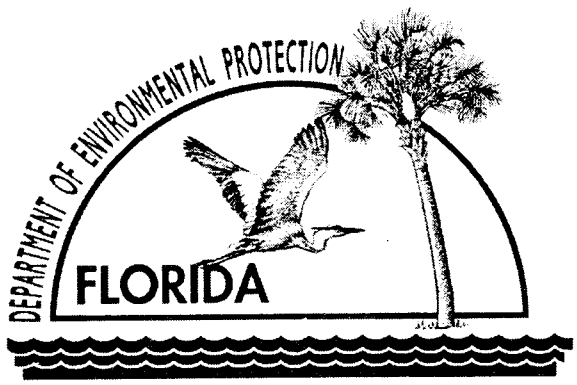


Biological Assessment of

E. I. DuPont de Nemours & Co., Inc. – Maxville Mine

Clay County

NPDES #FL0040274

Sampled July and August 1999

May 2000

Biology Section
Bureau of Laboratories
Division of Resource Assessment and Management

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection

Results of Fifth Year Inspections

Discharger:	E. I. DuPont de Nemours & Co., Inc. – Maxville Mine
County:	Clay
NPDES Number:	FL0040274
Permit Expiration Date:	01/08/2001

Toxics Sampling Inspection (XSI)

Date Sampled: 12 July 1999

Results: No pesticides or organic priority pollutants were detected in the effluent. Effluent metals complied with Class III water quality standards and the facility's permit limits. Aluminum, cadmium, copper, iron, lead, and nickel were detected in the effluent sample at levels that complied with Class III water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 12 July 1999

Results: The effluent was not acutely toxic to the invertebrate, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*.

Impact Bioassessment Inspection (IBI)

Date Sampled: 12 July 1999

Results: The phytoplankton community data showed improvement at the test site compared to the control sites. For example, the test site had higher taxa richness, Shannon-Weaver diversity, and a larger proportion of diatoms than the control sites. The one exception was the algal density, which was significantly higher at the test site compared to the control site. Phytoplankton chlorophyll *a* was undetected at all sites. In the periphyton samples, most of the community measures were similar between the study sites. The one exception was the algal density, which was extremely elevated at the test site compared to the control site. There were minor differences between the control and test site macroinvertebrate communities, but there was no clear indication that the effluent was responsible for these changes. The composite SCI scores placed all three study sites in the "excellent" category.

Water Quality Inspection (WQI)

Date Sampled: 12 July 1999

Results: The effluent did not appear to contribute to nutrient enrichment at the test site. Nutrients at all three study sites were similar and not elevated compared to other typical Florida streams. The AGP value at control sites 1 and 2 and the test site were similar and did not exceed the 5 mg dry wt/L "problem threshold" (Raschke and Shultz 1987). The effluent AGP was undetected.

The conductivity was higher at the test site (371 µmhos) than at control site 1 (71 µmhos) or control site 2 (137 µmhos). The effluent conductivity was 947 µmhos and appears to be responsible for the elevated level at the test site. The test site pH (5.8 SU) varied by more than one standard unit above control site 1 (4.0 SU) which is a violation of Class III water quality standards (Rule 62-302(52)(d) FAC, however the pH of control site 2 was 4.9 SU. The effluent pH was 7.0 SU.

This biological assessment was prepared by DEP staff to provide information to be used in reviewing an NPDES permit renewal application for the subject facility.

This assessment will be used in conjunction with other information concerning the facility and its receiving water body to determine appropriate final permit conditions.

Introduction

The E. I. DuPont de Nemours & Co., Inc.–Maxville Mine is a heavy mineral mining facility located in Clay County, Florida (see map in the Appendix). The effluent at this 4 MGD wastewater treatment plant is acidified with ferric chloride, sulfuric acid, or ferric sulfate to a pH between 3.0 and 3.5 SU for flocculation of colloidal material. Solids are then settled out in a system of three long–term ponds (which also provide percolation and evaporation). Subsequently, the effluent is neutralized with hydrated lime to bring the pH between 6.0 and 8.5 SU. After neutralization, additional settling is provided to remove gelatinous precipitate prior to final discharge (Outfall 001) (see Facility Summary in Appendix). Outfall 001 is an open channel, approximately 100 meters in length and 4 meters wide, with a Parshall flume and flow meter that discharges the effluent into Class III Gum Branch. Outfalls 002-1, 002-2, and 002-3 into New River Swamp are not actively used due to unacceptable water quality in the storm water ponds, and have not discharged within the past year. However, they are available for storm water run-off from undisturbed/disturbed mining areas and transfer into the wastewater treatment system with discharge via outfall 001 possible. The mean flow between May 1998 and April 1999 was 2.44 MGD. The actual flow during this survey was not recorded.

State permit limits for the WWTP are listed in Table 1. According to the facility's monthly operating reports, the plant had no permit violations or upsets within the past year (see Facility Summary in Appendix). The facility is un-

Table 1. Effluent limits and summary of chemistry data.

E.I. Dupont de Nemours & Co., Inc. - Maxville Mine	Effluent Limits	Effluent Sample	Control Site 1	Control Site 2	Test Site
Organic Constituents (mg/L)					
None Detected	-	-	-	-	-
Metals (µg/L)					
Aluminum	-	755 J	-	-	-
Arsenic	50 **	3.0 U	-	-	-
Cadmium	2.34 **a	0.15 I	-	-	-
Chromium	420.01 **a	0.60 U	-	-	-
Copper	24.74 ** a	0.44 I	-	-	-
Iron	1000 *c	42 A	-	-	-
Lead	9.56 **a	0.20 I	-	-	-
Mercury	0.012 **	0.10 U	-	-	-
Nickel	327.49 ** a	6.5 J	-	-	-
Selenium	5.0 **	1.2 U	-	-	-
Silver	0.07 **	0.04 U	-	-	-
Zinc	220.40 **a	8.0 U	-	-	-
Nutrients (mg/L)					
Ammonia	-	0.05 I	0.02 I	0.01 I	0.01 I
Nitrate+Nitrite	-	0.05	0.00 U	0.01	0.05
Organic Nitrogen	-	0.13	0.55	0.37	0.35
Ortho-phosphate	-	0.04 U	0.01 I	0.01 I	0.01
TKN	-	0.18 I	0.57	0.38	0.36
Total Nitrogen	-	0.23	0.57	0.39	0.41
Total Phosphorus	-	0.02 U	0.02 I	0.02 I	0.02 I
General Phys-Chem Parameters					
AGP (mg dry wt/L)	-	0.1 U	0.7	0.7	2.1
BOD, 5 day (mg/L)	-	-	2 K	2 K	2 K
Color (PtCo)	-	-	150	90	100
Conductivity (µmhos/cm)	-	947	71	137	371
DO (mg/L)	≥ 5.0 *c	7.4	5.2	7.1	6.1
Flow (MGD)	Report	-	-	-	-
Habitat Assessment	-	-	128	131	134
pH (SU)	6.0 - 8.5 *	7.0	4.0	4.9	5.8
Radium 226 & 228 (pico/L)	5.0 *d	21.3	-	-	-
Temperature (°C)	-	31.2	24.1	24.9	26.0
TSS (mg/L)	20.0 c	4	1	2	1
Turbidity (NTU)	-	-	0.5	0.6	0.6
Toxicity (48-hour static, screening bioassay)					
Bioassay - Fish	-	Not Toxic	-	-	-
Bioassay - Invertebrate	-	Not Toxic	-	-	-

a - Annual average
b - Value is based on hardness
c - Monthly average
d - interim limit of 28.1 pico/L in effect pursuant to Consent Order
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
K - Actual value is known to be less than value given
U - Material analyzed for but not detected; value reported is the minimum detection limit

* Permit limit
** Class III water quality standard

Table 2. Community structure of study sites.

E.I. Dupont de Nemours & Co., Inc. - Maxville Mine	Control Site 1	Control Site 2	Test Site
Phytoplankton Algae			
Number of Taxa	6	6	15
Shannon-Weaver diversity	2.17	2.26	3.48
Chlorophyll *a* (µg/L)	1.0 U	1.0 U	1.0 U
Algal Density (#/mL)	27.54	26.01	84.06
% Blue-green	27.8	5.9	3.7
% Green	50	35.3	18.5
% Diatoms	22.2	47.1	75.9
Periphyton Algae			
Number of Taxa	26	-	28
Shannon-Weaver diversity	3.26	-	3.3
Chlorophyll *a* (mg/m2)	2.93	10.4	15.4
Algal Density (#/cm2)	45,286	-	680,356
Diatom/Diatom + B-G Ratio	1.1	-	1
% Blue-green	5.2	-	0.6
% Green	4.3	-	3.8
% Diatoms	90.6	-	95.7
AGP (mg dry wt/L)	0.7	0.7	2.1

U - Not detected; value is the minimum detection limit

der an active Consent Order (OGC No. 97-1488) to either obtain a variance for the combined radium standard or provide additional treatment.

Methods

The purpose of this investigation was to determine the discharge effects on the receiving waters. A comparison of biological community health was made between control sites and a test site with all sites located in North Fork Black Creek (see map in the Appendix). Control site 1 was above Carter Spencer Road, approximately eight kilometers upstream of the confluence with Gum Branch; control site 2 was at County Road 218, approximately four kilometers upstream of the confluence with Gum Branch, and the test site was two kilometers below Gum Branch and approximately six kilometers downstream of the discharge.

The test site for DuPont was located at the first point where access was available. The idea of using two control sites was to evaluate what impacts might be associated with the mining operation other than the permitted discharge. Control site 1 is above any mining input. Control site 2 is above Maxville POD but is below possible non-point sources from other DuPont operations.

A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Data for this report were collected on July 12, 1999, and August 3, 1999. The effluent sample was analyzed for nutrients, metals, volitile organics, semi-volitile organics, organonitrogenand phosphorus pesticides, and organochlorine pesticides.

Acute screening toxicity bioassays, using the invertebrate, *Ceriodaphnia dubia,* and the fish, *Cyprinella leedsi*, as test organisms, were performed on an effluent sample.

Benthic macroinvertebrates were evaluated at the control and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip-net sweeps. Additional invertebrate collections were accomplished using Hester-Dendy multiplate samplers that were incubated for 28 days.

Periphyton were sampled at both control sites and the test site by incubating glass microscope slides in a standard periphytometer for 28 days. Periphyton were collected on August 3 instead of July 12, 1999. In addition, the periphyton rack at control site 2 was damaged and was not analyzed. Phytoplankton were sampled at the control and test sites via subsurface grabs. Chlorophyll *a* was determined for both phytoplankton and periphyton communities. *Selenastrum capricornutum* was used as the test organism for algal growth potential tests. All field and laboratory methods were carried out following the Bureau's Standard Operating Procedures (SOP's) which can be viewed on our web site at <www.dep.state.fl.us/labs/sops.htm>.

Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of the discharge. These measurements include: habitat

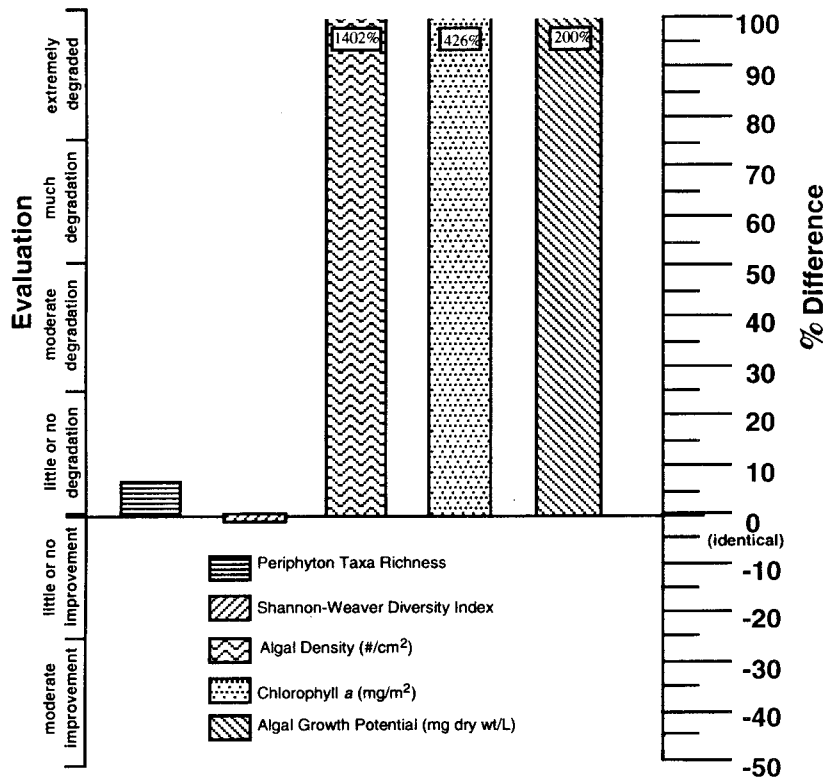


Figure 1. Effect of discharge on the periphyton community.

assessment, taxa richness, Shannon-Weaver Diversity Index, the Florida Index, Ephemeroptera-Plecoptera-Trichoptera (EPT) Index, community composition, functional feeding groups, algal biomass, and the Stream Condition Index (SCI). For a discussion of each of these measures, see *Explanation of Measurements of Community Health* in the Appendix.

For graphical purposes, the percent differences between the control and test sites involving the number of taxa, the diversity index, the Florida Index, the EPT Index, the diatom to blue-green algae ratio, and the % filter-feeders are measured as the control site minus test and control site 2 divided by the control site. The percent differences between sites involving the % contribution, algal density, chlorophyll *a*, and algal growth potential are measured as the test site minus the control site divided by the control site.

The following personnel were involved in this investigation: Pat O'Connor, James Wright, Sally Heuer and John E. Baxter (DEP Northeast District), and Julie Baughman, Ken Espy, Marshall Faircloth, Russell Frydenborg, Michael Heyn, Lisa Homann, Joy Jackson, Elizabeth Miller, Urania Quintana, Johnny Richardson, and Steve Wolfe (DEP Central Biology Laboratory in Tallahassee). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Chuck Ziegmont, and Michael Tanski, and District representatives.

Results

The chemical and biological results for this report are presented in Tables 1–3.

Discussion

Habitat assessment scores were similar among the study sites. All ranked in the "optimal" category (Table 1). The test site and control site 2 received slightly higher overall scores due to increased water velocity compared to control site 1 (see Habitat Assessments Data Sheets in the Appendix).

The dissolved oxygen concentration was greater than the 5.0 mg/L Class III standard at all three study sites (Table 1). There were differences in the conductivity, pH, and temperature at the test site compared to the control sites. For example, the conductivity was higher at the test site (371 µmhos) than at control site 1 (71 µmhos) or control site 2 (137 µmhos). The conductivity of the effluent was 947 µmhos and appears to be the source of the elevation. The pH of the test site (5.8 SU) was greater than one unit above control site 1 (4.0 SU) which violates Class III water quality standards (Rule 62-302(52)(c) FAC). However, the pH at control site 2 was 4.9 SU and that of the effluent was 7.0 SU.

Aluminum, cadmium, copper, iron, lead, and nickel were detected in the effluent sample at levels that complied with Class III water quality standards. No organic pollutants were detected in the effluent (Table 1). The effluent sample was not toxic to the fish, *Cyprinella leedsi,* or to the invertebrate, *Ceriodaphnia dubia,* during the 48-hour bioassay (Appendix).

The effluent did not appear to contribute to nutrient enrichment at the test site (Table 1). Nutrients at all three study sites were similar and not elevated compared to

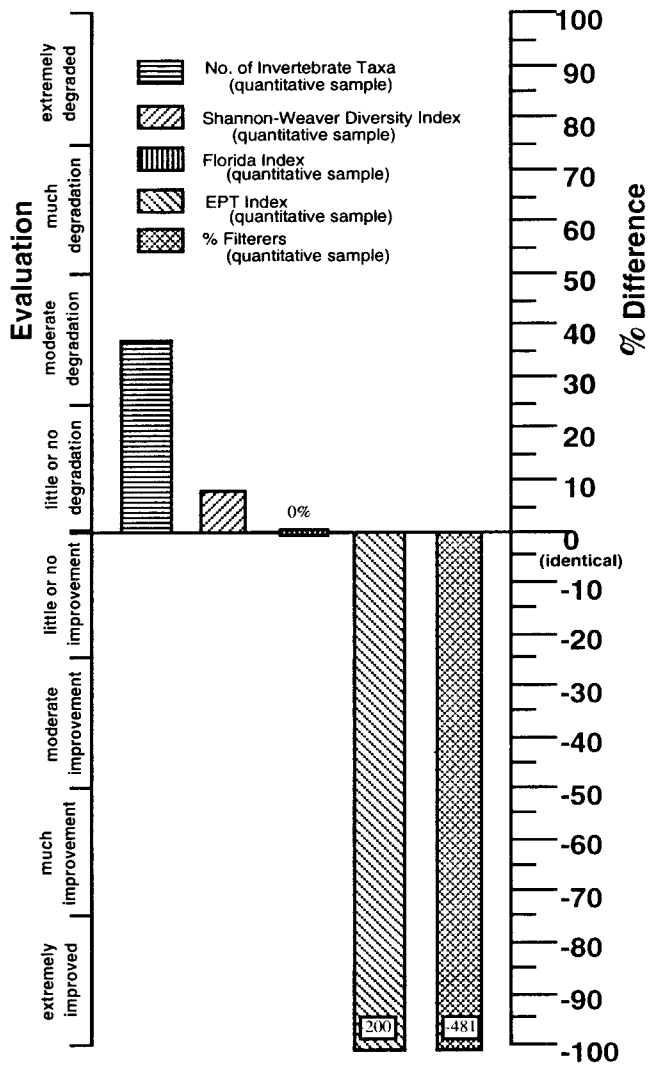


Figure 2. Effect of discharge on the benthic community.

other typical Florida streams (see *Typical Values for Selected Parameters In Florida Waters* in Appendix). The AGP value at control sites 1 and 2 and the test site were similar and did not exceed the 5 mg dry wt/L "problem threshold" (Raschke and Shultz 1987) (Table 1). The effluent AGP was undetected.

The phytoplankton data showed large differences between the test site compared to the control sites (Table 2). For example, the test site had higher taxa richness, Shannon-Weaver diversity, and algal density compared to both control sites. Diatoms increased 242% at the test site compared to control site 1, and 61% compared to control site 2. In contrast, green alga decreased 63% at the test site compared to control site 1 and 48% compared to control site 2. Chlorophyll *a* was undetected at all sites. In the periphyton community, there were little differences between the study sites. For example, the Shannon-Weaver Diversity Index, number of taxa values were similar among the three sites (Table 2).

The invertebrate dip-net samples were intermediate in quality at the test compared to control site 1 and 2 (Table 3). For example, the Florida Index was 26% lower at the test site compared to control site 2 but 56% higher than control site 1. The test site EPT Index value (5 points) was one point lower than control site 2 (6 points) and three points higher than control site 1 (2 points). The SCI score at both control sites (27 points) and the test site (29 points) placed all three sites in the "excellent" category (see SCI worksheet in Appendix). With the exception of taxa richness being lower at the test site compared to control sites, the macroinvertebrate quantitative samples did not appear significantly different among the study sites (Table 3). There were shifts in community composition among the study sites but the shifts did not indicate impairment at the test site as a result of the facility's input. For example, trichopterans which are considered indicators of good water quality, made up 25% of the community at the test site, but were not found at the control sites. Likewise, ephemeropterans made up 42% of the community at control site 2, 5% at the test site, and 2% at control site 1. Odonates made up 36% of the community at control site 1, but were not found at the test site or control site 2. There is no evidence that suggests the facility had a negative impact on the biological communities at the test site.

Literature Cited

Barbour, M. T., J. Gerritsen, and J. S. White. 1996. Develop-

Table 3. Community structure of study sites.

E.I. Dupont de Nemours & Co. Inc. - Maxville Mine	Control Site 1	Control Site 2	Test Site
Macroinvertebrate Qualitative			
% Dominant Taxon	11.1	8.3	17.9
EPT Index	2	6	5
Florida Index	9	19	14
Number of Taxa	37	39	32
SCI	27	27	29
Community Composition			
% Amphipoda	0.9	1.2	0.0
% Coleoptera	20.4	13.1	21.1
% Diptera	21.3	19.1	45.3
% Ephemeroptera	2.8	2.4	4.2
% Gastropoda	11.1	3.6	6.3
% Odonata	13.0	16.7	1.1
% Oligochaeta	10.2	8.3	6.3
% Pelecypoda	0.9	8.3	4.2
% Isopoda	3.7	7.1	4.2
% Trichoptera	3.7	7.1	7.4
% Trombidiformes	10.2	10.7	0.0
% Other	1.8	2.4	0.0
Functional Feeding Groups			
% Burrowing Deposit Feeders	10.2	6.0	2.1
% Predators	23.2	37.5	20.0
% Surface Deposit Feeders	21.8	15.5	31.1
% Suspension Feeders	1.4	13.1	12.6
% Scrapers	21.3	9.5	19.5
% Shredders	9.7	6.0	3.2
Macroinvertebrate Hester-Dendy			
Number of Taxa	16	14	10
Florida Index	7	6	7
Shannon-Weaver Diversity	3.4	2.99	3.15
EPT Index	1	2	3
Community Composition			
% Coleoptera	8.6	10.0	5.0
% Diptera	34.5	44.0	45.0
% Ephemeroptera	1.7	42.0	5.0
% Gastropoda	17.2	0.0	20.0
% Odonata	36.2	0.0	0.0
% Trichoptera	0.0	0.0	25.0
% Other	1.7	4.0	0.0
Functional Feeding Groups			
% Predators	39.7	15.0	10.0
% Surface Deposit Feeders	29.3	46.8	37.5
% Suspension Feeders	0.9	0.0	5.0
% Scrapers	23.3	25.0	25.0
% Shredders	5.2	6.0	7.5

ment of the Stream Condition Index for Florida. Prepared for the Fla. Dept. Environ. Protection. 105 p.

EA Engineering, Science, and Technology and Tetra Tech, Inc. 1994. Bioassessment for the nonpoint source program (draft). Prepared for the Fla. Dept. Environ. Protection. Unpaginated.

FDEP. 1994. Lake bioassessments for the determination of nonpoint source impairment in Florida. Fla. Dept. Environ. Prot. Biology Section, Tallahassee, Fla. 73 p.

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

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

Ross, L. T. 1990. Methods for aquatic biology. Fla. Dept. Environ. Reg. Tech. Ser. 10(1): 1-47.

Weber, C. I. 1993. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 4th edition. EPA/600/4-90/027. U. S. EPA, Cincinnati, Ohio. 216 pp.

Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health may have been employed to determine the effects of a discharge. These are briefly discussed here.

Habitat Assessment: Seven attributes known to have potential effects on the stream biota were evaluated and scored, with 20 possible points for each factor. Based on the sum of these individual scores, overall habitat quality is assigned to one of four categories: Optimal (105-140 points); Suboptimal (70-104 points); Marginal (35-69 points); and Poor (0-34 points).

Taxa richness: Stress tends to reduce the number of different types of organisms present in a system, although moderate nutrient enrichment may sometimes be correlated with increased algal taxa richness.

Shannon-Weaver diversity: This index is specified in the Florida Administrative Code as a measure of biological integrity. Low diversity scores are undesirable. They represent conditions where only a few organisms are abundant, to the exclusion of other taxa.

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 sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy.

Ephemeroptera/Plecoptera/Trichoptera (EPT) Index: This index is the sum of the number of EPT taxa present. Higher EPT values are associated with healthier systems.

Community structure: Substantial shifts in proportions of major groups of organisms, compared to control conditions, may indicate degradation.

Algal biomass: High algal biomass (algal density or chlorophyll *a*) implies nutrient stress. A decreased diatom to blue-green algae ratio (calculated by dividing the number of individuals in the Bacillariophyta by the number of individuals in the Bacillariophyta + Cyanophyta) is often indicative of nutrient enriched conditions in flowing streams.

Functional Feeding Groups: Disturbance can shift the feeding strategies of invertebrates. In Florida, for example, pollution may be responsible for reducing the numbers of filter-feeders (FDEP 1994) and shredders (EA Engineering 1994).

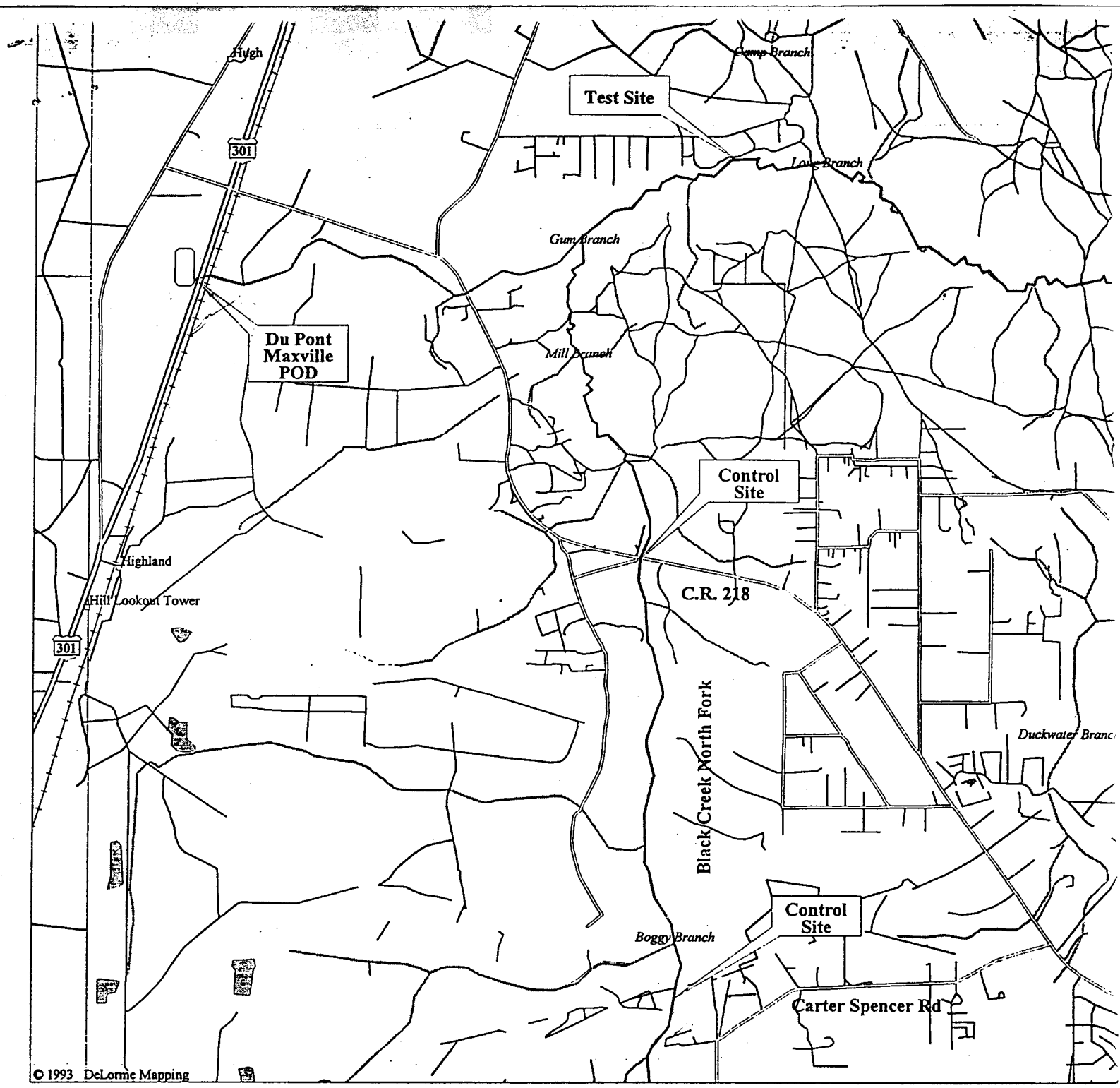
The Stream Condition Index (SCI): The SCI is a composite macroinvertebrate metric (Barbour *et al.* 1996) developed for Florida. The SCI assigns points to a variety of parameters, depending on how closely each parameter approaches an expected control condition (see SCI calculation table in Appendix).

Typical Values for Selected Parameters in Florida Waters

Adapted from Joe Hand, FDER, personal communication, 1991
(data was collected between 1980 and 1989)

	Percentile Distribution										
Parameter	**5%**	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**95%**
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90
Qualitative Taxa Richness	9.00	12.00	17.00	20.00	22.00	24.50	26.00	28.00	31.00	37.00	53.00
H-D Taxa Richness	6.00	6.50	9.00	11.50	13.00	15.00	17.00	21.50	26.00	29.00	32.00
TKN	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80
Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51
Ortho Phosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30

Units:
Phytoplankton Chlorophyll *a* (ug/L), Periphyton Chlorophyll *a* (mg/m^2), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates



LEGEND

- Population Center
- Geo Feature
- US Highway
- County Boundary
- Street, Road
- Major Street/Road
- US Highway
- Railroad
- River
- Open Water

Scale 1:62,500 (at center)

1 Miles

2 KM

Mag 13.00
Tue Aug 31 12:03:19 1999

State of Florida
Department of Environmental Protection
Facility Summary

Facility Name: E.I. DuPont de Nemours & Co., Inc. - Maxville Mine	**Prepared By:** John E. Baxter **Date:** 07/08/99	
Location: (See Attached Map)	**County:** 10 - Clay	**District:** Northeast
Federal Permit No.: FL0040274 **Expiration Date:** 01/08/01	**State GMS #:** 3110P02543 **State Expiration Date:** N/A	**Facility Type:** Industrial
Function of Facility: Heavy Minerals Mining		
Description of treatment process: The wastewater treatment system consists of acidification with ferric chloride, sulfuric acid, or ferric sulfate to a pH between 3.0 to 3.5 S.U. for flocculation of colloidal material. Solids are then settled out in a system of 3 long term ponds (which also provide for percolation/evaporation). Subsequently, neutralization with hydrated lime occurs to control pH to between 6.0 and 8.5 S.U. After neutralization, additional settling is provided to remove gelatinous precipitate prior to final discharge (outfall 001).		
Receiving Waters: Gum Branch	**Classification:** Class III - Fresh	
Design Flow: 4 MGD - annual average; 10 MGD - maximum daily	**Mean Flow:** 2.44 MGD (5/98-4/99)	**Flow during survey:**
Discharge is: Continuous *Intermittent* Seasonal *Rainfall Dependent* Other		
Facility Mixing Zone Details: N/A		
List effluent limits:		

Parameter	Limit	Describe special permit conditions and permit modifications:
Flow (MGD)	Monthly Average Report Only	
	Daily Maximum 10.0	
	Annual Average 4.0	
TSS (mg/l)	Monthly Average 20.0	
	Daily Maximum 30.0	
Total Recoverable Iron (mg/l)	Monthly Average 1.0	
	Daily Maximum 1.0	
Combined Radium 226 & 228 (pico/l)	Monthly Average 5.0*	*An interim limit of 28.1 pico/l is in effect pursuant to Consent Order 97-1488.
	Daily Maximum 5.0*	*An interim limit of 28.1 pico/l is in effect pursuant to Consent Order 97-1488.
pH (S.U.)	>6.0 & <8.5	

Chronic Toxicity		0, 6.25, 12.5, 25, 50, and 100% effluent for a daphnid (Ceriodaphnia dubia) Survival and Reproduction Test and a short-term fathead minnow (Pinephales Promelas) Larval Survival and Growth Test.
Description of permitted outfall: Outfall 001 is an open channel approximately 300 feet in length and 12 feet wide and includes a parshall flume flow meter which discharges the effluent to Gum Branch. Outfalls 002-1, 002-2, and 002-3 into New River Swamp are not actively used due to unacceptable water quality in the storm water ponds and have not discharged within the past year. However, they are available for storm water run-off from undisturbed/disturbed mining areas and transfer into the wastewater treatment system with discharge via outfall 001 is possible.		
List permit violations (MOR data) and plant upsets that occurred at the plant within the past year: N/A		
Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions: The facility is under an active Consent Order (OGC No. 97-1488) to either obtain a variance from the combined radium standard or provide additional treatment.		
Discuss MOR trends to prior data; is the trend improving or declining: The trend appears to be relatively consistent.		
Additional Information: N/A		

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
	20030723	7/12/99	1000	BLACK CREEK

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	CLAY	BLACK CREEK N. FORK ABOVE CARTER SPENCER RD	CONTROL SITE

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Land-Use in Watershed (specify relative percent in each category):

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
40	10	5	40	5			

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

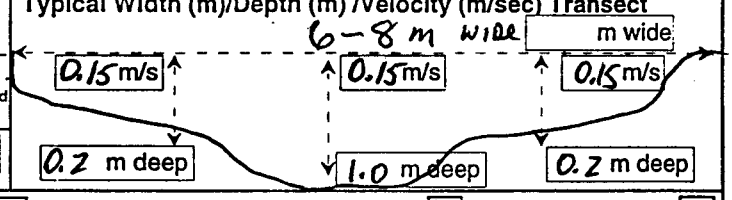
List & map dominant vegetation on back

Artificially Channelized ☐ no ☐ recent, severe ☐ some recovery ☒ mostly recovered more sinuous

Artificially Impounded ☐ yes

High Water Mark: 1.3 (m above present water level) + 1.0 (present depth in m) = 2.3 (m above bed)

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



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 Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	2		DIPNET	Sand	45		DIPNET
Leaf Packs or Mats	45		DIPNET	Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	8		DIPNET	*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top								1.0L
Mid-depth	0.5	24.11	3.96	5.22	71			
Bottom								

System Type : Stream: ☒ (1st - 2nd order, 3rd - 4th order, 5th - 6th order, 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

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

Water Surface Oils (check box): None: ☒ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity (check box): Clear: ☒ Slightly turbid: ☐ Turbid: ☐ Opaque: ☐

Color (check box): Tannic: ☒ Green (algae): ☐ Clear: ☐ Other: ☐

Weather Conditions/Notes:
Hot P/C PM Showers

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

SAMPLING TEAM:	SIGNATURE:	DATE:
HEVER, WRIGHT, O'CONNOR	Patrick O'Con	7/12/99

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (5-27-98)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
	20030723	7/12/99	BLACK CREEK

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	CLAY	BLACK CREEK, NORTH FORK ABOVE CARTER SPENCER RD	CONTROL SITE

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 16	Four or more productive habitats present (snags, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, 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 16	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 12	Max. observed at typical transect: >0.25 m/sec. but < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring; > 1 m/sec 5 4 3 2 1
Habitat Smothering 14	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 habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Primary Score 58				
Secondary Habitat Components **Artificial Channelization** 14	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 8 Left Bank 8	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 m 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 10 Left Bank 10	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 streambank 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
Secondary Score 70				

TOTAL SCORE 128

ANALYSIS DATE:	ANALYST:	SIGNATURE:
7/12/99	O'CONNOR	Patrick W O'Connor

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHEAST DISTRICT
7825 BAYMEADOWS WAY, SUIT B-200 **Comp.QAP # 880236**
JACKSONVILLE, FL 32256-7577

SAMPLE ID : 990428 STATION : DATE: 07/12/99 TIME: 10:00
SAMPLE SOURCE Black Creek N Fork SAMPLER: Wright/O'Connor/Heuer
STATION LOCATION: N Fork Black Cr. above carter spencer rd.
PROGRAM MOD.: 1316 COMPLIANCE: ☒ ENFORCEMENT: ☐
FIELD MEASUREMENTS

Tot. Depth:	2.0	Sample Depth:	1.0	W.Temp. °C:	24.11
Conductivity: µmoh/cm (EPA 120.1) :	71	Diss. Oxygen (EPA 360.1)	5.22	EPA 170.1	
Stream Velocity:	0.5	Salinity:		T.R.C.:	
pH:(EPA 150.1)	3.96	Secchi:	0.7 L	EPA 330.5	

WEATHER CONDITIONS: 90 o F - Partly Cloudy

LABORATORY MEASUREMENTS

Turbidity (NTU) : EPA 180.1	0.5	Color (PtCo): EPA 110.2	150
pH (standard unit): EPA 150.1	3.33	Conductivity(µmohs/cm) EPA 120.1	68

The following values are in mg/L

B.O.D : EPA 405.1	2 K	C.B.O.D : SM 5210-B		C.O.D : EPA 410.4	
Tot. S.S : EPA 160.2	1 K	Vol. S.S: EPA 160.4	1 K	Fix. S.S :	1 K
Oil & Grease : EPA 413.1		T.D.S EPA 160.1		Tot.Hardness : EPA 130.2	
T. Alkalinity: EPA 310.1	0	Settleable Matter: EPA 160.5		Diss. Oxygen: EPA 360.2	

COMMENTS:

Sample Custody
Sample Released to: Pat O'Connor Date: 07/12/99

Preservation: Ice Time: 18:00

Reported by: Bipin Adhyaru Date:: 07/19/99

K = Actual value is known to be less than the value given.
A = Value is the mean of two or more determinations.
O = Sampled, but analysis lost or not performed.
Q = Sample held beyond the accepted holding time.
T = Value reported is less than the laboratory method detection limit.
U = Indicates that the compound was analyzed for but not detected.
Y = The laboratory analysis was from an unpreserved or improperly preserved sample.
REJ = Data is rejected and should not be used.
L = Off - scale high. Actual value is known to be greater than value given

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
	20030250	7/12/99	1145	BLACK CREEK

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	CLAY	BLACK CREEK N. FORK @ CR 218	CONTROL SITE 2

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Land-Use in Watershed (specify relative percent in each category):

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
15	60			10		15	

Local Watershed Erosion (check box): None ☐ Slight ☒ Moderate ☒ Heavy ☐

Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☒ Moderate potential ☐ Obvious sources ☐

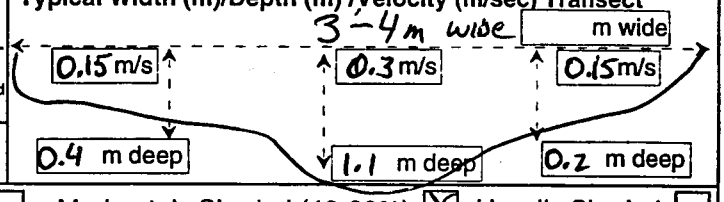
Width of riparian vegetation (m) on least buffered side: > 18 — *List & map dominant vegetation on back*

Artificially Channelized ☐ no ☐ recent. ☐ severe ☐ some recovery ☒ mostly recovered more sinuous

Artificially Impounded ☐ yes

High Water Mark: 1.5 (m above present water level) + 1.1 (present depth in m) = 2.6 (m above bed)

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



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 Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	15			Sand	85		
Leaf Packs or Mats	2			Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	3			***Draw aerial view sketch of habitats found in 100 m section***			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top								1.1L
Mid-depth	0.55	24.9	4.92	7.09	137			
Bottom								

System Type : Stream: ☒ (1st - 2nd order, 3rd - 4th order, 5th - 6th order, 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

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

Water Surface Oils (check box): None: ☒ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity (check box): Clear: ☒ Slightly turbid: ☐ Turbid: ☐ Opaque: ☐

Color (check box): Tannic: ☒ Green (algae): ☐ Clear: ☐ Other: ☐

Weather Conditions/Notes:

Hot, P/C, PM Showers

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

SAMPLING TEAM:	SIGNATURE:	DATE:
HEUER O'CONNOR WRIGHT	Patrick O'Con	7/12/99

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (5-27-98)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
	20030250	7/12/99	BLACK CREEK

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	CLAY	BLACK CREEK, N. FORK @ CR 218	CONTROL SITE # 2

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** [16]	Four or more productive habitats present (snags, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, 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 [13]	Greater than 30% productive habitat present at site. 20 19 18 17 16	16% to 30% productive habitat, by aerial extent. 15 14 13 12 11	6% to 15 % productive habitat 10 9 8 7 6	Less than 5% productive habitat. 5 4 3 2 1
Water Velocity [19]	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 [13]	Less than 20% of habitats affected by sand or silt accumulation	20%-50% of habitats affected by sand or silt accumulation	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent
Primary Score [61]	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
Secondary Habitat Components **Artificial Channelization** [20]	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 [5] Left Bank [5]	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 m 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 [10] Left Bank [10]	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 streambank 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
Secondary Score [70]				

[131] **TOTAL SCORE**

ANALYSIS DATE:	ANALYST:	SIGNATURE:
7/12/99	O'CONNOR	Patrick W O'Connor

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHEAST DISTRICT
7825 BAYMEADOWS WAY, SUIT B-200 **Comp.QAP # 880236**
JACKSONVILLE, FL 32256-7577

SAMPLE ID : 990429 STATION : DATE: 07/12/99 TIME: 11:45
SAMPLE SOURCE Black Creek N Fork SAMPLER: Wright/O'Connor/Heuer
STATION LOCATION: N Fork Black Cr. @ CR 218
PROGRAM MOD.: 1316 COMPLIANCE: ☒ ENFORCEMENT: ☐
FIELD MEASUREMENTS

Tot. Depth:	4.0	Sample Depth:	2.0	W.Temp. °C:	24.9
Conductivity: µmoh/cm (EPA 120.1) :	137	Diss. Oxygen (EPA 360.1)	7.09	EPA 170.1	
Stream Velocity:	1.0	Salinity:		T.R.C.:	
pH:(EPA 150.1)	4.92	Secchi:	1.1 L	EPA 330.5	

WEATHER CONDITIONS: 90 o F - Partly Cloudy

LABORATORY MEASUREMENTS

Turbidity (NTU) : EPA 180.1	0.6	Color (PtCo): EPA 110.2	90
pH (standard unit): EPA 150.1	4.58	Conductivity(µmohs/cm) EPA 120.1	137

The following values are in mg/L

B.O.D : EPA 405.1	2 K	C.B.O.D : SM 5210-B		C.O.D : EPA 410.4	
Tot. S.S : EPA 160.2	2	Vol. S.S: EPA 160.4	1	Fix. S.S :	1
Oil & Grease : EPA 413.1		T.D.S EPA 160.1		Tot.Hardness : EPA 130.2	
T. Alkalinity: EPA 310.1	1 K	Settleable Matter: EPA 160.5		Diss. Oxygen: EPA 360.2	

COMMENTS:

Sample Custody
Sample Released to: Pat O'Connor Date: 07/12/99

Preservation: Ice Time: 18:00

Reported by: Bipin Adhyaru Date:: 07/19/99

K = Actual value is known to be less than the value given.
A = Value is the mean of two or more determinations.
O = Sampled, but analysis lost or not performed.
Q = Sample held beyond the accepted holding time.
T = Value reported is less than the laboratory method detection limit.
U = Indicates that the compound was analyzed for but not detected.
Y = The laboratory analysis was from an unpreserved or improperly preserved sample.
REJ = Data is rejected and should not be used.
L = Off - scale high. Actual value is known to be greater than value given

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
	20030724	7/12/99	1400	Black Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Clay	Black Creek, N. Fork, 1.5 miles below Gum Branch	Test Site

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Land-Use in Watershed (specify relative percent in each category): Utility Easement

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
45	45			2		5	3

Local Watershed Erosion (check box): None ☐ Slight ☐ Moderate ☒ Heavy ☐

Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☒ Moderate potential ☐ Obvious sources ☐

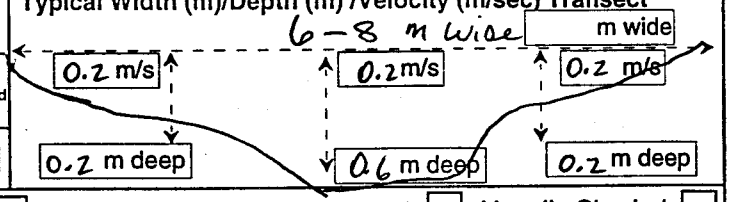
Width of riparian vegetation (m) on least buffered side: >18 — *List & map dominant vegetation on back*

Artificially Channelized ☒ no ☐ recent, severe ☐ some recovery ☐ mostly recovered more sinuous

Artificially Impounded ☐ yes

High Water Mark: 3.1 (m above present water level) + 0.6 (present depth in m) = 3.7 (m above bed)

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



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 Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	12			Sand	80		
Leaf Packs or Mats	3			Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	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. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top								0.6L
Mid-depth	0.3	25.96	5.76	6.11	371			
Bottom								

System Type : Stream: ☒ (1st - 2nd order, 3rd - 4th order, 5th - 6th order, 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☐ Other: ☐

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

Water Surface Oils (check box): None: ☒ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity (check box): Clear: ☒ Slightly turbid: ☐ Turbid: ☐ Opaque: ☐

Color (check box): Tannic: ☒ Green (algae): ☐ Clear: ☐ Other: ☐

Weather Conditions/Notes: Hot, P/c, PM Showers

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

SAMPLING TEAM: Heuer, O'Connor, Wright

SIGNATURE: [signature]

DATE: 7/12/99

DEPARTMENT OF ENVIRONMENTAL PROTECTION

FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (5-27-98)

SUBMITTING AGENCY CODE: SUBMITTING AGENCY NAME:	STORET STATION NUMBER: 20030724	DATE: (M/D/Y) 7/12/99	RECIEVING BODY OF WATER: BLACK CREEK

REMARKS:	COUNTY: CLAY	LOCATION: BLACK CREEK N FORK 1.5 miles below GUM BRANCH	FIELD ID/NAME: TEST Site

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** [14]	Four or more productive habitats present (snags, logs, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock, or other stable habitat. 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 habitats present. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Substrate Availability [14]	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 [18]	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: 0.1 to 0.5 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 [15]	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20% - 50% of habitats affected by sand or silts accumulation 15 14 13 12 11	Smothering of 50% - 80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of > 80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
PRIMARY SCORE [61]				
Secondary Habitat Components **Artificial Channelization** [20]	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 [6] Left Bank [7]	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% - 100% 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 18m 10 9	Width of native vegetation (least buffered side) 12m to 18m 8 7 6	Width of native vegetation 6 to 12m, human activities still close to system 5 4	Less than 6m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank [10] Left Bank [10]	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 streambank 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
SECONDARY SCORE [73]		**TOTAL SCORE**	[134]	

ANALYSIS DATE:	ANALYST:	SIGNATURE:
7/12/99	O'CONNOR	Robert W O'Connor

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHEAST DISTRICT
7825 BAYMEADOWS WAY, SUIT B-200 **Comp.QAP # 880236**
JACKSONVILLE, FL 32256-7577

SAMPLE ID : 990430 STATION : DATE: 07/12/99 TIME: 14:00
SAMPLE SOURCE Black Creek N Fork SAMPLER: Wright/O'Connor/Heuer
STATION LOCATION: N Fork Black Cr. aprox. 1.5 mile below confluence
PROGRAM MOD.: 1316 COMPLIANCE: ☒ ENFORCEMENT: ☐ Test site
FIELD MEASUREMENTS

Tot. Depth:	2.0	Sample Depth:	1.0	W.Temp. °C:	25.96
Conductivity: µmoh/cm (EPA 120.1) :	371	Diss. Oxygen (EPA 360.1)	6.11	EPA 170.1	
Stream Velocity:	0.75	Salinity:		T.R.C.:	
pH:(EPA 150.1)	5.76	Secchi:	0.6 L	EPA 330.5	

WEATHER CONDITIONS: 90 o F - Partly Cloudy

LABORATORY MEASUREMENTS

Turbidity (NTU) : EPA 180.1	0.6	Color (PtCo): EPA 110.2	100
pH (standard unit): EPA 150.1	5.77	Conductivity(µmohs/cm) EPA 120.1	380

The following values are in mg/L

B.O.D : EPA 405.1	2 K	C.B.O.D : SM 5210-B		C.O.D : EPA 410.4	
Tot. S.S : EPA 160.2	1	Vol. S.S: EPA 160.4	1 K	Fix. S.S :	1
Oil & Grease : EPA 413.1		T.D.S EPA 160.1		Tot.Hardness : EPA 130.2	
T. Alkalinity: EPA 310.1	5	Settleable Matter: EPA 160.5		Diss. Oxygen: EPA 360.2	

COMMENTS:

Sample Custody
Sample Released to: Pat O'Connor Date: 07/12/99

Preservation: Ice Time: 18:00

Reported by: Bipin Adhyaru Date:: 07/19/99

K = Actual value is known to be less than the value given.
A = Value is the mean of two or more determinations.
O = Sampled, but analysis lost or not performed.
Q = Sample held beyond the accepted holding time.
T = Value reported is less than the laboratory method detection limit.
U = Indicates that the compound was analyzed for but not detected.
Y = The laboratory analysis was from an unpreserved or improperly preserved sample.
REJ = Data is rejected and should not be used.
L = Off - scale high. Actual value is known to be greater than value given

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Dupont Maxwell mine
County: Clay
Contact / District: John Baxter / NE Dist.
NPDES Permit #: FL0040274
LIMS Sample #: 394180 **LIMS Job #:** TLH-1999-07-13-20
sample log
Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Test Number: 1 of 2

Sample Collection: Date 7-12-99 Time 12:15
Test Beginning: Date 7-13-99 Time 1300
Test Ending: Date 7-15-99 Time 1300
Organism Batch #: 35 **Diluent Batch #:** 29
Organism Age: <24hrs SRT toxicant batch #: NA
Test organism: Ceriodaphnia dubia

Remarks:

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control A	A	5	5	5	7.4		7.8	24.2		24.0	7.5		7.8	160		190
Control B	B	5	5	5			7.8			24.0			7.9			190
Control C	C	5	5	5			7.8			24.1			7.9			190
Control D	D	5	5	5			7.8			23.9			8.0			190
100% A	A	5	5	5	6.9		7.2	24.1		23.9	7.5		8.2	825		1100
100% B	B	5	5	5			7.2			23.2			8.2			1080
100% C	C	5	5	5			7.2			24.0			8.1			1090
100% D	D	5	5	5			7.1			24.0			8.0			1130
measured by:		MF	MF		CH		MF	CH		MF	CH		MF	CH		MF
recorded by:		MF(SC	MF		FW		FW	FW		MF	FW		MF	FW		MF

Investigators' Signatures
Marshall Faircloth
Tracy Wakefield
Courtney Head
Shannon Gerardo

Temperature Range °C
Incubator # 2 25.0-26.0 °C
Room 23.0-25.5 °C

	Salt Water Well Water	Water Quality Parameters 20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			Not measured			FW
Lab Total Residual Cl2 (mg/L):	—	<0.03	<0.03	DR-100	CH	FW
Alkalinity (mg/L as $CaCO_3$):	—	71	11	Hach	SG/CH	FW
Hardness (mg/L as $CaCO_3$):	—	81	241	Hach	SG/CH	FW
Total ammonia (mg/L as N):	—	<0.017	<0.017	Denver	~~Denver~~ MF	FW
Salinity:	—	—	0	YSI	FW	FW

Marshall Faircloth J Hudgins
reviewer form updated 3/3/99

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Dupont - Maxwell mine
County: Clay
Contact / District: John Baxter / Northeast
NPDES Permit #: FL0040274
LIMS Sample #: 394180 **LIMS Job #:** TLH-1999-07-13-20

Sample Collection: Date 7-12-99 Time 12:15
Test Beginning: Date 7-13-99 Time 1330
Test Ending: Date 7-14-99 Time 0930
Organism Batch #: 52 **Diluent Batch #:** well H2O
Organism Age: 11 days SRT toxicant batch #: NA

sample log
Test Type: Screening / Definitive
(Static) / Static Renewal / Flow-through
Test Number: 2 of 2

Test organism: Cyprinella leedsi

Remarks: Test terminated @ 24hr - excess control mortality, MF 7/14/99
All the fish in the Carolina Bowl were also dead, Conductivity was 800 µmhos. OK
Parameters of Ammonia Test performed
Cause of toxicity not established
NO Chlorine or Ammonia detected in the controls at 24 hours, MF

Conc.	Chamber #	Number Live 0 hr	24 h	48 h	pH 0 hr	24 h	48 h	Temperature (°C) 0 hr	24 h	48 h	D.O. (mg/L) 0 hr	24 h	48 h	UNCORRECTED Cond. (mmhos/cm) / Cond. (µmhos/cm) 0 hr	24 h	48 h
Control A	C1	5	0 (5)		7.4	7.9		24.4	25.3		7.0	7.7		220	270	
Control B	C2	5	0 (5)		7.4	7.8		24.4	25.2		7.2	7.7		240	265	
Control C	C3	5	0 (5)		7.4	7.9		24.4	25.2		7.2	7.8		245	265	
Control D	C4	5	2	1 (1)	7.4	7.9		24.3	24.9		7.4	7.8		250	260	
100 % A	C5	5	3	0 (3)	6.9	6.9		24.3	24.8		7.3	8.0		880	955	
100 % B	C6	5	2	0 (2)	6.9	6.9		24.3	24.6		7.2	8.0		910	945	
100 % C	C7	5	5	4 (10)	6.9	6.9		24.3	25.1		7.3	8.0		915	970	
100 % D	C8	5	5	0 (5)	6.9	6.9		24.2	24.7		7.3	7.8		915	945	
measured by:		CO	MF		CH	SG		CH	MF		CH	MF		CH	MF	
recorded by:		MF	MF		FW	SG		FW	SG		FW	SG		FW	SG	

Investigators' Signatures
Marshall Fairbotth
Frances Gerardi
Courtney Hearn
Shannon Gerardi

Temperature Range °C
Incubator # 3 25.5 - 26.5 °C
Room 23.0 - 25.5 °C

Water Quality Parameters	Salt Water (Well Water)	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			Not measured		FW	
Lab Total Residual Cl2 (mg/L):	<0.03	—	<0.03	DR-700	CH	FW
Alkalinity (mg/L as $CaCO_3$):	130	—	11	Hach	SG/CH	FW
Hardness (mg/L as $CaCO_3$):	120	—	241	Hach	SG/CH	FW
Total ammonia (mg/L as N):	<0.017	—	<0.017	Denver	MF	FW
Salinity:	—	—	0	YSI	FW	FW

reviewer form updated 3/3/99

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Dupont Maxwell mine
County: Clay
Contact / District: John Barker / Northeast
NPDES Permit #: FL00 40274
LIMS Sample #: 394180 **LIMS Job #:** TLH-1999-07-13-20

sample log

Test Type: (Screening) I Definitive
(Static) I Static Renewal I Flow-through
Test Number: 2nd of 3 mt
1 of 1

Remarks:

Sample Collection: Date 7-12-99 Time 1215
Test Beginning: Date 7-14-99 Time 0950
Test Ending: Date 7-16-99 Time 1050
Organism Batch #: 53 **Diluent Batch #:** well H2O
Organism Age: 10 days SRT toxicant batch #: NA

Test organism: Cyprinella leedsi

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm)) 0 hr	UNCORRECTED Cond. (µmhos/cm) 24 h	UNCORRECTED Cond. (µmhos/cm) 48 h
Control A	E1	5	5	5	7.7	7.7	7.9	24.0	23.9	26.1	7.8	7.8	7.7	235	245	265
Control B	E2	5	5	5	7.7	7.7	7.9	24.0	23.9	25.5	7.8	7.8	7.8	240	245	260
Control C	E3	5	5	5	7.7	7.7	7.9	24.0	24.4	25.8	7.8	7.7	7.8	240	250	265
Control D	E4	5	5	5	7.7	7.7	7.9	24.0	24.5	255	7.8	7.5	7.6	240	250	260
100% A	E5	5	5	5	7.4	7.1	7.2	24.0	24.9	25.1	7.3	7.4	8.0	910	930	950
100% B	E6	5	5	5	7.4	7.1	7.2	24.0	24.9	25.5	7.3	7.4	8.0	915	925	960
100% C	E7	5	5	5	7.4	7.1	7.2	24.0	24.3	25.5	7.3	7.6	7.9	910	930	965
100% D	E8	5	5	5	7.3	7.1	7.2	24.1	24.4	25.2	7.3	7.5	7.8	915	915	950
measured by:		MF	MF	MF	CH	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF
recorded by:		MF	MF	MF	CH	MF	CH	MF	MF	CH	MF	MF	CH	MF	MF	CH

Investigators' Signatures

Marshall Faircloth
Courtney Head
Shannon Gerardi

Temperature Range °C
Incubator # 3 25.5-26.5°C
Room 23.0-25.5°C

Water Quality Parameters	Salt Water: Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			Not measured			MF
Lab Total Residual Cl2 (mg/L):	<0.03		<0.03	DR-160	CH/MF	MF
Alkalinity (mg/L as $CaCO_3$):	120		13	Hach	CH/MF	MF
Hardness (mg/L as $CaCO_3$):	125		252	Hach	CH/MF	MF
Total ammonia (mg/L as N):	<0.017		<0.017	Denver	MF	MF
Salinity:	0		0	YCT	FW/SC	MF

Marshall Faircloth, Stephanie Wolfe
reviewer

form updated 3/3/99

STATE OF FLORIDA
DEPT. OF ENVIRONMENTAL PROTECTION
NORTHEAST DISTRICT

Division of Water Facilities
Surface Water Section

MICROBIOLOGICAL ANALYSIS REPORT

NAME OF SURVEY			COLLECTOR
Dupont Maxville			O'Connor Wright
DATE: COLLECTED	**RECEIVED**	**PROCESS START**	**COMPLETED**
07/12/99	1620 07/12/99	1640 07/12/99	1710 07/13/99
SURVEY TYPE	**SAMPLE TYPE**	**COUNTY**	**ANALYTICAL METHOD**
Industrial Waste Fifth Year Survey	Effluent Surface Water	Clay	Membrane Filter
ANALYST	**COMMENTS**		
Niedbalski			

LAB NO.	STORET NO.	SITE LOCATION	COLL TIME	SET UP TIME	TOTAL COLIFORM #/100ML	TOTAL COLIFORM CODE	FECAL COLIFORM #/100ML	FECAL COLIFORM CODE
99373		Final Effluent	1215	1755	20	B	10	K
99374		Black Creek above CR 218	1215	1755	TNTC	Z	500	
99375		Black Creek above Carter Spencer Rd	1320	1755	70	B	70	
99376		Black Creek ~ 1.5 mi. below Gum Creek confl.	1400	1755	630	B	220	

RESULTS APPROVED BY:	DATE

STATE OF FLORIDA
DEPT. OF ENVIRONMENTAL PROTECTION
NORTHEAST DISTRICT

E. I. DuPont de Nemours & Co., Inc. – Control Site 1

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	37	≥22	21-12	<12	5
EPT Index	2	-	≥2	<2	3
# Chironomid Taxa	9	≥7	6-4	<4	5
% Contribution of Dominant Taxon	11	≤31	32-66	>66	5
% Diptera	21	-	≤47	>47	3
Florida Index	9	≥8	7-4	<5	5
% Suspension feeders/Filterers	1	-	≥7	<7	1
Total Score		Northeast			27
Interpretation of Scores		Excellent			25-29
		Good			19-24
		Poor			13-18
		Severely Degraded			7-12

Summer Index Period: Stream Condition Index (SCI) for Florida Northeast (April 1996)

E. I. DuPont de Nemours & Co., Inc. – Control Site 2

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	39	≥22	21-12	<12	5
EPT Index	6	-	≥2	<2	3
# Chironomid Taxa	4	≥7	6-4	<4	3
% Contribution of Dominant Taxon	8	≤31	32-66	>66	5
% Diptera	19	-	≤47	>47	3
Florida Index	19	≥8	7-4	<5	5
% Suspension feeders/Filterers	13	-	≥7	<7	3
Total Score		Northeast			27
Interpretation of Scores		Excellent			25-29
		Good			19-24
		Poor			13-18
		Severely Degraded			7-12

Summer Index Period: Stream Condition Index (SCI) for Florida Northeast (April 1996)

E. I. DuPont de Nemours & Co., Inc. – Test Site

Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	5	3	1	Score
Total Number of Taxa	32	≥22	21-12	<12	5
EPT Index	5	-	≥2	<2	3
# Chironomid Taxa	13	≥7	6-4	<4	5
% Contribution of Dominant Taxon	18	≤31	32-66	>66	5
% Diptera	45	-	≤47	>47	3
Florida Index	14	≥8	7-4	<5	5
% Suspension feeders/Filterers	13	-	≥7	<7	3
Total Score		Northeast			29
Interpretation of Scores		Excellent			25-29
		Good			19-24
		Poor			13-18
		Severely Degraded			7-12

Summer Index Period: Stream Condition Index (SCI) for Florida Northeast (April 1996)

Periphyton taxa list and densities (#/cm^2) for E. I. DuPont de Nemours & Co., Inc. – Maxville Mine facility, collected via glass microscope slides in receiving water, on August 8, 1999.

	Control Site 1	Test Site
Bacillariophyceae		
Achnanthes exigua constricta	214	–
Achnanthes exigua	–	100841
Achnanthes hustedtii	2777	–
Achnanthes lanceolata apiculata	–	5106
Achnanthes lanceolata dubia	214	5106
Achnanthes lanceolata	214	–
Achnanthes linearis	–	2553
Achnanthes sp.	214	–
Bacillaria paradoxa	–	5106
Cocconeis placentula	854	47229
Cyclotella sp.	–	2553
Cymbella minuta	–	20423
Cymbella sp.	–	10212
Eunotia flexuosa	214	–
Eunotia naegelii	6836	–
Eunotia pectinalis	1282	39570
Eunotia sp.	17730	182535
Eunotia tenella	854	–
Eunotia vanheurcki	214	7659
Frustulia rhomboides amphipleuroides	1923	–
Frustulia rhomboides crassinerva	427	–
Frustulia rhomboides rhomboides	641	–
Frustulia sp.	427	–
Gomphonema parvulum	–	25529
Melosira varians	–	22976
Navicula arvensis	214	15318
Navicula capitata hungarica	–	5106
Navicula cocconeiformis	427	–
Navicula minima	1282	112329
Navicula minuscula	214	–
Navicula radiosa	–	2553
Navicula subtilissima	214	–
Nitzschia amphibia	214	–
Nitzschia palea	641	–
Nitzschia paleaformis	641	7659
Nitzschia sp.	854	7659
Pinnularia braunii	214	–
Pinnularia sp.	427	–
Undetermined Pennales	641	22976
Chlorophyceae		
Ankistrodesmus falcatus	–	3829

Characium sp.	854	1276
Chlamydomonas sp.	–	10212
Dactylococcopsis acicularis	–	1276
Kirchneriella sp.	–	1276
Mougeotia sp.	427	–
Scenedesmus quadricauda	–	1276
Stigeoclonium sp.	–	5106
Tetraedron minimum	–	1276
Undetermined Chlorophyceae	641	–
Cyanophyceae		
Chroococcus sp.	–	1276
Dactylococcopsis sp.	–	1276
Microcystis sp.	214	–
Oscillatoria limosa sp.	–	1276
Oscillatoria sp.	1923	–
Synechococcus sp.	214	–

Benthic macroinvertebrate taxa list for E.I. DuPont de Nemours & Co., Inc. – Maxville Mine, collected via 20 discrete dip net sweeps in receiving water, on July 12, 1999.

	Control Site 1	Control Site 2	Test Site
Amphipoda			
Crangonyx sp.	–	1	–
Undetermined Amphipoda	1	–	–
Coleoptera			
Ancyronyx variegatus	1	–	1
Dineutus sp.	2	1	–
Dubiraphia vittata	5	–	–
Hydroporus sp.	–	2	–
Microcylloepus pusillus	5	2	17
Microvelia sp.	–	1	–
Stenelmis sp.	7	6	2
Undetermined Dytiscidae	1	–	–
Undetermined Elmidae	1	–	–
Decapoda			
Undetermined Cambaridae	1	–	–
Diptera			
Ablabesmyia mallochi	1	–	3
Ablabesmyia rhamphe grp.	–	1	–
Alluaudomyia sp.	1	–	–
Atrichopogon sp.	–	–	3
Cryptotendipes sp.	–	–	1
Culicoides sp.	1	–	–
Dasyhelea sp.	–	–	1
Dicrotendipes modestus	–	–	1
Dicrotendipes sp.	–	–	1
Hemerodromia sp.	1	–	–
Meropelopia sp.	–	–	5
Nilothauma sp.	–	–	1
Orthocladius sp.	1	–	–
Parametriocnemus sp.	1	–	–
Polypedilum scalaenum grp.	–	–	1
Polypedilum tritum	1	–	–
Procladius sp.	–	1	7
Simulium sp.	–	4	1
Stempellina sp.	–	–	2
Stenochironomus sp.	11	3	2
Stictochironomus devinctus	1	–	–
Tanytarsus sp. c Epler	–	–	2
Tanytarsus sp. g Epler	–	–	1
Tanytarsus sp. m Epler	–	–	3
Tanytarsus sp. o Epler	1	–	–

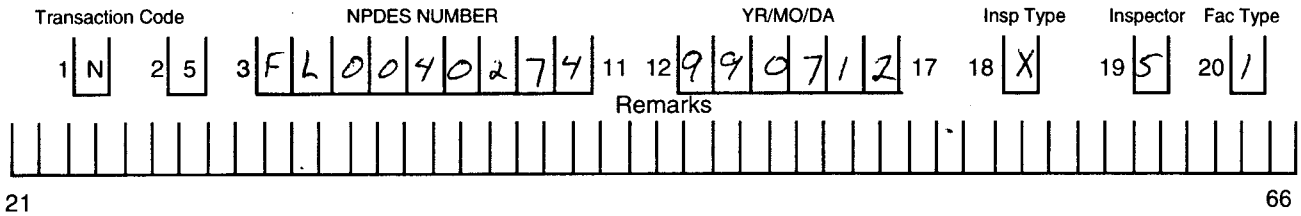
Tanytarsus sp.	–	–	5
Thienemannimyia grp.	1	–	–
Tribelos fuscicornis	1	–	–
Tribelos jucundus	–	4	–
Tribelos sp.	–	–	2
Undetermined Ceratopogonidae	–	–	1
Undetermined Chironomidae	1	2	–
Undetermined Sciaridae	–	1	–
Ephemeroptera			
Attenella attenuata	–	1	–
Undetermined Ephemerellidae	3	–	–
Labiobaetis sp.	–	1	3
Undetermined Leptophlebiidae	–	–	1
Gastropoda			
Micromenetus sp.	–	–	2
Physella sp.	–	2	–
Undetermined Ancylidae	12	1	4
Isopoda			
Caecidotea sp.	4	6	4
Megaloptera			
Corydalus cornutus	–	1	–
Odonata			
Argia sp.	2	–	–
Boyeria vinosa	–	1	–
Erythemis simplicicollis	–	1	–
Gomphus sp.	–	4	–
Neurocordulia alabamensis	–	–	1
Progomphus sp.	–	1	–
Undetermined Coenagrionidae	5	6	–
Undetermined Corduliidae	1	–	–
Undetermined Libellulidae	1	1	–
Undetermined Odonata	5	–	–
Oligochaeta			
Dero digitata	–	1	–
Dero vaga	–	1	–
Eclipidrilus sp.	2	1	1
Haber speciosus	–	1	–
Haemonais waldvogeli	4	–	–
Limnodrilus hoffmeisteri	–	–	1
Nais communis complex	–	1	4
Prostoma rubrum	1	–	–
Spirosperma sp.	–	1	–
Undetermined Enchytraeidae	3	1	–
Undetermined Tubificidae	2	–	–
Pelecypoda			
Undetermined Pelecypoda	–	7	–
Undetermined Sphaeriidae	1	–	4
Trichoptera			
Hydroptila sp.	–	1	3

Nectopsyche exquisita	–	1	3
Nectopsyche sp.	–	1	–
Oecetis georgia sp.	–	1	–
Polycentropus sp.	–	–	1
Triaenodes perna	1	2	–
Triaenodes sp.	2	–	–
Undetermined Leptoceridae	1	–	–
Trombidiformes			
Arrenurus problecornis	2	–	–
Arrenurus sp.	5	2	–
Hydrodroma sp.	–	5	–
Lebertia sp.	–	1	–
Limnesia sp.	1	–	–
Neumania sp.	–	1	–
Oribatei sp.	1	–	–
*Unionicola*sp.	2	–	–

Benthic macroinvertebrate taxa list for E. I. DuPont de Nemours & Co., Inc. – Maxville Mine facility, collected via Hester-Dendy artificial substrates in receiving water, on July 12, 1999. Densities, in number/m^2, represent the mean of three replicates.

	Control Site 1	Control Site 2	Test Site
Coleoptera			
Ancyronyx variegatus	3	8	–
Dineutus sp.	–	3	–
Microcylloepus pusillus	–	3	–
Stenelmis sp.	11	–	3
Diptera			
Ablabesmyia mallochi	3	19	3
Ablabesmyia rhamphe grp.	3	5	3
Dicrotendipes simpsoni	3	–	–
Fittkauimyia serta	–	3	–
Hemerodromia sp.	–	5	–
Labrundinia becki	–	3	–
Phaenopsectra obediens grp.	5	–	–
Polycentropus sp.	–	–	5
Polypedilum fallax	13	8	8
Polypedilum scalaenum grp.	3	8	–
Tribelos fuscicornis	21	5	11
Tribelos jucundus	3	–	–
Undetermined Chironomidae	–	3	–
Ephemeroptera			
Eurylophella doris	3	–	–
Undetermined Heptageniidae	–	3	–
Undetermined Leptophlebiidae	–	3	3
Stenonema sp.	–	50	–
Gastropoda			
Hebetancylus excentricus	11	–	–
Micromenetus sp.	–	–	5
Physella sp.	–	–	5
Undetermined Ancylidae	16	–	–
Isopoda			
Caecidotea sp.	–	5	–
Megaloptera			
Nigronia sp.	3	–	–
Odonata			
Argia sp.	19	–	–
Epitheca sp.	3	–	–
Undetermined Coenagrionidae	5	–	–
Undetermined Libellulidae	11	–	–
Undetermined Odonata	19	–	–
Trichoptera			
Undetermined Hydroptilidae	–	–	8

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)

