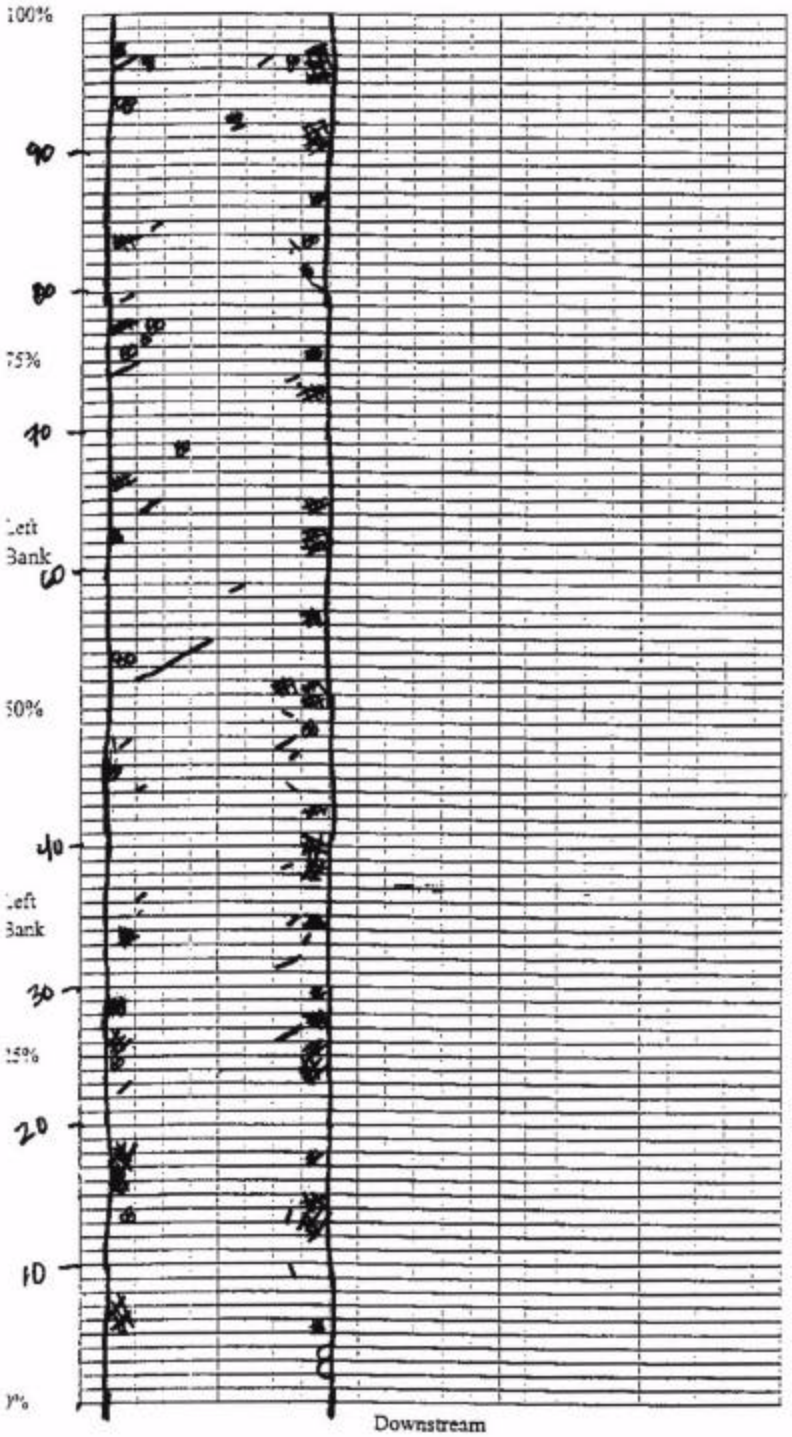
REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Calhoun	Blountstown WWTP	Sutton Cr. control

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 13	Four or more productive habitats present [snags, tree roots/undercut banks, 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 7	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 2	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 9 Primary Score 31	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of the habitats with sand or silt, pools shallow, frequent sediment movement 10 (9) 8 7 6	Smothering of >80% of habitats with sand or silt, as severe problem, pools absent 5 4 3 2 1
Secondary Habitat Components **Artificial Channelization** 13	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 (13) 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability Right Bank 9 Left Bank 9	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 (9)	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank 10 Left Bank 10	Width of native vegetation (least buffered side) greater than 18 m (10) 9	Width of native vegetation (least buffered side) 12 to 18 m 8 7 6	Width of native vegetation 6 to 12 m, human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 9 Left Bank 9 Secondary Score 69	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions 10 (9)	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of stream bank surfaces are vegetated and/or poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less 3 2 1

100 **TOTAL SCORE**

ANALYSIS DATE:	ANALYST:	SIGNATURE:
1/6/03	M. W. Heyn	

Stream/River Habitat Sketch Sheet, Form FD 9000-4 (June 1, 2001)
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
- LP Leaf Packs (or mats)
- Macrophytes
- d unstable/erosion
- _____
- _____

Velocity:
Note where velocity measures were taken.

Habitat Smothering:
Note areas (on map) where sand or silt is something 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:

8 m wide

16 m² = snags

39 m² = roots

10 m² = leaf packs

800 | 1600 = 2%

800 | 4000 = 5%

800 | 1000 = <1%

DEP-SOP-001/01: Form FD 9000-3 (December 11, 2001)
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME EST	RECEIVING BODY OF WATER:
		1/6/03	0945	

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Calhoun	Blountstown WWTP	Sutton Lake Test Site

RIPARIAN ZONE/STREAM FEATURES

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

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
				✓	✓		

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

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

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side: >18

LIST & MAP DOMINANT VEGETATION ON BACK

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

ARTIFICIALLY IMPOUNDED ☐ yes

HIGH WATER MARK: 1.5 (m above present water level) + 1.5 (present depth in m) = 3.0 (m above bed)

TYPICAL WIDTH (M) DEPTH (M)/VELOCITY (M/SEC) TRANSECT: 6 m wide

0.20 m/s	0.23 m/s	0.09 m/s
Time 19.0	16.5	50.8
0.1 m deep	0.4 m deep	0.4 m deep

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

SEDIMENT/SUBSTRATE

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

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

SEDIMENT DEPOSITION: SLUDGE: ☐ SAND SMOTHERING: NONE SLIGHT (MODERATE) SEVERE SILT SMOTHERING: NONE (SLIGHT) MODERATE SEVERE OTHER: ____

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	3	5		SAND	93	5	
LEAF PACKS OF MATS	1	5		MUD/MUCK/SILT			
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE				OTHER:			
UNDERCUT BANKS/ROOTS	2	5		DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION			

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP	0.2	9.33	5.47	11.58	35			
MID-DEPTH	0.2	9.53	5.41	11.53	35			VOB
BOTTOM	0.2	9.33	5.36	11.53	35			

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

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

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

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

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

WEATHER CONDITIONS/NOTES:

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

SAMPLING TEAM: Heyn, Springer, Riley, Richardson

SIGNATURE: Julie

DATE: 1/6/03

DEP-SOP-001/01: Form FD 9000-5 (December 11, 2001)

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):	RECEIVING BODY OF WATER:

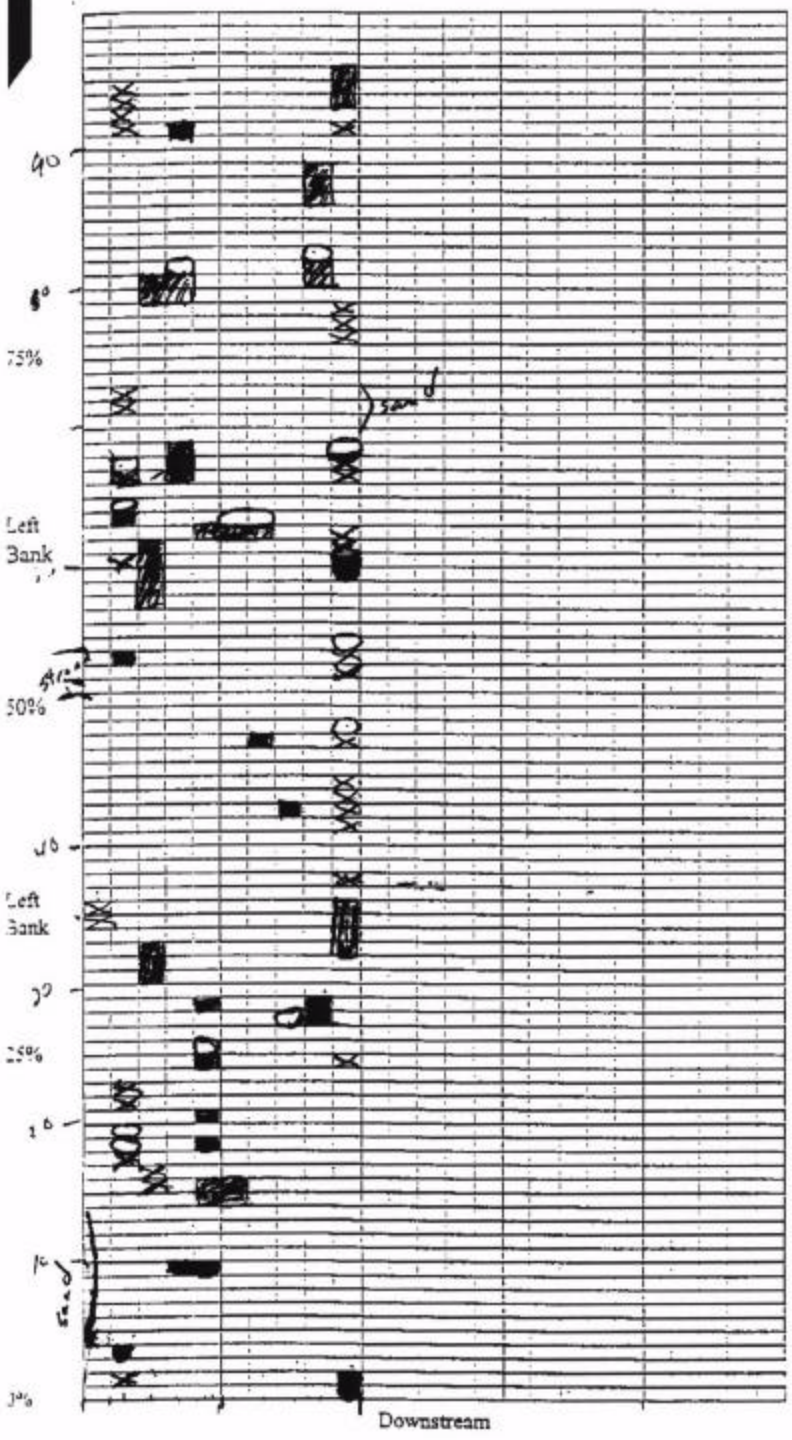
REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Calhoun	Blountstown WWTP	Sutton Cr. Test

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 13	Four or more productive habitats present [snags, tree roots/undercut banks, 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 6	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 4	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occuring: > 1 m/sec 5 (4) 3 2 1
Habitat Smothering 9 Primary Score 32	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of the habitats with sand or silt, pools shallow, frequent sediment movement 10 (9) 8 7 6	Smothering of >80% of habitats with sand or silt, as severe problem, pools absent 5 4 3 2 1
Secondary Habitat Components **Artificial Channelization** 13	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 (13) 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability Right Bank 9 Left Bank 9	Stable. No evidence of erosion or bank failure. Little potential for future problems. (10) 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank 10 Left Bank 10	Width of native vegetation (least buffered side) greater than 18 m (10) 9	Width of native vegetation (least buffered side) 12 to 18 m 8 7 6	Width of native vegetation 6 to 12 m. human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 9 Left Bank 5 Secondary Score 69	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions 10 (9)	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of stream bank surfaces are vegetated and/or poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less 3 2 1

101 **TOTAL SCORE**

ANALYSIS DATE:	ANALYST:	SIGNATURE:
1/6/03	M W Heyn	

ream/River Habitat Sketch Sheet, Form FD 9000-4 (June 1, 2001)
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
- _____
- _____
- _____

Velocity:
Note where velocity measures were taken.

Habitat Smothering:
Note areas (on map) where sand or silt is something 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:

snags = 25 m²
roots = 16 m²
leaf pack = 7 m²
800/2500 = 3.00 %
200/1000 2.00 %
100/1700 1.0 %

Florida Department of

Memorandum **Environmental Protection**

TO: Mr. Glenn Butts

THROUGH: Mr. Jerry Brooks
Dr. Landon Ross

FROM: Russel Frydenborg

DATE: 23 April 1994

SUBJECT: Research; Point Source Studies–Blountstown WWTP

As requested, here are the results of the abbreviated bioassessment performed in Sutton Creek, with stations upstream (reference site) and downstream (test site) of the Blountstown WWTP discharge. Sampling, which you conducted on 22 March 1994, consisted of 20 discrete dip net sweeps of available substrates. The tabulated results and taxa list are attached.

Species richness increased from 41 taxa at the reference site to 51 taxa at the test site, suggesting a slight improvement. The ten additional taxa found at the test site consisted mostly of chironomids. The Florida Index, however, decreased by 21.4% between the upstream and downstream stations, indicating moderately undesirable conditions. Note that the reference site Florida Index value (14) was already lower than that expected from a healthy stream in the panhandle (20 or greater). This is probably due to stormwater inputs from Blountstown, and the fact that this part of Sutton Creek receives water from a reportedly eutrophic pond. The Ephemeroptera/ Plecoptera/Trichoptera Index was 6 at the reference site and 5 at the test site (a 20% decrease below the WWTP discharge). At the reference site, 17.1% of the community consisted of *Polypedilum halterale*, a Class II clean water indicator. At the test site, the dominant taxon (32.2% of the population) was *Limnodrilus hoffmeisteri*, an organism tolerant of organic wastes and low dissolved oxygen. This type of community shift is usually associated with degradation.

The Stream Invertebrate Index for Florida (SIIF) serves to summarize the above differences between the two sites. The reference site received 21 SIIF points, which means it is "moderately impaired", although it scored at the upper portion the "moderately impaired" scale. The test site received only 15 SIIF points, which places it at the lower end of the "moderately impaired" range. This 28.6% decrease in the SIIF score is cause for concern.

In conclusion, the data indicate moderately negative effects on the biota of Sutton Creek, which appear to be related to the Blountstown WWTP discharge. The differences between the reference and test sites may have been more striking if the upstream station were not already affected by anthropogenic inputs. While these results suggest that the discharge requires improvement, they do not indicate that it was in violation of the Rule prohibiting imbalances in flora or fauna.

Biological results for Blountstown WWTP Bioassessment Study, collected upstream and downstream of the discharge in Sutton Creek on 22 March 1994.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	41	51
Florida Index	14	11
SIIF Index	21	15
Shannon-Weaver Diversity	4.6	4.4
E-P-T Index	6	5
% Contribution of Dominant Taxon	17.1	32.2
% Amphipoda	5.3	2.5
% Coleoptera	6.6	4.3
% Decapoda	4.6	2.4
% Diptera	51.3	42.9
% Ephemeroptera	5.3	6.2
% Odonata	9.9	4.3
% Oligochaeta	2.6	34.2
% Pelecypoda	12.5	1.2
% Platyhelminthes	0.7	0.6
% Trichoptera	1.3	0.6
% Gastropoda	0.0	0.6
% Predators	22.2	27.0
%Collector-Gatherer/Deposit Feeder	45.3	58.5
% Suspension Feeders	20.4	5.4
% Scrapers	2.9	4.0
% Shredders	8.9	4.2
% Other	0.7	1.2

Appendix 9a

Density (number/cm^2) and taxa list for periphyton collected from glass microscope slides incubated for 28 days upstream and downstream of Blountstown WWTP discharge, January 6, 2003.

	Control Site	Test Site
Bacillariophyta		
Achnanthes minutissima	150	-
Anomoeoneis vitrea	150	351
Aulacoseira sp.	-	351
Cocconeis sp.	150	702
Cymbellaceae	450	702
Encyonema neomesianum	-	351
Encyonema silesiacum	150	1,405
Eunotia sp.	25,779	49,173
Eunotia exigua	300	351
Eunotia flexuosa	150	351
Eunotia incisa	150	351
Eunotia pectinalis	450	351
Fragilaria fasciculata	150	-
Fragilariaceae	749	2,810
Frustulia sp.	450	2,810
Gomphonema sp.	2,248	6,322
Gomphonema affine	-	351
Gomphonema gracile	450	1,054
Gomphonema parvulum	749	2,459
Navicula cryptocephala	450	1,405
Navicula pupula	150	351
Naviculaceae	150	351
Nitzschia sp.	1,199	7,025
Nitzschia nana	150	351
Nitzschia palea	899	2,107
Nitzschia subacicularis	150	-
Pinnularia sp.	150	1,054
Stauroneis sp.	150	-
Surirella sp.	150	351
Tabellaria sp.	150	-
Tabellaria fenestrata	150	351
Chlorophycota		
Characium sp.	150	-
Chlamydomonas sp.	1,049	1,756
Chlorella sp.	749	2,107
Chlorococcaceae	-	1,405
Chlorococcum sp.	450	1,054
Enteromorpha sp.	150	-
Euastrum sp.	150	-
Mougeotia sp.	-	351
Oedogonium sp.	300	702
Scenedesmus sp.	150	-
Scenedesmus bijuga	150	-
Scenedesmus dimorphus	-	2,107
Stigeoclonium sp.	1,049	1,405
Chrysophyta		
Kephyrion sp.	-	702
Cyanophycota		
Anabaena sp.	150	702
Chroococcaceae	-	351
Chroococcus minutus	600	351
Cyanobium parvum	749	1,405
Cyanobium plancticum	300	1,054
Lyngbya sp.	450	2,107
Microcystis sp.	450	351
Oscillatoria sp.	899	6,673
Euglenophycota		
Euglena sp.	150	-

Appendix 9b

Number of individuals counted and taxa list for periphyton collected from glass microscope slides incubated for 28 days upstream and downstream of Blountstown WWTP discharge, January 6, 2003.

	Control Site	Test Site
Bacillariophyta		
Achnanthes minutissima	1	-
Anomoeoneis vitrea	1	1
Aulacoseira sp.	-	1
Cocconeis sp.	1	2
Cymbellaceae	3	2
Encyonema neomesianum	-	1
Encyonema silesiacum	1	4
Eunotia sp.	172	140
Eunotia exigua	2	1
Eunotia flexuosa	1	1
Eunotia incisa	1	1
Eunotia pectinalis	3	1
Fragilaria fasciculata	1	-
Fragilariaceae	5	8
Frustulia sp.	3	8
Gomphonema sp.	15	18
Gomphonema affine	-	1
Gomphonema gracile	3	3
Gomphonema parvulum	5	7
Navicula cryptocephala	3	4
Navicula pupula	1	1
Naviculaceae	1	1
Nitzschia sp.	8	20
Nitzschia nana	1	1
Nitzschia palea	6	6
Nitzschia subacicularis	1	-
Pinnularia sp.	1	3
Stauroneis sp.	1	-
Surirella sp.	1	1
Tabellaria sp.	1	-
Tabellaria fenestrata	1	1
Chlorophycota		
Characium sp.	1	-
Chlamydomonas sp.	7	5
Chlorella sp.	5	6
Chlorococcaceae	-	4
Chlorococcum sp.	3	3
Enteromorpha sp.	1	-
Euastrum sp.	1	-
Mougeotia sp.	-	1
Oedogonium sp.	2	2
Scenedesmus sp.	1	-
Scenedesmus bijuga	1	-
Scenedesmus dimorphus	-	6
Stigeoclonium sp.	7	4
Chrysophyta		
Kephyrion sp.	-	2
Cyanophycota		
Anabaena sp.	1	2
Chroococcaceae	-	1
Chroococcus minutus	4	1
Cyanobium parvum	5	4
Cyanobium plancticum	2	3
Lyngbya sp.	3	6
Microcystis sp.	3	1
Oscillatoria sp.	6	19
Euglenophycota		
Euglena sp.	1	-

Appendix 10a

Benthic macroinvertebrates collected from Hester-Dendy artificial substrates incubated upstream and downstream of the Blountstown WWTP for 28 days (January 6, 2003). Taxa collected and density (average # of individuals/m^2, collapsed) rounded to the nearest individual (n = 3 samples). See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site	Test Site
Annelida		
Oligochaeta		
Chaetogaster diaphanus	-	5
Nais communis complex	3	-
Slavina appendiculata	3	16
Stylaria lacustris	-	24
Arthropoda		
Crustacea		
Amphipoda		
Hyalella azteca	3	40
Insecta		
Coleoptera		
Hydroporus sp.	-	3
Diptera		
Ablabesmyia mallochi	16	-
Chironomus sp.	-	3
Cricotopus bicinctus	3	0
Paratanytarsus sp.	-	11
Paratanytarsus dissimilis	3	-
Polypedilum fallax	6	3
Polypedilum illinoense grp.	10	-
Polypedilum sp. A Epler	-	3
Rheocricotopus robacki	3	-
Rheotanytarsus exiguus grp.	-	28
Rheotanytarsus pellucidus	-	28
Tanytarsus sp. G Epler	4	-
Tanytarsus sp. L Epler	7	24
Ephemeroptera		
Leptophlebiidae	-	8
Stenacron sp.	3	19
Stenonema sp.	-	11
Trichoptera		
Nyctiophylax sp.	5	-
Paranyctiophylax sp.	3	-
Mollusca		
Bivalvia		
Sphaeriidae	-	3
Gastropoda		
Physella sp.	-	5
Cincinnatia sp.	13	-
Platyhelminthes		
Platyhelminthes	3	-

Appendix 10b

Benthic macroinvertebrates collected from Hester-Dendy artificial substrates incubated upstream and downstream of the Blountstown WWTP for 28 days (January 6, 2003). Taxa collected and total number of individuals counted rounded to the nearest individual (n = 3 samples).

	Control Site	Test Site
Annelida		
Oligochaeta		
Chaetogaster diaphanus	-	2
Nais communis complex	1	-
Slavina appendiculata	1	6
Stylaria lacustris	-	9
Arthropoda		
Crustacea		
Amphipoda		
Hyalella azteca	1	15
Insecta		
Coleoptera		
Hydroporus sp.	-	1
Diptera		
Ablabesmyia mallochi	1	-
Chironomidae	5	4
Chironomus sp.	-	1
Cricotopus bicinctus	1	-
Paratanytarsus sp.	-	3
Paratanytarsus dissimilis	1	-
Polypedilum sp.	1	-
Polypedilum fallax	2	1
Polypedilum illinoense grp.	3	-
Polypedilum sp. a epler	-	1
Rheocricotopus robacki	1	-
Rheotanytarsus sp.	-	16
Rheotanytarsus exiguus grp.	-	2
Rheotanytarsus pellucidus	-	2
Tanytarsus sp.	1	2
Tanytarsus sp. G Epler	1	-
Tanytarsus sp. L Epler	2	6
Ephemeroptera		
Leptophlebiidae	-	3
Stenacron sp.	1	7
Stenonema sp.	-	4
Trichoptera		
Nyctiophylax sp.	2	-
Paranyctiophylax sp.	1	-
Mollusca		
Bivalvia		
Sphaeriidae	-	1
Gastropoda		
Cincinnatia sp.	1	-
Hydrobiidae	3	-
Physella sp.	-	2
Undetermined Gastropoda	1	-
Platyhelminthes	1	-

Appendix 11a

Qualitative benthic macroinvertebrate collections (n = 20 discrete dipnet sweeps) upstream and downstream of Blountstown WWTP (January 6, 2003). Taxa lists and number of individuals counted (collapsed). See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site	Test Site
Annelida		
Oligochaeta		
Dero sp.	-	1
Dero lodeni	1	-
Nais communis complex	-	18
Slavina appendiculata	5	-
Stylaria lacustris	-	23
Lumbriculus variegatus	-	1
Arthropoda		
Crustacea		
Amphipoda		
Hyalella azteca	7	12
Decapoda		
Palaemonetes sp.	4	-
Insecta		
Coleoptera		
Ancyronyx variegatus	2	1
Dubiraphia sp.	-	1
Dubiraphia vittata	5	-
Diptera		
Ablabesmyia mallochi	4	-
Ablabesmyia rhamphe grp.	2	-
Ceratopogonidae	1	-
Corynoneura sp.	1	1
Cryptochironomus sp.	1	-
Labrundinia pilosella	5	-
Nanocladius sp.	5	2
Paratanytarsus dissimilis	-	2
Phaenopsectra punctipes grp.	1	-
Polypedilum halterale grp.	3	-
Polypedilum illinoense grp.	2	-
Polypedilum scalaenum grp.	2	-
Rheocricotopus robacki	2	2
Rheotanytarsus exiguus grp.	1	-
Rheotanytarsus pellucidus	3	-
Stenochironomus sp.	3	3
Tanytarsus sp. c Epler	7	4
Tanytarsus sp. g Epler	1	-
Tanytarsus sp. l Epler	1	-
Thienemanniella sp.	-	4
Thienemanniella lobapodema	2	-
Thienemanniella xena	5	-
Thienemannimyia grp.	2	6
Tribelos sp.	1	-
Xenochironomus xenolabis	1	-
Ephemeroptera		
Acerpenna pygmaea	-	2
Stenonema sp.	2	1
Trichoptera		
Cheumatopsyche sp.	2	8
Mollusca		
Bivalvia	2	-
Corbicula fluminea	-	2
Gastropoda		
Amnicola sp.	12	-
Platyhelminthes		
Turbellaria	-	2
Undetermined Platyhelminthes	1	-

Appendix 11b

Qualitative benthic macroinvertebrate collections (n = 20 discrete dipnet sweeps) upstream and downstream of Blountstown WWTP (January 6, 2003). Taxa lists and number of individuals counted.

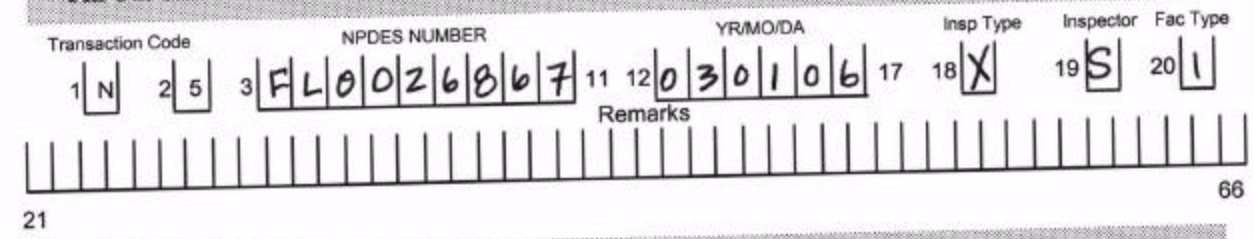
	Control Site	Test Site
Annelida		
Oligochaeta		
Dero sp.	-	1
Dero lodeni	1	-
Naididae	1	-
Nais communis complex	-	18
Slavina appendiculata	4	-
Stylaria lacustris	-	23
Lumbriculus variegatus	-	1
Arthropoda		
Crustacea		
Amphipoda		
Hyalella azteca	7	12
Decapoda		
Palaemonetes sp.	4	-
Insecta		
Coleoptera		
Ancyronyx variegatus	2	1
Dubiraphia sp.	-	1
Dubiraphia vittata	5	-
Diptera		
Ablabesmyia mallochi	3	-
Ablabesmyia rhamphe grp.	1	-
Ceratopogonidae	1	-
Chironomidae	5	4
Corynoneura sp.	1	1
Cryptochironomus sp.	1	-
Labrundinia pilosella	3	-
Nanocladius sp.	5	2
Paratanytarsus dissimilis	-	2
Phaenopsectra punctipes grp.	1	-
Polypedilum halterale grp.	3	-
Polypedilum illinoense grp.	2	-
Polypedilum scalaenum grp.	2	-
Rheocricotopus robacki	2	2
Rheotanytarsus exiguus grp.	1	-
Rheotanytarsus pellucidus	3	-
Stenochironomus sp.	3	3
Tanytarsus sp.	2	3
Tanytarsus sp. c Epler	5	1
Tanytarsus sp. g Epler	1	-
Tanytarsus sp. l Epler	1	-
Thienemanniella sp.	1	4
Thienemanniella lobapodema	2	-
Thienemanniella xena	4	-
Thienemannimyia grp.	1	2
Tribelos sp.	1	-
Xenochironomus xenolabis	1	-
Ephemeroptera		
Acerpenna pygmaea	-	2
Stenonema sp.	2	1
Trichoptera		
Cheumatopsyche sp.	2	8

Appendix 11b continued

Qualitative benthic macroinvertebrate collections (n = 20 discrete dipnet sweeps) upstream and downstream of Blountstown WWTP (January 6, 2003). Taxa lists and number of individuals counted.

	Control Site	Test Site
Mollusca		
Bivalvia	2	-
Corbicula fluminea	-	2
Gastropoda		
Amnicola sp.	9	-
Undetermined Gastropoda	3	-
Platyhelminthes		
Turbellaria	-	2
Undetermined Platyhelminthes	1	-

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



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

