

Biological Assessment of

E. I. DuPont de Nemours, Inc. - Maxville Mine

Clay County

NPDES #FL0040274

Sampled July 11, 2005

May 2006

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:	E. I. DuPont de Nemours, Inc. - Maxville Mine	County:	Clay
Physical Address:	U.S. Highway 301 near Maxville	Permit Expiration:	May 9, 2006
NPDES Number:	FL0040274		

Toxics Sampling Inspection **(XSI)**

Date Sampled: July 11, 2005

Results: All metals complied with Class III Fresh Water Quality Criteria and facility permit limits. No organic priority pollutants were detected in the effluent sample.

Compliance Biomonitoring Inspection **(CBI)**

Date Sampled: July 11, 2005

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

Water Quality Inspection **(WQI)**

Date Sampled: July 11, 2005

Results: Fecal and total coliforms were not detected in the effluent, but were detected in the receiving water at levels that complied with Class III Water Quality Criteria and the facility's permit limits. Of the nutrients measured, only nitrate+nitrite was elevated at the Test Site (0.012 mg/L) compared to the Control Site (0.004 I mg/L). Conductivity (221 μmhos/cm) and temperature (27.1^{o}C) at the Test Site were elevated relative to the Control Site (52 μmhos/cm, 24.2^{o}C) and similar to effluent values (266 μmhos/cm, 30^{o}C).

Impact Bioassessment Inspection **(IBI)**

Date Sampled: July 11, 2005

Results: AGP was not detected in the effluent or in the receiving water samples. Qualitative periphyton taxa richness was 38% higher at the Test Site than at the Control Site and there was a higher percentage of blue-green algae at the Test Site (17.4%) relative to Control Site (7.1%).

Macroinvertebrate abundance was 67% lower at the Test Site (38 individuals) than at the Control Site (114 individuals) in the quantitative Hester-Dendy samples. In addition, taxa richness was 32% lower, and the number of EPT taxa was 75% lower at the Test Site than at the Control Site. Shannon-Weaver diversity was similar at both the Control and Test Sites. For the qualitative macroinvertebrate (SCI) results, the Test Site received a score of 41, which placed it in the "Poor" category, compared to the Control Site SCI score of 81, which was considered "Good".

Biological assessments prepared by FDEP staff, provide information for NPDES permit renewal applications and in conjunction with other information concerning the subject facility and its receiving-water body, aid in determining appropriate permit conditions.

Introduction

The E. I. DuPont de Nemours, Inc. Maxville Mine is located in Clay County, Florida (Appendix 1). This facility is a heavy minerals mining operation with a wastewater treatment system permitted to discharge at Outfall D-001, into the Class III freshwaters of Gum Branch. The facility is permitted to discharge 4.0 million gallons per day (MGD) annual average daily flow with a maximum daily discharge of 10.0 MGD. The mean flow during the previous year (June 2004 to May 2005) was 2.1 MGD and the flow during the survey period was 2.8 MGD (Appendix 2). The process consists of flocculation of colloidal material by acidification with ferric chloride, sulfuric acid or ferric sulfate to a pH between 3.0 to 3.5 standard units. It is also treated with barium chloride that binds Radium with solids, removing Radium and Gross Alpha from the wastewater discharge. Solids are settled out in a system of 3 long-term ponds, which also provide for percolation and evaporation. These solids are pumped intermittently to Humate Storage ponds. Following the long-term ponds, neutralization with hydrated lime occurs to control pH to between 6.0 and 8.5 standard units. When necessary and upon Department approval, polymer addition may be used after neutralization for aluminum reduction or to aid in the settling of dredged solids transferred to the short term ponds. After neutralization, additional settling is provided to remove gelatinous precipitate prior to final discharge from outfall D-001 to Gum Branch. The outfall is an open channel approximately 90 meters (300 ft.) in length and 3.5 meters (12 feet) wide. The point of discharge is located approximately at latitude 30° 08'32" N, longitude 82° 02'10" W.

Surface Water Quality Criteria and facility permit limits are listed in Table 1. The facility's monthly discharge monitoring reports contain the following exceedances: 1) total recoverable iron, 2) length of longest pH excursion, and 3) % of time exceeding pH permit limits were exceeded in September 2004, 4) the routine chronic *C. dubia* test in November 2004 failed, and 5) due to Hurricane Frances and the large amounts of rainfall the site design capacity was exceeded (9/5-9/8/2004), and 6) failure to collect water quality samples for the Pond 16 discharge for the week of October 25th and November 1st 2004 (Appendix 2). Consent Order 03-0390 dated July 31, 2003 has been resolved except item 20 of this Consent Order which is still open and states that: "The Respondent (the owner of Maxville Mine) submitted a Work Plan for the Monitoring of Radium Levels in Groundwater at DuPont's Maxville Mine Site ("Work Plan") on November 15, 2002." The Work Plan contains steps to monitor the water level and quality in the wells for Radium, and the Department has approved this work as of February 2003. Monthly reports are to be submitted to the Department as outlined in the Work Plan.

Methods

The purpose of this investigation was to determine the potential effects of the facility's effluent on the biota of the receiving waters. Chemical and biological comparisons were made between a Control Site (located in Mill Creek approximately 50 meters upstream of Stud Road) and a Test Site (located in the Gum Branch approximately 200 meters downstream of the discharge). Separate streams were utilized in this study because the upstream portions of Gum Branch, the receiving stream, have been incorporated into the mine facility. Detailed methods and their relationship to Florida Administrative Code 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/2002 sops.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: Tom Kallemeyn and Sharon Evans (FDEP Northeast District), and FDEP Central Laboratory in Tallahassee. The report was reviewed by District representatives and the Point Source Studies Review Committee (Wayne Magley, Shannan Bogdanov, 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 (726 µg/L) was detected in the effluent. Iron (132 µg/L) was detected in the effluent at a concentration that complied with the Class III Water Quality Criterion (≤ 1,000 µg/L; 62-302.530(39) F.A.C.) and the facility permit limits. The metals cadmium, lead, nickel, and zinc were found in the effluent at levels above the method detection limit (MDL) and below the practical quantitation limit (PQL). No priority organic pollutants were detected in the effluent.
- Radium 226+228 concentrations (2.5 pCi/L) complied with the Class III Water Quality Criterion and the facility permit limit.
- Effluent conductivity (266 µmhos/cm), pH (6.7 SU) and dissolved oxygen (7.7 mg/L) complied with Class III Water Quality Criteria (62-302, F.A.C.) and facility permit limits.

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

DuPont Maxville Mine	Class III Stds	Effluent Limits	Effluent Samples	Control Site	Test Site
Organic Constituents (µg/L)					
None Detected	-	-	-	-	-
Metals (µg/L unless otherwise noted)					
Aluminum	-	-	726	640	835
Arsenic	≤ 50	-	4 U	4 U	4 U
Cadmium	≤ 0.8 b	-	0.067 I	0.057 I	0.08 I
Calcium (mg/L)	-	-	21.3	3.8	18.4
Chromium-III	≤ 57.5 b	-	2 U	2 U	2 U
Copper	≤ 6.1 b	-	0.5 U	0.5 U	0.5 U
Iron	≤ 1000	≤ 1000	132	784	422
Lead	≤ 1.7 b	-	0.12 I	0.72	0.28 I
Magnesium (mg/L)	-	-	1.9	0.75	1.7
Nickel	≤ 34.3 b	-	4.1 I	2 U	2.8 I
Selenium	≤ 5	-	2.5 U	0.5 U	1 U
Silver	≤ 0.07	-	0.025 U	0.025 U	0.025 U
Zinc	≤ 78.8 b	-	4.8 I	3 U	3 I
Nutrients (mg/L)					
Ortho-phosphate	-	-	0.004 U	0.028	0.004 U
Total Phosphorus	-	-	0.02 U	0.04 I	0.02 U
Ammonia	-	-	0.031	0.011 I	0.019 I
Unionized Ammonia	≤ 0.02	-	≤ 0.02	≤ 0.02	≤ 0.02
Nitrate+Nitrite	-	-	0.007 I	0.004 I	0.012
Total Kjeldahl Nitrogen	-	-	0.29	0.7	0.36
Organic Nitrogen	-	-	0.26 c	0.69 c	0.34 c
Total Nitrogen	-	-	0.3 c	0.7 c	0.37 c
General Physical and Chemical Parameters					
Radium 226 + 228(pCi/L)	-	≤ 5	2.5	-	-
Radium 226 + 228Counting Error(pCi/L)	-	-	0.9	-	-
Radium 226 (pCi/L)	-	-	1	-	-
Radium 226-Counting Error (pCi/L)	-	-	0.2	-	-
Radium 228 (pCi/L)	-	-	1.5	-	-
Radium 228-Counting Error (pCi/L)	-	-	0.7	-	-
Habitat Assessment	-	-	-	125	95
Dissolved Oxygen (mg/L)	≥ 5	-	7.7	6.4	7.3
pH (S.U.)	-	6 - 8.5	6.7	4.8	6.4
Conductivity (umhos/cm)	≤ 1275	-	266	52	221
Phytoplankton Chlorophyll *a* (µg/L)	-	-	0.85 U	0.85 U	1.1 U
Phaeophyton Chlorophyll *a* (µg/L)	-	-	0.85 U	0.85 U	1.1 U
Temperature (C)	-	-	30	24.2	27.1
TSS (mg/L)	-	30	4 U	-	-
Turbidity (NTU)	-	≤ 29 t	2.9	-	-
Flow (mgd)	-	10	2.8	-	-
Hardness (mg/L)	-	-	61 c	-	-
Microbiology (# counts/100ml)					
Fecal Coliforms-Membrane Filter	400	-	10 U	73 AB	54 AB
Total Coliforms	2400	-	10 B	892 AB	1018 AB
Toxicology Bioassays (96 hour Acute Screen Bioassays % mortality in 100% effluent)					
Fish (*Cyprinella leedsi*)	-	≥ 100% LC_{50}	15%	-	-
Water flea (*Ceriodaphnia dubia*)	-	≥ 100% LC_{50}	0%	-	-

Value exceeds the Class III Water Quality Criteria

b - Value is calculated based on hardness

c - Value is calculated

t - Above background

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

B - Results based on colony counts outside the acceptable range

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

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

LC_{50} - Concentration estimated to be lethal to 50% of the test organisms

- Control and Test Site dissolved oxygen, pH, conductivity, and temperature complied with Class III Water Quality Criteria (Table 1). Test Site measurements of pH (6.4 SU), conductivity (221 µmhos/cm) and temperature (27.1°C) were elevated compared to the Control Site pH (4.8 SU), conductivity (52 µmhos/cm), and temperature (24.2°C).
- The effluent sample was not acutely toxic to the fish, *Cyprinella leedsi,* or to the water flea, *Ceriodaphnia dubia,* during 96-hour acute screening bioassays (See Table 1 for percent mortality and Appendix 6 for bioassay bench sheets). The permit requires chronic screening tests with 24-hr composite samples using freshwater species conducted quarterly. If NOEC < 100% effluent in any routine test, the facility must perform three additional definitive tests. When 5 consecutive discharge days have not occurred in a quarter, the permittee shall conduct a 96-hr acute toxicity test using one 24-hr composite sample in lieu of the chronic testing. If mortality > 20% in effluent, then "a minimum of 3" valid additional acute definitives are required.
- Fecal and total coliforms were not detected in the effluent, but were detected in the receiving waters at levels that complied with Class III Water Quality Criteria (See Table 1 for results and Appendix 6 for laboratory worksheets).
- The effluent total nitrogen concentration was 0.3 mg/L (Table 1). Effluent total phosphorus (below detection limit of 0.02 mg/L), ortho-phosphate (below detection limit of 0.004 mg/L), and total ammonia concentrations (0.031 mg/L, Table 1) did not appear to contribute to levels at

Table 2. Measured and predicted algal growth potential (AGP; mg dry wt/L) for total soluble nitrogen (TSIN), total nitrogen (TN), ortho phosphate (OP), and total phosphorus (TP) limitation of Pseudokirchneriella subcapitata.

Location	AGP (measured)	Predicted AGP (TSIN) ± 20%	Predicted AGP (OP) ± 20%	Predicted AGP (TN) ± 20%	Predicted AGP (TP) ± 20%	Inorganic N:P ratio	Total N:P ratio
Effluent Samples	0.300 U	1.44 ± 0.288	NC	11.29 ± 2.258	NC	0.04	0.3
Control Site	0.521 I	0.57 ± 0.114	12.04 ± 2.408	26.75 ± 5.35	17.2 ± 3.44	0.54	17.6
Test Site	0.304 AI	1.18 ± 0.236	NC	14.14 ± 2.828	NC	0.03	0.37

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

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

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

NC - not calculable because phosphorus was not detected in the sample

the Test Site. Nutrient levels at the Control Site were generally higher than those at the Test Site. Test Site total ammonia, total Kjeldahl nitrogen (TKN), nitrate+nitrite, total phosphorus and ortho-phosphate concentrations ranked near the 5th percenttile of typical values for Florida streams (Appendix 5). At the Control Site, concentrations of total phosphorus and ortho-phosphate ranked in the 10th percentile and TKN ranked in the 20th percentile of typical values for Florida streams.

- 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 value at the Mill Creek Control Site and the Gum Branch Test Site were between the MDL and PQL (Table 2). AGP was not detected in the effluent sample. This suggests there is no nutrient enrichment related to the Maxville Mine discharge in this portion of Gum Branch. There was no evidence of growth inhibition in AGP data (Table 2).
- Chlorophyll-*a* was not detected in the effluent, Control, or Test Site samples (Table 1).
- There were only minor differences in qualitative periphyton algal community composition between the Control and Test Sites (Table 3, Appendix 8). There were 44 taxa at the Control Site and 64 taxa at the Test Site. However, there were no significant differences in dominant taxon, percent dominant taxon, or percent diatoms. Periphyton chlorophyll-*a* was not detected in Control or Test Site samples.
- Habitat assessment scores were 125 at the Control Site and 95 at the Test Site (Table 1, data sheets in Appendix 7). Of the habitat assessment primary parameters, habitat smothering and substrate availability scored significantly lower at the Test Site than at the Control Site. The secondary parameters, artificial channelization and bank stability, also scored lower at the Test Site than at the Control Site.
- Two of the four Control Site Hester-Dendy samplers were lost during the study, therefore the biological integrity criterion cannot be applied. The criterion requires that three Hester-Dendy samplers be analyzed for each site for the results to be valid. However, the quantitative measures of benthic macroinvertebrate assemblages calculated from the available Hester-Dendy data indicate that substantial differences in community structure exist between the Control Site and the Test Site (Table 4, Appendix 9). Test Site number of individuals (38), number of taxa (15), and number of EPT taxa (2) were significantly fewer than those found to be present on Control Site samplers (individuals 114, taxa 22, and EPT taxa 8). Additionally, the Control Site dominant taxon was

Table 3. Periphyton composition

	Control Site	Test Site
Number of Taxa	44	64
Percent Dominant Taxon	27.6	30.7
Dominant Taxon (name)	*Eunotia sp.*	*Eunotia sp.*
TotalNind	308	316
Percentage Composition		
Blue-green algae	7.1	17.4
Diatoms	88.3	81.6
Green algae	4.6	1

Table 4. Macroinvertebrate Hester-Dendy Samples - Quantitative

DuPont Maxville Mine	Control Site	Test Site
Summary Statisics		
Shannon-Weaver Diversity	3.79	3.5
Number of Taxa	22	15
Florida Index	13	6
Number of EPT Taxa	8	2
Percent Dominant Taxon	23.6	18.2
Dominant Taxon (name)	*Cheumatopsyche* sp.	*Polypedilum illinoense* grp.
Dominant Taxon (group)	Trichoptera	Diptera
Total Number of Individuals	114	38
Community Composition: Percent of total		
Coleoptera	30.6	5.3
Diptera	15	65.8
Ephemeroptera	15.9	7.9
Oligochaeta	0	2.6
Trichoptera	35	15.8
Other	3.5	2.6
Functional Feeding Groups: Percent of total		
Browsers/Grazers	0	1.3
Burrowing Deposit Feeders	0	2.6
Predators	13	14.3
Surface Deposit Feeders	28.9	38.4
Suspension Feeders	30.2	17.3
Scavengers	0.9	1.3
Scrapers	23.3	6.6
Shredders	3.8	18.2

the hydropsychid caddisfly Cheumatopsyche sp. and at the Test Site the dominant taxon was the chironomid midge *Polypedilum illinoense* group. Many of these differences may be the result of pH and conductivity differences observed between sites or due to habitat loss caused by habitat smothering or hydrologic differences between the sites. Recently, in performing the departmental triennial review of water quality criteria, the Biology Section of the Bureau of Laboratories investigated the relationship between conductivity and the presence or absence of taxa listed as sensitive (Taxonomic Lists on the FDEP web site: http://www.dep.state.fl.us/labs/cgi-bin/Sbio/keys.asp#keys) determined that substantial reductions in sensitive taxa can occur when conductivity is increased from background by no more than 100 to 200 μmhos/cm (FDEP, 2005). Even though some of the Hester-Dendy samplers were lost during the study, and the biological integrity criterion cannot be applied, it should be noted that two remaining Control Site samplers produced nearly 3 times more macroinvertebrates than the four Test Site samplers.

- Qualitative measures of benthic macroinvertebrate assemblages from dipnet samples are summarized in Tables 5 and 6 and in Appendix 10. The Control Site SCI score of 81 and the Test Site SCI score of 41 placed the Control Site in the "Good" category and the Test Site in the "Poor" category. The dipnet samples reflect similar patterns of macroinvertebrate community structure as those found with the Hester-Dendy samplers. The primary differences between the Control Site and Test Site dipnet samples were a 54% reduction in taxa richness, and a near doubling of the percent dominant taxon and percent suspension feeders and filterers at the Test Site compared to the Control Site. Even though 20-dipnet composite sample and 100 count subsamples are qualitative and no estimates of macroinvertebrate density are calculated, it should be noted that approximately 1.5 times more Test Site sample material was sorted in order to produce 100 organisms than was needed to produce the same number from the Control Site.

Summary

Data collected for this inspection indicate that the Maxville Mine effluent from Outfall D-001 has had little effect on the water quality of Gum Branch during the sampling period. With the exception of pH and conductivity, only minor differences exist between the Gum Branch Test Site and Mill Creek Control Site in the parameters measured. Conductivity and pH of the discharge are within the permit limits however, the limits are higher than levels found at the background Control Site. The biological assessment of Gum Branch indicates that there are significant differences in macroinvertebrate populations between streams. The differences that were observed are primarily due to differences in pH, conductivity, and flow. Differences in flow are the result of the mining around the upstream portion of Gum Branch and its incorporation into the discharge of the long-term settling

Table 5. Macroinvertebrate Dipnet Samples - Qualitative

DuPont Maxville Mine	Control Site	Test Site
Stream Condition Index (value)	81	41
Stream Condition Index (word)	Good	Poor
Stream Condition Index Metrics		
Number of Total Taxa	33	15
Number of Ephemeroptera Taxa	3	1
Number of Trichoptera Taxa	5	5
Number of Clinger Taxa	10	4
Number of Long-lived Taxa	5	0
Number of Sensitive Taxa	10	3
Percent of Dominant Taxon	24.8	49.5
Percent Suspension Feeders and Filterers	26.7	56.4
Percent of Tanytarsini individuals	0.0	0.0
Percent of Very Tolerant individuals	1.0	1.0
Total Number of Individuals	105	101
Community Composition: Percent of total		
Dominant Taxon (name)	*Cheumatopsyche* sp.	*Cheumatopsyche* sp.
Dominant Taxon (group)	Trichoptera	Trichoptera
Amphipoda	1.9	0.0
Coleoptera	33.3	9.9
Odonata	1.9	0.0
Plecoptera	1.0	0.0
Oligochaeta	8.6	4.0
Bivalvia	0.0	3.0
Diptera	12.4	3.0
Ephemeroptera	6.7	16.8
Gastropoda	0.0	5.9
Trichoptera	30.5	57.4
Other	3.7	0.0
Functional Feeding Groups: Percent of total		
Burrowing Deposit Feeders	8.6	4.0
Predators	8.1	1.5
Surface Deposit Feeders	25.2	16.3
Suspension Feeders and Filterers	26.7	56.4
Scrapers	23.3	19.3
Shredders	5.2	2.5
Unknown	2.9	0.0

ponds. Evaluation of the sediment control mechanisms in the upstream portion of Gum Branch should be considered because reducing sediment loading would decrease the amount of habitat smothered and improve the flow in the stream, leading to an improved macroinvertebrate community. Also, some consideration should be given to changing the pH and conductivity permit limits to levels more closely representing those of the background conditions. Both DMR and FDEP data from this inspection indicate continued monitoring is warranted for this facility.

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Table 6a. Stream Condition Index Metrics - Northeast Bioregion

Maxville Mine Control Site			
Metric:	Value	Raw Metric Score	Fixed Score 0 -10
Total Number of Taxa	33	6.5	6.5
Number of Ephemeroptera Taxa	3	8.6	8.6
Number of Trichoptera Taxa	5	7.7	7.7
Number of Clinger Taxa	10	11.1	10.0
Number of Long-lived Taxa	5	16.7	10.0
Number of Sensitive Taxa	10	9.1	9.1
Percent Contribution of Dominant Taxon	24.76	6.6	6.6
Percent Suspension Feeders and Filterers	26.67	6.3	6.3
Percent of Tanytarsini individuals	0	0.0	0.0
Percent of Very Tolerant individuals	0.95	8.5	8.5
Total Score			**81**
Interpretation of Scores		Good	73-100
		Fair	46-72
		Poor	19-45
		Very Poor	0-18

Table 6b. Stream Condition Index Metrics - Northeast Bioregion

Maxville Mine Test Site			
Metric:	Value	Raw Metric Score	Fixed Score 0 -10
Total Number of Taxa	15	-0.4	0.0
Number of Ephemeroptera Taxa	1	2.9	2.9
Number of Trichoptera Taxa	5	7.7	7.7
Number of Clinger Taxa	4	4.4	4.4
Number of Long-lived Taxa	0	0.0	0.0
Number of Sensitive Taxa	3	2.7	2.7
Percent Contribution of Dominant Taxon	49.5	1.0	1.0
Percent Suspension Feeders and Filterers	56.44	13.5	10.0
Percent of Tanytarsini individuals	0	0.0	0.0
Percent of Very Tolerant individuals	0.99	8.4	8.4
Total Score			**41**
Interpretation of Scores		Good	73-100
		Fair	46-72
		Poor	19-45
		Very Poor	0-18

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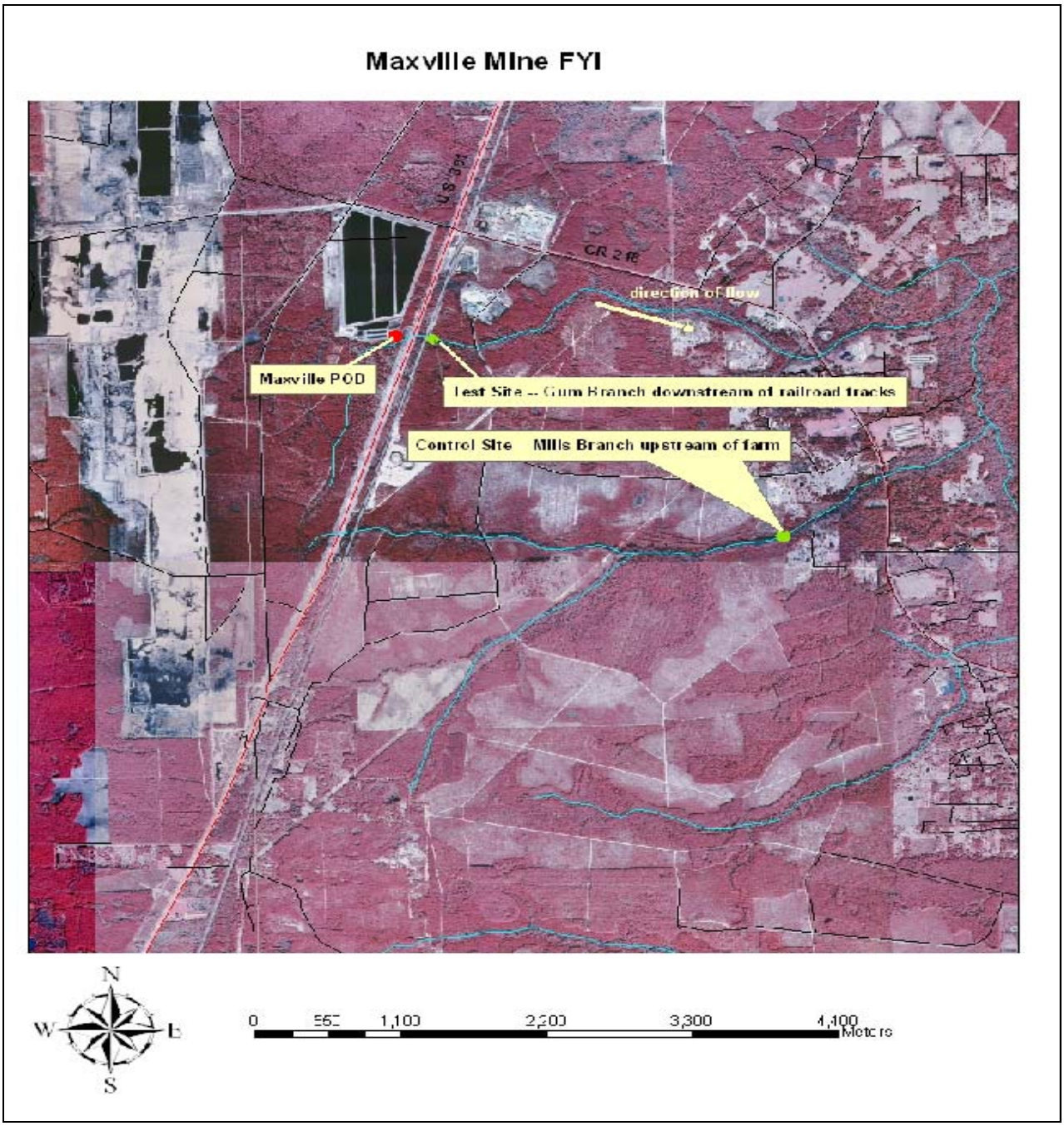
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Appendices

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

Appendix 1

Map of Facility



Appendix 2

Facility Summary and DMR Data

E.I. Dupont de Nemours & Co., Inc.

Maxville Mine

FL0040274

This is a 4.0 mgd annual average daily flow (10.0 mgd maximum daily flow) heavy minerals mining wastewater treatment system providing acidification with ferric chloride, sulfuric acid or ferric sulfate to a pH between 3.0 to 3.5 standard units, for flocculation of colloidal material. Short-term ponds are constructed in above grade tailings as mining progresses to provide settling and percolation/evaporation of wastewater as well as recycling of wastewater for the wet mill operation. The short-term ponds may also discharge to separate process wastewater ponds (fka storm water ponds), which also receive storm water runoff from undisturbed/disturbed mining areas. Solids are settled out in a system of 3 long-term ponds (which also provide for percolation/evaporation). Following the long-term ponds, neutralization with hydrated lime occurs to control pH to between 6.0 and 8.5 standard units. When necessary and upon Department approval, polymer addition may be provided after neutralization for aluminum reduction or to aid in the settling of dredged solids transferred to the short term ponds. After neutralization, additional settling is provided to remove gelatinous precipitate prior to final discharge from outfall D-001 to Gum Branch, a Class III fresh water of the State.

Separate wastewater ponds receive contact storm water from undisturbed/disturbed mining areas and process wastewater. The permittee is authorized to discharge under emergency provisions from these process wastewater ponds as identified in Part I.B.1 of this permit. Such discharges will occur from outfall D-002 to the New River Swamp, a Class III fresh water of the State. Recycled water from the ore scrubbing operation will be routed to either the short-term pond system, the dredge pond, or to the long-term ponds.

The substantial revision to the permit is to allow the intermittent discharge of contact stormwater and incidental process water to outfall D-003 from the stormwater impoundment on the northern portion of the Maxville Mine and the construction of a flashboard outfall structure. The impoundment receives runoff from unmined, mined and reclaimed lands. The impoundment was designed to contain greater than a 25 year 24 hour storm. This discharge will allow the permittee to bleed down the impoundment as needed to maintain surge capacity for the 25 year 24 hour storm. The discharge will be treated with Department approved polymers or alum as needed to meet turbidity standards.

Surface Water Discharge: This is an existing 4.0 MGD annual average (10.0 MGD maximum) permitted discharge at Outfall D-001, to Gum Branch, a Class III fresh surface water. The outfall is an open channel approximately 300 feet in length and 12 feet wide. The point of discharge is located approximately at latitude 30°08'32" N, longitude 82°02'10" W. The permittee is authorized for emergency discharges from outfall D-002 to the New River Swamp, consisting of contact stormwater and process wastewater in accordance with this permit. Alternative emergency discharge points may be authorized upon Department approval as the mine path progresses. The permittee is authorized for intermittent discharges consisting of contact stormwater and incidental process wastewater from outfall D-003 to existing drainage paths with eventual discharge to the North Fork of Black Creek, a Class III fresh surface water. The point of discharge is located at latitude 30°11'24.9" N, longitude 82°02'31.4" W.

Land Application: The separate process wastewater ponds, long and short term ponds also provide for the percolation/ evaporation of wastewater from the mining operation. All discharges are to Class GII ground waters of the state. Groundwater monitoring is required by Part III of this permit.

Facility Name (as it appears on permit): E.I. Dupont – Maxville Mine		**Former Names:**
Physical Address: Hwy 218, West of US 310 Maxville, Florida	NPDES Permit No.: FL0040274 Expiration Date: May 9, 2006	Prepared By: Reza Shayan
County: Clay	**District:** NE	**Facility Type:** Major
Function of Facility: Dredge mining of heavy mineral sands to separate ilmenite, zircon, and staurolite.		
Sampling Location (actual permit designation of permitted sampling point): Unless specified elsewhere in the permit, samples taken in compliance with the monitoring requirements specified in I.B.1. shall be taken at the nearest accessible point after final treatment but prior to the actual discharge with the receiving water.		
Description of permitted outfall: Outfall D-001 to Gum Branch, latitude 30° 08' 32" N, longitude 82° 02' 10" W; Outfall D-002 to the New River Swamp; Outfall D-003 to existing drainage paths with eventual discharge to the North Fork of Black Creek, latitude 30°11'24.9" N, longitude 82°02'31.4" W.		
Description of treatment process (if multiple discharge points, include a map or diagram of facility): The facility is a heavy minerals mining wastewater treatment system providing acidification with ferric chloride, sulfuric acid or ferric sulfate to a pH between 3.0 to 3.5 standard units, for flocculation of colloidal materials. Short term ponds are constructed in above grade tailings as mining progresses to provide settling and percolation/ evaporation of wastewater as well as recycling of wastewater for the mill operation. The short-term ponds may also discharge to separate process wastewater ponds, which also receive storm water runoff from undisturbed/disturbed mining areas. Solids are settled out in a system of 3 long-term ponds. Polymer addition may be provided after neutralization for aluminum reduction or to aid in the settling of dredged solids transferred to the short-term ponds.		
Receiving Waters: Gum Branch, New River Swamp, and North Fork of Black Creek.	**Classification (indicate whether fresh or marine):** Class III fresh water of the State.	
Temperature (C): 30.02	**Design Flow:** 10 mgd maximum daily flow.	
pH **(SU): 6.68**	Mean Flow: **6.83 mgd from June 2004 through May 2005**	
Conductivity (umhos/cm): 266	**Flow During Survey**: **2.8 MG**	
Method of Chlorination	**Method of Dechlorination**	
Dissolved Oxygen (mg/L): 7.72	**Total Residual Chlorine (mg/L) (after disinfection):**	
Discharge is: Rainfall Dependent		
Toxicity Test Requirements (routine and/or additional test language test species, salinity adjustment, etc.): **D-001** => Requires chronic screening tests with 24-hr composite samples using freshwater species conducted quarterly. If NOEC < 100% effluent in any routine test, facility needs "up to 3" additional definitive tests. If first definitive passes, the remaining two tests are not required. When 5 consecutive discharge days have not occurred, the permittee shall conduct acute toxicity testing in lieu of the chronic testing. Acute tests will be 96-hr screens, also with *C.dubia* and *P.promelas*, using one 24-hr composite sample. If mortality > 20% in effluent, then "a minimum of 3" valid additional acute definitives are required. **D-002 and D-003** => require 96-hr acute screening tests with *C.dubia* and *P.promelas*, conducted per discharge. If mortality > 20% in 100% effluent, then "a minimum of 3" valid additional acute definitives are required. The additional testing requirements for discharges from outfall D-002/003 may be waived upon Department approval.		

Administrative or Consent Orders: Consent Order No. 04-1712 has been signed and dated on November 10, 2004 and ordered that the Respondent should have paid the Department $7,500.00 in settlement of the matters addressed in this Consent Order. The amount has been paid on December 16, 2004.

Consent Order 03-0390 dated July 31, 2003 has been resolved except item 20 of this Consent Order which is still open and states that:

The Respondent (the owner of Maxville Mine) submitted a Work Plan for the Monitoring of Radium Levels in Groundwater at DuPont's Maxville Mine Site ("Work Plan") on November 15, 2002. The Work Plan contains steps to monitor the water level and quality in the wells for Radium, and the Department has approved this work in February 2003. Monthly reports are to be submitted to the Department as outlined in the Work Plan. The Department will review these and determine if the Work Plan must be modified to ensure compliance with groundwater standards. Respondent shall apply for a modification to permit FL0040274 within 30 days from the written determination by the Department that a permit modification is required.

Facility Mixing Zone Details: n/a

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

a) Total Recoverable Iron, Length of longest pH excursion, and % of Time exceeding pH exceeded in September 2004 due to Hurricane Frances.
b) The routine chronic *C.dubia* test reported in November 2004 failed; however, the follow-up test passed.
c) By-Pass and Upset provisions due to Hurricane Frances and the high amounts of rainfall that exceeded the design capacity of the site (9/5- 9/8/2004).
d) Failure to collect water quality samples for the Pond 16 discharge for the week of October 25th and November 1st 2004.

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions: FDEP conducted a 5th-yr bioassessment in July 1999 at the Maxville mine. The effluent was found to be in compliance with water quality standards for acute toxicity, metals, pesticides, organics, and nutrients. Algal density was the only biological parameter to be elevated at the test site. The effluent appeared to contribute to elevated pH and conductivity at the test site. All 3 study sites earned SCI scores of "excellent".

Discuss MOR trends to prior data; is trend improving or declining:

No noticeable trend.

List Effluent Limits (include additional sheets as necessary):		
Parameter and Units	**Limit**	**Describe special permit conditions and permit modifications:**
<u>Outfall D-001: Gum Branch</u>		
Flow (mgd)	Monthly Average, Report Daily Maximum: 10.0	
TSS (mg/L)	Monthly Average: 20.0 Daily Maximum: 30.0	
Total Recoverable Iron (mg/L)	Monthly Average: 1.0 Daily Maximum: 1.0	
Acute Whole Effluent Toxicity, (%)	The LC50 shall not be less than 100% effluent.	If discharge is less than 5 consecutive days, acute tests are allowed in lieu of chronics.
Chronic Whole Effluent Toxicity, (%)	NOEC ≥ 100% effluent.	If first additional test passes, no further additionals are required.
Combined radium 226 and 228, Picocuries/L	Monthly Average: 5.0 Daily Maximum: 5.0	Monthly sampling is required. Based on the monitoring results after 1 year, the Department may modify this monitoring requirement.
pH (SU) - Effluent	Daily Minimum: 6.0 Daily Maximum: 8.5	The pH values shall not deviate outside the range of 6.0 to 8.5 SU more than 1% of the time in any calendar month and no individual excursion shall exceed 60 minutes. An “excursion” is an unintentional and temporary incident in which the pH value of discharged wastewater exceeds the range set forth in the permit.
<u>Outfall D-002 New River Swamp</u>		
Flow (mgd)	Monthly Average, Report Daily Maximum, Report	
TSS (mg/L)	Monthly Average: 20.0 Daily Maximum: 30.0	
Turbidity, NTU	Maximum 29.0 NTU above natural background.	Turbidity shall be sampled at the point of discharge and at a background station approved by DEP.
Combined Radium 226 and 228, Picocuries/L	Monthly Average: 5.0 Daily Maximum: 5.0	

Total Recoverable Iron (mg/L)	Monthly Average: 1.0 Daily Maximum: 1.0	
pH (SU) - Effluent	See comment	The pH shall be sampled per discharge event. If the natural background is less than 6.0, the pH shall not vary below natural background pH or vary more than one unit above natural background pH.
pH (SU) – Background	See comment	The pH shall be sampled at the point of discharge and at a background station approved by DEP.
Acute Toxicity	The LC50 shall not be less than 100% effluent.	Sampled and tested once per discharge but no more frequently than once per quarter.
<u>Outfall D-003</u> North Fork of Black Creek		
Flow (mgd) from D-003	Monthly Average, Report Daily Maximum, 5.0	
Flow (mgd) from D-003 *combined* with D-001	Monthly Average, 10.0 Daily Maximum, Report	
TSS (mg/L)	Monthly Average: 20.0 Daily Maximum: 30.0	
Total Recoverable Iron (mg/L)	Monthly Average: 1.0 Daily Maximum: 1.0	
Turbidity, NTU	Maximum 29.0 NTU above natural background.	Turbidity shall be sampled at the point of discharge and at a background station approved by DEP.
Acute Toxicity	The LC50 shall not be less than 100% effluent**.**	Sampled and tested once per discharge but no more frequently than once per quarter.
Combined Radium 226 and 228, Picocuries/L	Monthly Average: 5.0 Daily Maximum: 5.0	
pH (SU) - Effluent		The pH shall be sampled per discharge event. If the natural background is less than 6.0, the pH shall not vary below natural background pH or vary more than one unit above natural background pH.
pH (SU) – Background		The pH shall be sampled at the point of discharge and at a background station approved by DEP.

DMR Summary Results

Facility ID	Facility Name	District	Facility Type	Major (M)	Outfall Type	Monitoring Date	Outfall Indicator	Parameter Code	Parameter Description
FL0040274	E I DUPONT DE NEMOURS & CO -	JA	I	M	EFFLUENT	9/30/2004	001-1	P 00980	IRON, TOTAL RECOVERABLE
FL0040274	E I DUPONT DE NEMOURS & CO -	JA	I	M	EFFLUENT	9/30/2004	001-1	P 50050	FLOW
FL0040274	E I DUPONT DE NEMOURS & CO -	JA	I	M	EFFLUENT	9/30/2004	001-1	P 72107	LENGTH OF LONGEST PH EXCURSION
FL0040274	E I DUPONT DE NEMOURS & CO -	JA	I	M	EFFLUENT	9/30/2004	001-1	P 72108	% OF TIME EXCEEDING PH LIMITS
FL0040274	E I DUPONT DE NEMOURS - MAXVIL	JA	I	M	EFFLUENT	11/30/2004	001-T	P TBP3B	NOEL STATRE 7DAY CHR CERIODAPHNIA
FL0040274	E I DUPONT DE NEMOURS - MAXVIL	JA	I	M	EFFLUENT	6/30/2005	002-1	P 00400	PH

Monitoring Location Code	Quantity (1)	Quantity Limit (1)	Quantity Statistical Base (1)	Quantity (2)	Quantity Limit (2)	Quantity Statistical Base	Quantity Units	Concentration (1)	Concentration Limit (1)	Concentration Statistical Base (1)
1									DELMON	
1	4.3	ADDMON	MO AVG	12.9	10	DAILY MX	MGD			
P									DELMON	
P									DELMON	
P								<100	100	MINIMUM
1								3.98	6	DAILY MN

Concentration (2)	Concentration Limit (2)	Concentration Statistical Base (2)	Concentration Limit (3)	Concentration Statistical Base (3)	Concentration Units	No Discharge Indicator Code	Violation Code
1.6	1	MO AVG	1	DAILY MX	MG/L		E90
							E90
	DELMON		60	MAXIMUM	MIN- UTES		E90
	DELMON		1	MO MAX	PER- CENT		E90
	DELMON		DELMON		PER- CENT		E90
	DELMON		8.5	DAILY MX	SU		E90

Appendix 3

Explanation of Measurements

(1) Quality Assurance and Quality Control

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

(2) Chemical Analyses of the Effluent

The effluent was analyzed for nutrients, metals, organic constituents (base, neutral, and acid extractables) and pesticides following FDEP SOPs. A list of the analytes tested for, results, data qualifiers, the minimum detection limit and the practical quantitation limit are given in Appendix 4. The results from these analyses were compared with Water Quality Criteria (62-302 F.A.C.) and facility permit limits (Table 1, Appendix 2). Exceedances of Water Quality Criteria may be violations of specific provisions of Chapter 62-302 (F.A.C.) and/ or facility permit limits.

(3) Toxicity Bioassays

Acute screening toxicity bioassays were performed on the effluent sample using the water flea, *Ceriodaphnia dubia,* and the fish, *Cyprinella leedsi* following FDEP SOPs TA07_01 and TA07_02. Failure of toxicity testing may constitute a violation of 62-302.520(21), 62-302.530(62) and/or facility permit limits.

(4) Bacteriological Testing

The effluent and water from control and test sites were analyzed for the presence and concentration of total and fecal coliform bacteria following FDEP SOPs MB1_0 and MB1_1. High levels of fecal or total coliform bacteria may constitute violation of 62-302.530(6), 62-302.530(7) and/or facility permit limits.

(5) Habitat Assessment

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

(6) Algal Growth Potential (AGP)

The effluent and water from control and test sites are autoclaved, filtered (0.45μm), inoculated with the unicellular green alga, *Pseudokirchneriella subcapitata* (formerly *Selenastrum capricornutum,* USEPA 2002*),* and incubated for 14 days (FDEP SOP TA08_05). The algal growth potential (AGP) value is the peak growth of the alga within that 14-day period, recorded as mg dry weight/L. Raschke and Shultz (1987) found that an AGP above 5.0 mg dry weight/L represents a “problem” threshold for fresh receiving waters, implying nutrient enrichment. High AGP values may constitute one line of

evidence for violation of 62-302.530(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 10:1, nitrogen limitation of algal production is likely. When the N: P ratio is 20:1 or greater, phosphorus limitation is likely (USEPA 2000). For ratios in-between, co-limitation may occur. Production of lower biomass than expected may be evidence of growth inhibition related to toxic compounds present in the water sample tested and may be a violation of 62-302.530(62) F.A.C..

(7) Algal Phytoplankton and Periphyton Assemblages

Methods: Qualitative periphyton were sampled at both control and test sites by taking subsamples of algae from natural substrates throughout the sample reach. Phytoplankton were sampled using a 1 L grab sample (QA Rule SOP FS7100). Periphyton were subsampled and identified to the lowest practical level, usually species (FDEP SOPs AB03, AB03_1 and AB05).

Chlorophyll *a* Content: Chlorophyll *a* content is measured in both phytoplankton and periphyton samples to estimate algal biomass (FDEP SOP BB05). High algal biomass implies nutrient stress (Stevenson and Bahls 1999) and may be a violation of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C. and/or 62-302.530(48)(b) F.A.C..

Algal Density: Algal density is estimated as number of natural units/ml for phytoplankton samples and number of natural units/cm^2 for periphyton samples. Although algal density of a single site is highly variable and depends on a number of factors, comparison of algal density at a control site to algal density at a related test site gives a partial comparison of algal biomass at the two sites (Stevenson and Smol 2003).

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

Community Composition: Shifts in relative proportions of major groups of algae downstream of a point source, compared to upstream, control conditions, may indicate negative effects of a discharge (Stevenson and Bahls 1999) and may constitute violations of 62-302.530(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..

(8) Benthic Macroinvertebrate Assemblages

Methods: Benthic macroinvertebrates were collected using two methods. Quantitative samples were collected from Hester-Dendy multi-plate samplers incubated for 28 days (QA Rule SOP FS7430). Qualitative collections are made using 20 dipnet sweeps (QA Rule SOP FS7420). Benthic macroinvertebrates were sorted and identified to the lowest practical taxonomic level, usually species (FDEP SOP IZ06).

Taxa richness: Taxa richness is the number of distinct macroinvertebrate taxa present in a sample. Stress, habitat destruction and pollution tend to reduce the number of different types of organisms present (Karr and Chu 1998). Decreases in taxa richness related to a facility's effluent may constitute violations of 62-302.530(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..

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 developed for Florida. This Index was revised in 2004 using data from qualitative dipnet samples. The SCI now assigns points to ten parameters; depending on how closely each parameter approaches an expected value (QA Rule SOP LT 7200). Points are assigned depending on which bioregion (Panhandle, Northeast, or Peninsula) the sampling location exists in and summed to yield a final SCI score (range 0-100). Included in the calculation of SCI are taxa richness, number of Ephemeroptera taxa, number of Trichoptera taxa, percent contribution of the dominant taxon, number of sensitive taxa, number of clinger taxa, number of long-lived taxa, percent contribution of Tanytarsini, percent contribution of very tolerant, and the percent contribution of suspension and filter feeders. Scores are broken into four ordinal groups: Good, Fair, 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 4

Chemical analysis of effluent and receiving water

SITE LOCATION	ANALYSIS GRP	COMPONENT	RESULT	REMARK	UNITS	MDL	PQL
MILLS (CONTROL)	Bio-AGP/LimNut	Algal Growth Potential	0.521	I	mg DryWt/L	0.3	0.9
MILLS (CONTROL)	Bio-Chl-a	Chlorophyll-A, Monochromatic, Periphyton			mg/m2		
MILLS (CONTROL)	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.85	U	ug/L	0.85	2.6
MILLS (CONTROL)	Bio-Chl-a	Phaeophytin-A, Monochromatic, Periphyton			mg/m2		
MILLS (CONTROL)	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0.85	U	ug/L	0.85	2.6
MILLS (CONTROL)	Bio-Invertebrates	Macroinvert-FW-Qual-Dipnetx20-# Taxa	34		# Taxa		
MILLS (CONTROL)	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	17		# Taxa		
MILLS (CONTROL)	Bio-Peri/Phyto	Periphyton-Qualitative-# Diatom Taxa	36		# Taxa		
MILLS (CONTROL)	Bio-Peri/Phyto	Periphyton-Qualitative-# Wet Taxa	9		#Taxa		
MILLS (CONTROL)	Metals-Water	Aluminum	640		ug/L	5	20
MILLS (CONTROL)	Metals-Water	Arsenic	4	U	ug/L	4	16
MILLS (CONTROL)	Metals-Water	Cadmium	0.057	I	ug/L	0.05	0.2
MILLS (CONTROL)	Metals-Water	Calcium	3.8		mg/L	0.05	0.2
MILLS (CONTROL)	Metals-Water	Chromium	2	U	ug/L	2	8
MILLS (CONTROL)	Metals-Water	Copper	0.5	U	ug/L	0.5	2
MILLS (CONTROL)	Metals-Water	Iron	784		ug/L	10	40
MILLS (CONTROL)	Metals-Water	Lead	0.72		ug/L	0.075	0.3
MILLS (CONTROL)	Metals-Water	Magnesium	0.75		mg/L	0.01	0.04
MILLS (CONTROL)	Metals-Water	Nickel	2	U	ug/L	2	8
MILLS (CONTROL)	Metals-Water	Selenium	0.5	U	ug/L	0.5	2
MILLS (CONTROL)	Metals-Water	Silver	0.025	U	ug/L	0.025	0.1
MILLS (CONTROL)	Metals-Water	Zinc	3	U	ug/L	3	12
MILLS (CONTROL)	Nutrients-Liquid	Ammonia-N	0.011	I	mg N/L	0.01	0.02
MILLS (CONTROL)	Nutrients-Liquid	Kjeldahl Nitrogen	0.7		mg N/L	0.06	0.2
MILLS (CONTROL)	Nutrients-Liquid	NO2NO3-N	0.004	I	mg N/L	0.004	0.01
MILLS (CONTROL)	Nutrients-Liquid	O-Phosphate-P	0.028		mg P/L	0.004	0.01
MILLS (CONTROL)	Nutrients-Liquid	Total-P	0.04	I	mg P/L	0.02	0.06
MILLS (CONTROL)	Overflow	Radium 226			pCi/L		
MILLS (CONTROL)	Overflow	Radium 226-Counting Error			pCi/L		
MILLS (CONTROL)	Overflow	Radium 228			pCi/L		
MILLS (CONTROL)	Overflow	Radium 228-Counting Error			pCi/L		
MILLS REP 2	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	17		# Taxa		
MILLS REP 3	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa			# Taxa		
GUM BRANCH (TEST)	Bio-AGP/LimNut	Algal Growth Potential	0.304	AI	mg DryWt/L	0.3	0.9
GUM BRANCH (TEST)	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	1.1	U	ug/L	1.1	3.2
GUM BRANCH (TEST)	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	1.1	U	ug/L	1.1	3.2

SITE LOCATION	ANALYSIS GRP	COMPONENT	RESULT	REMARK	UNITS	MDL	PQL
GUM BRANCH (TEST)	Bio-Peri/Phyto	Periphyton-Qualitative-# Diatom Taxa	55		# Taxa		
GUM BRANCH (TEST)	Bio-Peri/Phyto	Periphyton-Qualitative-# Wet Taxa	8		#Taxa		
GUM BRANCH (TEST)	Metals-Water	Aluminum	835		ug/L	5	20
GUM BRANCH (TEST)	Metals-Water	Arsenic	4	U	ug/L	4	16
GUM BRANCH (TEST)	Metals-Water	Cadmium	0.08	I	ug/L	0.05	0.2
GUM BRANCH (TEST)	Metals-Water	Calcium	18.4		mg/L	0.05	0.2
GUM BRANCH (TEST)	Metals-Water	Chromium	2	U	ug/L	2	8
GUM BRANCH (TEST)	Metals-Water	Copper	0.5	U	ug/L	0.5	2
GUM BRANCH (TEST)	Metals-Water	Iron	422		ug/L	10	40
GUM BRANCH (TEST)	Metals-Water	Lead	0.28	I	ug/L	0.075	0.3
GUM BRANCH (TEST)	Metals-Water	Magnesium	1.7		mg/L	0.01	0.04
GUM BRANCH (TEST)	Metals-Water	Nickel	2.8	I	ug/L	2	8
GUM BRANCH (TEST)	Metals-Water	Selenium	1	U	ug/L	1	4
GUM BRANCH (TEST)	Metals-Water	Silver	0.025	U	ug/L	0.025	0.1
GUM BRANCH (TEST)	Metals-Water	Zinc	3	I	ug/L	3	12
GUM BRANCH (TEST)	Nutrients-Liquid	Ammonia-N	0.019	I	mg N/L	0.01	0.02
GUM BRANCH (TEST)	Nutrients-Liquid	Kjeldahl Nitrogen	0.36		mg N/L	0.06	0.2
GUM BRANCH (TEST)	Nutrients-Liquid	NO2NO3-N	0.012		mg N/L	0.004	0.01
GUM BRANCH (TEST)	Nutrients-Liquid	O-Phosphate-P	0.004	U	mg P/L	0.004	0.01
GUM BRANCH (TEST)	Nutrients-Liquid	Total-P	0.02	U	mg P/L	0.02	0.06
GUM BRANCH (TEST)	Overflow	Radium 226			pCi/L		
GUM BRANCH (TEST)	Overflow	Radium 226-Counting Error			pCi/L		
GUM BRANCH (TEST)	Overflow	Radium 228			pCi/L		
GUM BRANCH (TEST)	Overflow	Radium 228-Counting Error			pCi/L		
GUM BRANCH (TEST)	Bio-Chl-a	Chlorophyll-A, Monochromatic, Periphyton			mg/m2		
GUM BRANCH (TEST)	Bio-Chl-a	Phaeophytin-A, Monochromatic, Periphyton			mg/m2		
GUM BRANCH (TEST)	Bio-Invertebrates	Macroinvert-FW-Qual-Dipnetx20-# Taxa	15		# Taxa		
GUM BRANCH (TEST)	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	5		# Taxa		
GUM BRANCH (TEST)	Bio-Peri/Phyto	Periphyton-Qualitative-# Diatom Taxa			# Taxa		
GUM BRANCH (TEST)	Bio-Peri/Phyto	Periphyton-Qualitative-# Wet Taxa			#Taxa		
GUM BRANCH REP 2	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	9		# Taxa		
GUM BRANCH REP 3	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	5		# Taxa		
GUM BRANCH REP 4	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	7		# Taxa		
EFFLUENT	Bio-AGP/LimNut	Algal Growth Potential	0.3	U	mg DryWt/L	0.3	0.9
EFFLUENT	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.85	U	ug/L	0.85	2.6
EFFLUENT	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0.85	U	ug/L	0.85	2.6
EFFLUENT	Bio-Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	L	LC50		
EFFLUENT	Bio-Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	L	LC50		
EFFLUENT	BNA-Water	1,2,4-Trichlorobenzene	1	U	ug/L	1	4

SITE LOCATION	ANALYSIS GRP	COMPONENT	RESULT	REMARK	UNITS	MDL	PQL
EFFLUENT	BNA-Water	1,2-Dichlorobenzene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	1,3-Dichlorobenzene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	1,4-Dichlorobenzene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	2,4,6-Trichlorophenol	1	U	ug/L	1	4
EFFLUENT	BNA-Water	2,4-Dichlorophenol	1	U	ug/L	1	4
EFFLUENT	BNA-Water	2,4-Dimethylphenol	50	U	ug/L	50	200
EFFLUENT	BNA-Water	2,4-Dinitrophenol	15	U	ug/L	15	60
EFFLUENT	BNA-Water	2,4-Dinitrotoluene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	2,6-Dinitrotoluene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	2-Chloronaphthalene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	2-Chlorophenol	1	U	ug/L	1	4
EFFLUENT	BNA-Water	2-Methyl-4,6-dinitrophenol	3	U	ug/L	3	12
EFFLUENT	BNA-Water	2-Nitrophenol	1	U	ug/L	1	4
EFFLUENT	BNA-Water	3,3'-Dichlorobenzidine	40	U	ug/L	40	160
EFFLUENT	BNA-Water	4,4'-DDD	1.5	U	ug/L	1.5	6
EFFLUENT	BNA-Water	4,4'-DDE	1.5	U	ug/L	1.5	6
EFFLUENT	BNA-Water	4,4'-DDT	1.5	U	ug/L	1.5	6
EFFLUENT	BNA-Water	4-Bromophenyl phenyl ether	1	U	ug/L	1	4
EFFLUENT	BNA-Water	4-Chloro-3-methylphenol	1	U	ug/L	1	4
EFFLUENT	BNA-Water	4-Chlorophenyl phenyl ether	2	U	ug/L	2	8
EFFLUENT	BNA-Water	4-Nitrophenol	15	U	ug/L	15	60
EFFLUENT	BNA-Water	Acenaphthene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Acenaphthylene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Aldrin	1.5	U	ug/L	1.5	6
EFFLUENT	BNA-Water	alpha-BHC	1.5	U	ug/L	1.5	6
EFFLUENT	BNA-Water	Anthracene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Benzidine	100	U	ug/L	100	400
EFFLUENT	BNA-Water	Benzo(a)anthracene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Benzo(a)pyrene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Benzo(b)fluoranthene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Benzo(g,h,i)perylene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Benzo(k)fluoranthene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	beta-BHC	1.5	U	ug/L	1.5	6
EFFLUENT	BNA-Water	Bis(2-chloroethoxy)methane	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Bis(2-chloroethyl)ether	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Bis(2-chloroisopropyl)ether	3	U	ug/L	3	12
EFFLUENT	BNA-Water	Bis(2-ethylhexyl)phthalate	15	U	ug/L	15	60
EFFLUENT	BNA-Water	Butyl benzyl phthalate	5	U	ug/L	5	20
EFFLUENT	BNA-Water	Chrysene	1	U	ug/L	1	4

SITE LOCATION	ANALYSIS GRP	COMPONENT	RESULT	REMARK	UNITS	MDL	PQL
EFFLUENT	BNA-Water	delta-BHC	1.5	U	ug/L	1.5	6
EFFLUENT	BNA-Water	Dibenzo(a,h)anthracene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Dieldrin	1.5	U	ug/L	1.5	6
EFFLUENT	BNA-Water	Diethyl phthalate	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Dimethyl phthalate	50	U	ug/L	50	200
EFFLUENT	BNA-Water	Di-n-butyl phthalate	5	U	ug/L	5	20
EFFLUENT	BNA-Water	Di-n-octyl phthalate	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Endosulfan I	4	U	ug/L	4	16
EFFLUENT	BNA-Water	Endosulfan II	4	U	ug/L	4	16
EFFLUENT	BNA-Water	Endosulfan sulfate	1.5	U	ug/L	1.5	6
EFFLUENT	BNA-Water	Endrin	1.5	U	ug/L	1.5	6
EFFLUENT	BNA-Water	Endrin aldehyde	4	U	ug/L	4	16
EFFLUENT	BNA-Water	Fluoranthene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Fluorene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	gamma-BHC	1.5	U	ug/L	1.5	6
EFFLUENT	BNA-Water	Heptachlor	1.5	U	ug/L	1.5	6
EFFLUENT	BNA-Water	Heptachlor epoxide	1.5	U	ug/L	1.5	6
EFFLUENT	BNA-Water	Hexachlorobenzene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Hexachlorobutadiene	3	U	ug/L	3	12
EFFLUENT	BNA-Water	Hexachlorocyclopentadiene	3	UJ	ug/L	3	12
EFFLUENT	BNA-Water	Hexachloroethane	3	U	ug/L	3	12
EFFLUENT	BNA-Water	Indeno(1,2,3-cd)pyrene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Isophorone	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Naphthalene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Nitrobenzene	2	U	ug/L	2	8
EFFLUENT	BNA-Water	N-Nitrosodimethylamine	2	U	ug/L	2	8
EFFLUENT	BNA-Water	N-Nitrosodi-n-propylamine	2	U	ug/L	2	8
EFFLUENT	BNA-Water	N-Nitrosodiphenylamine	3	U	ug/L	3	12
EFFLUENT	BNA-Water	Pentachlorophenol	3	U	ug/L	3	12
EFFLUENT	BNA-Water	Phenanthrene	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Phenol	1	U	ug/L	1	4
EFFLUENT	BNA-Water	Pyrene	1	U	ug/L	1	4
EFFLUENT	GC-Water	Alachlor	0.6	U	ug/L	0.6	2.4
EFFLUENT	GC-Water	Ametryn	0.05	U	ug/L	0.05	0.2
EFFLUENT	GC-Water	Atrazine	0.05	U	ug/L	0.05	0.2
EFFLUENT	GC-Water	Azinphos Methyl	0.1	U	ug/L	0.1	0.4
EFFLUENT	GC-Water	Bromacil	0.2	U	ug/L	0.2	0.8
EFFLUENT	GC-Water	Butylate	0.2	U	ug/L	0.2	0.8
EFFLUENT	GC-Water	Chlorpyrifos Ethyl	0.05	U	ug/L	0.05	0.2

SITE LOCATION	ANALYSIS GRP	COMPONENT	RESULT	REMARK	UNITS	MDL	PQL
EFFLUENT	GC-Water	Chlorpyrifos Methyl	0.1	U	ug/L	0.1	0.4
EFFLUENT	GC-Water	Diazinon	0.05	U	ug/L	0.05	0.2
EFFLUENT	GC-Water	Ethion	0.05	U	ug/L	0.05	0.2
EFFLUENT	GC-Water	Ethoprop	0.1	U	ug/L	0.1	0.4
EFFLUENT	GC-Water	Fenamiphos	0.2	U	ug/L	0.2	0.8
EFFLUENT	GC-Water	Fonofos	0.1	U	ug/L	0.1	0.4
EFFLUENT	GC-Water	Hexazinone	0.1	U	ug/L	0.1	0.4
EFFLUENT	GC-Water	Malathion	0.15	U	ug/L	0.15	0.6
EFFLUENT	GC-Water	Metalaxyl	0.25	UJ	ug/L	0.25	1
EFFLUENT	GC-Water	Metolachlor	0.5	U	ug/L	0.5	2
EFFLUENT	GC-Water	Metribuzin	0.1	U	ug/L	0.1	0.4
EFFLUENT	GC-Water	Mevinphos	0.2	U	ug/L	0.2	0.8
EFFLUENT	GC-Water	Naled	0.8	U	ug/L	0.8	3.2
EFFLUENT	GC-Water	Norflurazon	0.1	U	ug/L	0.1	0.4
EFFLUENT	GC-Water	Parathion Ethyl	0.15	U	ug/L	0.15	0.6
EFFLUENT	GC-Water	Parathion Methyl	0.1	U	ug/L	0.1	0.4
EFFLUENT	GC-Water	Phorate	0.05	U	ug/L	0.05	0.2
EFFLUENT	GC-Water	Prometryn	0.15	U	ug/L	0.15	0.6
EFFLUENT	GC-Water	Simazine	0.05	U	ug/L	0.05	0.2
EFFLUENT	Metals-Water	Aluminum	726		ug/L	5	20
EFFLUENT	Metals-Water	Arsenic	4	U	ug/L	4	16
EFFLUENT	Metals-Water	Cadmium	0.067	I	ug/L	0.05	0.2
EFFLUENT	Metals-Water	Calcium	21.3		mg/L	0.05	0.2
EFFLUENT	Metals-Water	Chromium	2	U	ug/L	2	8
EFFLUENT	Metals-Water	Copper	0.5	U	ug/L	0.5	2
EFFLUENT	Metals-Water	Iron	132		ug/L	10	40
EFFLUENT	Metals-Water	Lead	0.12	I	ug/L	0.075	0.3
EFFLUENT	Metals-Water	Magnesium	1.9		mg/L	0.01	0.04
EFFLUENT	Metals-Water	Nickel	4.1	I	ug/L	2	8
EFFLUENT	Metals-Water	Selenium	2.5	U	ug/L	2.5	10
EFFLUENT	Metals-Water	Silver	0.025	U	ug/L	0.025	0.1
EFFLUENT	Metals-Water	Zinc	4.8	I	ug/L	3	12
EFFLUENT	Nutrients-Liquid	Ammonia-N	0.031		mg N/L	0.01	0.02
EFFLUENT	Nutrients-Liquid	Kjeldahl Nitrogen	0.29		mg N/L	0.06	0.2
EFFLUENT	Nutrients-Liquid	NO2NO3-N	0.007	I	mg N/L	0.004	0.01
EFFLUENT	Nutrients-Liquid	O-Phosphate-P	0.004	U	mg P/L	0.004	0.01
EFFLUENT	Nutrients-Liquid	Total-P	0.02	U	mg P/L	0.02	0.06
EFFLUENT	Nutrients-Liquid	TSS	4	U	mg/L	4	16
EFFLUENT	Nutrients-Liquid	Turbidity	2.9		NTU	0.05	0.05

SITE LOCATION	ANALYSIS GRP	COMPONENT	RESULT	REMARK	UNITS	MDL	PQL
EFFLUENT	Overflow	Radium 226	1		pCi/L		
EFFLUENT	Overflow	Radium 226-Counting Error	0.2		pCi/L		
EFFLUENT	Overflow	Radium 228	1.5		pCi/L		
EFFLUENT	Overflow	Radium 228-Counting Error	0.7		pCi/L		
BLANK	BNA-Water	1,2,4-Trichlorobenzene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	1,2-Dichlorobenzene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	1,3-Dichlorobenzene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	1,4-Dichlorobenzene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	2,4,6-Trichlorophenol	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	2,4-Dichlorophenol	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	2,4-Dimethylphenol	48	U	ug/L	48	190
BLANK	BNA-Water	2,4-Dinitrophenol	14	U	ug/L	14	58
BLANK	BNA-Water	2,4-Dinitrotoluene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	2,6-Dinitrotoluene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	2-Chloronaphthalene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	2-Chlorophenol	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	U	ug/L	2.9	12
BLANK	BNA-Water	2-Nitrophenol	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	3,3'-Dichlorobenzidine	38	U	ug/L	38	150
BLANK	BNA-Water	4,4'-DDD	1.4	U	ug/L	1.4	5.8
BLANK	BNA-Water	4,4'-DDE	1.4	U	ug/L	1.4	5.8
BLANK	BNA-Water	4,4'-DDT	1.4	U	ug/L	1.4	5.8
BLANK	BNA-Water	4-Bromophenyl phenyl ether	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	4-Chloro-3-methylphenol	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	4-Chlorophenyl phenyl ether	1.9	U	ug/L	1.9	7.7
BLANK	BNA-Water	4-Nitrophenol	14	U	ug/L	14	58
BLANK	BNA-Water	Acenaphthene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Acenaphthylene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Aldrin	1.4	U	ug/L	1.4	5.8
BLANK	BNA-Water	alpha-BHC	1.4	U	ug/L	1.4	5.8
BLANK	BNA-Water	Anthracene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Benzidine	96	U	ug/L	96	380
BLANK	BNA-Water	Benzo(a)anthracene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Benzo(a)pyrene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Benzo(b)fluoranthene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Benzo(g,h,i)perylene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Benzo(k)fluoranthene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	beta-BHC	1.4	U	ug/L	1.4	5.8
BLANK	BNA-Water	Bis(2-chloroethoxy)methane	0.96	U	ug/L	0.96	3.8

SITE LOCATION	ANALYSIS GRP	COMPONENT	RESULT	REMARK	UNITS	MDL	PQL
BLANK	BNA-Water	Bis(2-chloroethyl)ether	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	U	ug/L	2.9	12
BLANK	BNA-Water	Bis(2-ethylhexyl)phthalate	14	U	ug/L	14	58
BLANK	BNA-Water	Butyl benzyl phthalate	4.8	U	ug/L	4.8	19
BLANK	BNA-Water	Chrysene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	delta-BHC	1.4	U	ug/L	1.4	5.8
BLANK	BNA-Water	Dibenzo(a,h)anthracene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Dieldrin	1.4	U	ug/L	1.4	5.8
BLANK	BNA-Water	Diethyl phthalate	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Dimethyl phthalate	48	U	ug/L	48	190
BLANK	BNA-Water	Di-n-butyl phthalate	4.8	U	ug/L	4.8	19
BLANK	BNA-Water	Di-n-octyl phthalate	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Endosulfan I	3.8	U	ug/L	3.8	15
BLANK	BNA-Water	Endosulfan II	3.8	U	ug/L	3.8	15
BLANK	BNA-Water	Endosulfan sulfate	1.4	U	ug/L	1.4	5.8
BLANK	BNA-Water	Endrin	1.4	U	ug/L	1.4	5.8
BLANK	BNA-Water	Endrin aldehyde	3.8	U	ug/L	3.8	15
BLANK	BNA-Water	Fluoranthene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Fluorene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	gamma-BHC	1.4	U	ug/L	1.4	5.8
BLANK	BNA-Water	Heptachlor	1.4	U	ug/L	1.4	5.8
BLANK	BNA-Water	Heptachlor epoxide	1.4	U	ug/L	1.4	5.8
BLANK	BNA-Water	Hexachlorobenzene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Hexachlorobutadiene	2.9	U	ug/L	2.9	12
BLANK	BNA-Water	Hexachlorocyclopentadiene	2.9	UJ	ug/L	2.9	12
BLANK	BNA-Water	Hexachloroethane	2.9	U	ug/L	2.9	12
BLANK	BNA-Water	Indeno(1,2,3-cd)pyrene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Isophorone	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Naphthalene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Nitrobenzene	1.9	U	ug/L	1.9	7.7
BLANK	BNA-Water	N-Nitrosodimethylamine	1.9	U	ug/L	1.9	7.7
BLANK	BNA-Water	N-Nitrosodi-n-propylamine	1.9	U	ug/L	1.9	7.7
BLANK	BNA-Water	N-Nitrosodiphenylamine	2.9	U	ug/L	2.9	12
BLANK	BNA-Water	Pentachlorophenol	2.9	U	ug/L	2.9	12
BLANK	BNA-Water	Phenanthrene	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Phenol	0.96	U	ug/L	0.96	3.8
BLANK	BNA-Water	Pyrene	0.96	U	ug/L	0.96	3.8
BLANK	GC-Water	Alachlor	0.59	U	ug/L	0.59	2.4
BLANK	GC-Water	Ametryn	0.049	U	ug/L	0.049	0.2

SITE LOCATION	ANALYSIS GRP	COMPONENT	RESULT	REMARK	UNITS	MDL	PQL
BLANK	GC-Water	Atrazine	0.049	U	ug/L	0.049	0.2
BLANK	GC-Water	Azinphos Methyl	0.098	U	ug/L	0.098	0.39
BLANK	GC-Water	Bromacil	0.2	U	ug/L	0.2	0.8
BLANK	GC-Water	Butylate	0.2	U	ug/L	0.2	0.8
BLANK	GC-Water	Chlorpyrifos Ethyl	0.049	U	ug/L	0.049	0.2
BLANK	GC-Water	Chlorpyrifos Methyl	0.098	U	ug/L	0.098	0.39
BLANK	GC-Water	Diazinon	0.049	U	ug/L	0.049	0.2
BLANK	GC-Water	Ethion	0.049	U	ug/L	0.049	0.2
BLANK	GC-Water	Ethoprop	0.098	U	ug/L	0.098	0.39
BLANK	GC-Water	Fenamiphos	0.2	U	ug/L	0.2	0.8
BLANK	GC-Water	Fonofos	0.098	U	ug/L	0.098	0.39
BLANK	GC-Water	Hexazinone	0.098	U	ug/L	0.098	0.39
BLANK	GC-Water	Malathion	0.15	U	ug/L	0.15	0.6
BLANK	GC-Water	Metalaxyl	0.25	UJ	ug/L	0.25	1
BLANK	GC-Water	Metolachlor	0.49	U	ug/L	0.49	2
BLANK	GC-Water	Metribuzin	0.098	U	ug/L	0.098	0.39
BLANK	GC-Water	Mevinphos	0.2	U	ug/L	0.2	0.8
BLANK	GC-Water	Naled	0.78	U	ug/L	0.78	3.1
BLANK	GC-Water	Norflurazon	0.098	U	ug/L	0.098	0.39
BLANK	GC-Water	Parathion Ethyl	0.15	U	ug/L	0.15	0.6
BLANK	GC-Water	Parathion Methyl	0.098	U	ug/L	0.098	0.39
BLANK	GC-Water	Phorate	0.049	U	ug/L	0.049	0.2
BLANK	GC-Water	Prometryn	0.15	U	ug/L	0.15	0.6
BLANK	GC-Water	Simazine	0.049	U	ug/L	0.049	0.2
BLANK	Metals-Water	Aluminum	5	U	ug/L	5	20
BLANK	Metals-Water	Arsenic	4	U	ug/L	4	16
BLANK	Metals-Water	Cadmium	0.05	U	ug/L	0.05	0.2
BLANK	Metals-Water	Calcium	0.05	U	mg/L	0.05	0.2
BLANK	Metals-Water	Chromium	2	U	ug/L	2	8
BLANK	Metals-Water	Copper	0.5	U	ug/L	0.5	2
BLANK	Metals-Water	Iron	10	U	ug/L	10	40
BLANK	Metals-Water	Lead	0.075	U	ug/L	0.075	0.3
BLANK	Metals-Water	Magnesium	0.01	U	mg/L	0.01	0.04
BLANK	Metals-Water	Nickel	2	U	ug/L	2	8
BLANK	Metals-Water	Selenium	0.5	U	ug/L	0.5	2
BLANK	Metals-Water	Silver	0.025	U	ug/L	0.025	0.1
BLANK	Metals-Water	Zinc	3	U	ug/L	3	12
BLANK	Nutrients-Liquid	Ammonia-N	0.01	U	mg N/L	0.01	0.02
BLANK	Nutrients-Liquid	Kjeldahl Nitrogen	0.06	U	mg N/L	0.06	0.2

SITE LOCATION	ANALYSIS GRP	COMPONENT	RESULT	REMARK	UNITS	MDL	PQL
BLANK	Nutrients-Liquid	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
BLANK	Nutrients-Liquid	O-Phosphate-P	0.004	U	mg P/L	0.004	0.01
BLANK	Nutrients-Liquid	Total-P	0.02	U	mg P/L	0.02	0.06
BLANK	Overflow	Radium 226	0.2	U	pCi/L		
BLANK	Overflow	Radium 226-Counting Error	0.1		pCi/L		
BLANK	Overflow	Radium 228	1	U	pCi/L		
BLANK	Overflow	Radium 228-Counting Error	0.6		pCi/L		

Appendix 5

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
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	**3.79**
Hester-Dendy Taxa Richness	6	6.5	9	11.5	13	15	17	21.5	26	29	32	**22**
Dipnet Taxa Richness	9	12	17	20	22	24.5	26	28	31	37	53	**33**
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	**0.7**
Total Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60	**0.011 I**
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	**0.004 I**
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51	**0.04 I**
Orthophosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37	**0.028**

TEST SITE

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	Measured
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	**3.5**
Hester-Dendy Taxa Richness	6	6.5	9	11.5	13	15	17	21.5	26	29	32	**15**
Dipnet Taxa Richness	9	12	17	20	22	24.5	26	28	31	37	53	**15**
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	**0.36**
Total Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60	**0.019 I**
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	**0.012**
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51	**0.02 U**
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 U**

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 6

Additional physical, chemical, toxicological and microbiological results

STATE OF FLORIDA
DEPT. OF ENVIRONMENTAL PROTECTION
NORTHEAST DISTRICT

Division of Water Facilities
Technical Support
7825 Baymeadows Way,suite 200B
Jacksonville, Florida 32256

Microbiology Report

Name: Maxville Mine **Survey type:** 5YI
Sample: Surface water/Effluent **Sample date:** 07/11/05

D.O.H.accred.#E32890 S.M.9222B S.M.9222D

Lab I.D.#	Site Name	Date	Time	Total colif. #cfu/100ml	code	Fecal colif. #cfu/100ml	code
050661	Maxville Effluent	7/11/2005	14:24	10	B	10	U
050662	~~Upstream~~ of Maxville Control	7/11/2005	10:24	892	AB	73	AB
050663	Downstream of Maxville	7/11/2005	12:55	1018	AB	54	AB

Results for NELAP accredited tests contained in this report meet the requirements for the National Environmental Accredidation Program.

A - Value reported is the mean of two or more determinations.
B - Results based on colony counts outside the acceptable range.
I - Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit.
J - Estimated Value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
N - Presumptive evidence of presence of material.
O - Sampled, but analysis lost or not performed.
Q - Sample held beyond normal holding time.
T - Value reported is less than the criterion of detection.
U - Material was analyzed for but not detected; the value reported is the minimum detection limit.
V - Analyte was detected in both sample and method blank.
Z - Colonies were too numerous to count (TNTC).

SURVEY TYPE: Ambient Monitoring--Trend,Reference Stream,Reference Lake,BioReconn,Special project Permit Compliance--5th Year,3rd Year,CSI,CEI,PAI,RI,Complaint Potable Water--Sanitary Survey,Facility Inspection
SAMPLE TYPE: Suface Water,Ground Water,Potable Water,Treated Effluent,Untreated Effluent,Sediment,Sludge,Soil

Signature Sample Results:Jeremy Parrish Date: 7/15/2005

FDEP Biology Section - Acute Bioassay Bench Sheets

Facility: EI Dupont de Nemours - Maxville Mine

Address: Highway 301 - Near Maxville

City: Maxville County: Clay

Contact/District: Reza Shayan / Northeast

NPDES Permit #: FL 0040274

LIMS Job #: TLH-205-07-12-02 LIMS Sample #: 847897

Lims Data Entry: 7-22-05 MF Data Entry Verification: ~~DN~~ 7/22/05

Sample Collection: Date: 7-11-05 Time: ~~1430~~ SP 1338

Hold time Start: Date: 7-11-05 Time: ~~1430~~ SP 1338

Comments:
(A) sample for 48 hour renewal was aerated
initial DO: 9.5 mg/L final DO: 8.0 mg/L
duration: 25 minutes rate: ~100 bubbles/min

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

Test Type: (Screening) Definitive
Static (Static Renewal) Flow-through

Test Duration: 48 (96) Hours
Light Intensity : 50 - 100 ft. candles
Photoperiod : 16 hours light 8 hours dark

Initial sample handling:

Test 1 validation: Test 1: SOP TA07_01
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No

Test 2 validation: Test 2: SOP TA07_02
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No

pH adjustment : yes (no) Initial pH NaOH N HCl N Drops mL Final pH

(A) Aeration : (yes) no Initial DO: 10.1 mg/L Final DO: 7.7 mg/L Duration: 60 minutes Rate: ~100 bubbles/min

Salinity adjusted (Test 1): yes (no) Initial Salinity: Final Salinity: Salts Hypersaline brine

Salinity adjusted (Test 2): yes (no) Initial Salinity: Final Salinity: Salts Hypersaline brine

Dechlorination: yes (no) mL of 0.025N Sodium thiosulfate per liter of sample. Final TRC

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

Temperature Range °C
Incubator # 3 Range 241-249
Room B246: 236-242
Waterbath: N/A

Investigators' Signatures
Sarah Pritchard
Kevin Nicholson
Marshall Faircloth
Eric Reis
James Daniels
Mindi Wetterhoff
REVIEWER

Water Quality Parameters	20% DMW	Well Water	Salt Water ASW NSW Test 1	Salt Water ASW NSW Test 2	Moderately Hard Water	Original Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):	N/A	N/A	N/A	N/A	N/A	not measured		-	SP
Lab Total Residual Cl2 (mg/L):	<0.03				<0.03	<0.03	HACH	EW	SP
Alkalinity (mg/L as $CaCO_3$):	97				84	21	HACH	SP	MF
Hardness (mg/L as $CaCO_3$):	85				84	73	HACH	SP	MF
Total Ammonia (mg/L as N):	<0.017				<0.017	<0.017	DENVER	DN	SP
Salinity (ppth):	<1				<1	<1	YSI (Mettler)	DN/SD	MF

V.1.6 7/1/05

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FDEP Biology Section - - Bioassay Bench Sheet

Survival

LIMS Sample #: 847897 Test #: 1 Test Started: Date 7-12-05 Time: 1630

Organism: C.dubia Test Ended: Date 7-16-05 Time: 1300

Organism Batch: 23-05 Diluent/ Batch: DMW / 21-05

Organism Age: <24 hrs Food: (YCT) (P. subcapitata) *Artemia*

Chamber Size ~~1000~~ 30mL Batch: 3-05 2-05

Test Volume ~~500~~ 20mL Feeding: (Prior to test - Prior to renewal) - Daily

Concentration	Replicate	Chamber #	Test Hour: 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	A	A	5	5	5	5	5	5
	B	B	5	5	5	5	5	5
	C	C	5	5	5	5	5	5
	D	D	5	5	5	5	4	4
100%	A	A	5	5	5	5	5	5
	B	B	5	5	5	5	5	5
	C	C	5	5	5	5	5	5
	D	D	5	5	5	5	5	5
Organisms loaded by: SP Loading verified at 0 hours by: DN		Checked by: (initials)	[redacted]	DN	DN	SP	SP	MF

Comments:

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

Test Results:

% mortality in 100% sample Ø

LC_{50}: >100% If Calculated: 95% CI_____ Method:_____

Screening Tests: Report LC50 as >100%, =100%, or <100%.

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

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FDEP Biology Section - - Bioassay Bench Sheet
Survival

LIMS Sample #: 847897 **Test #:** 2 **Test Started: Date** 7-12-~~04~~ 05 **Time:** 1530
Organism: P.promelas **Test Ended: Date** 7-16-05 **Time:** 1300
Organism Batch: 7-05 **Diluent/ Batch:** MHW / 5-05
Organism Age: 8days **Food:** YCT *P. subcapitata* (*Artemia*)
Chamber Size 1000 **mL** **Batch:** ___ ___ 35138425GR
Test Volume 500 **mL** **Feeding:** (Prior to test) (Prior to renewal) Daily

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	A	D17	10	10	10	10	10	10
	B	D18	10	9 1D	9	9	9	9
	C	D19	10	10	10	10	10	10
	D	D20	10	10	10	10	10	10
100%	A	D21	10	8 2D	5 3D	5	5	5
	B	D22	10	10	9 1D	9	9	9
	C	D23	10	10	10	10	10	10
	D	D24	10	10	10	10	10	10
Organisms loaded by: DN Loading verified at 0 hours by: SP		Checked by: (initials)	[redacted]	JJ	JD	SP	SP	MF

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

Comments: Cause of toxicity (mortality) in 100% Rep A not readily determined. MF 8-4-05

Test Results:
% mortality in 100% sample 15%
LC_{50}: >100 If Calculated: 95% CI______________ Method:____________
Screening Tests: Report LC50 as >100%, =100%, or <100%.
Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

Page 000013 v1.2 3/8/05

Bioassay Parameters

LIMS Sample # : 847897 **Test # :** 1 **of** 2

TEST SOP: TA07_ 01 **Test Species:** (*Ceriodaphnia dubia*) *Cyprinella leedsi* *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

V.1 2/24/04

Concentration CTRL	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A		B	B		C
pH (S.U.)	8.0		8.0	8.1		8.1
Temperature °C	24.6		24.0	24.0		24.1
Dissolved Oxygen mg/L	8.2		7.9	7.9		8.1
Conductivity (µmhos) mmhos	175		187	175		185
(initials) Measured by:	DN		DN	DN		MF
(initials) Recorded by:	DN		DN	DN		MF

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A		B	B		C
pH (S.U.)	7.6		7.6	7.5		7.8
Temperature °C	24.3		24.0	24.1		24.2
Dissolved Oxygen mg/L	8.2		7.9	7.9		7.9
Conductivity (µmhos) mmhos	260		260	260		285
(initials) Measured by:	DN		DN	DN		MF
(initials) Recorded by:	DN		DN	DN		MF

Comments:

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

Comments:

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

Comments:

v1.1 2/24/04

0000014

Appendix 6 Continued

Bioassay Parameters

LIMS Sample # : 847897 **Test # :** 2 **of** 2

TEST SOP: TA07_ 02 **Test Species:** *Ceriodaphnia dubia Cyprinella leedsi* (*Pimephales promelas*) *Americamysis bahia Menidia beryllina* Other:_____

V.1 2/24/04

Concentration CTRL	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	8.2	7.9	8.0	7.9	8.2	8.2
Temperature °C	25.0	25.1	24.0	24.6	24.8	24.6
Dissolved Oxygen mg/L	7.8	7.1	7.3	7.8	6.9	7.5
Conductivity µmhos (mmhos)	0.345	0.457	0.513	0.310	0.292	310umhos
(initials) Measured by:	JD	DN	JD	DN	BP	MF
(initials) Recorded by:	JD	BP	JD	DN	BP	MF

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	7.7	7.3	7.3	7.7	7.2	7.4
Temperature °C	25.1	24.9	24.4	24.5	24.1	24.1
Dissolved Oxygen mg/L	7.7	7.3	7.5	7.8	6.9	7.4
Conductivity µmhos (mmhos)	0.270	0.354	0.393	0.290	0.305	300umhos
(initials) Measured by:	JD	DN	JD	DN	BP	MF
(initials) Recorded by:	JD	BP	JD	DN	BP	MF

Comments:

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

Comments:

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

Comments:

v1.1 2/24/04

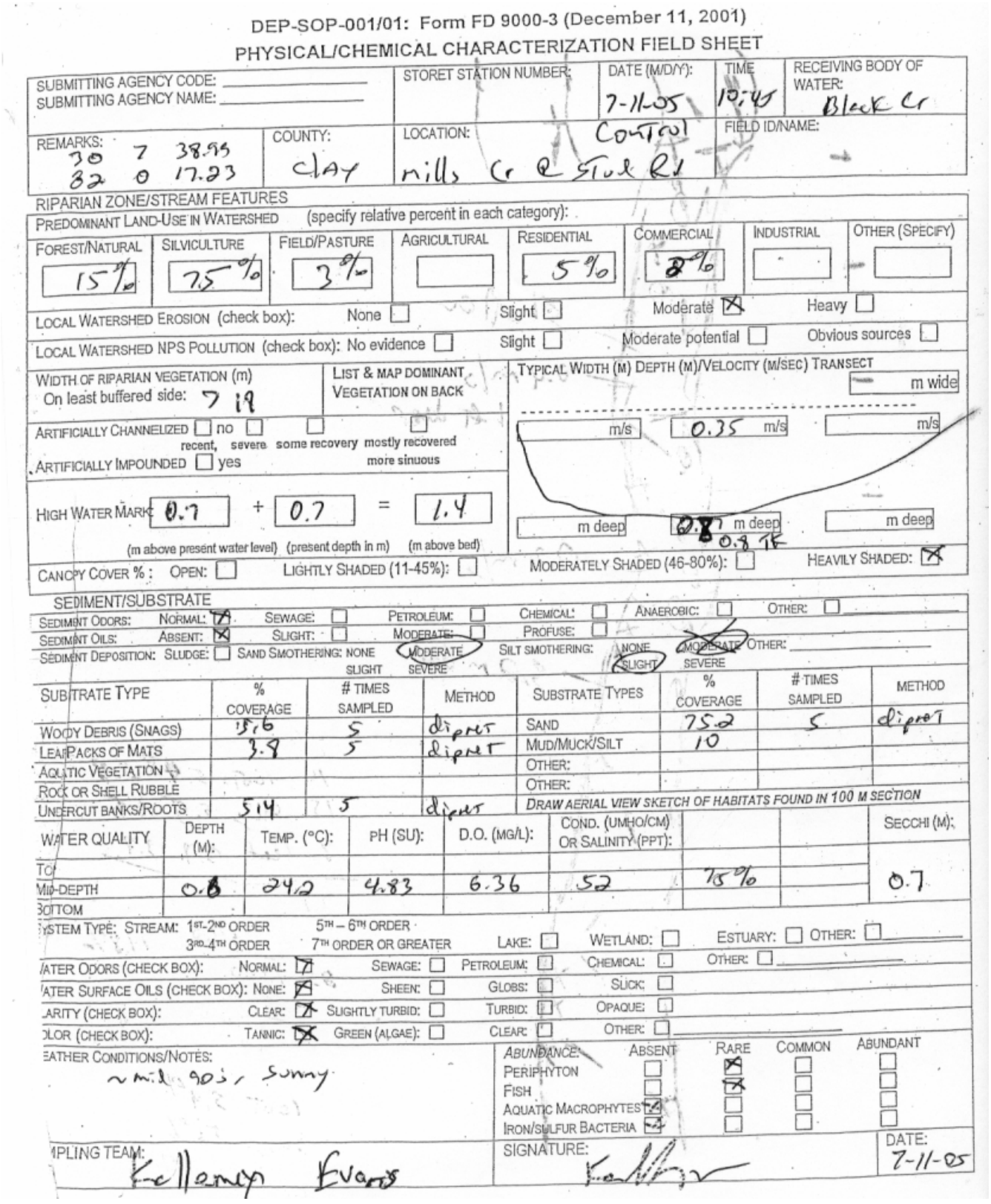
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Appendix 7

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): 7-11-05	TIME: 10:45	RECEIVING BODY OF WATER: Black Cr
REMARKS: 30 7 38.93 / 82 0 17.23	COUNTY: clay	LOCATION: Mills Cr @ Stub Rd Control		FIELD ID/NAME:

RIPARIAN ZONE/STREAM FEATURES

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

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
15%	75%	3%		5%	2%		

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: 7 19

LIST & MAP DOMINANT VEGETATION ON BACK

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

ARTIFICIALLY IMPOUNDED ☐ yes more sinuous

HIGH WATER MARK: 0.7 (m above present water level) + 0.7 (present depth in m) = 1.4 (m above bed)

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

m wide

m/s | 0.35 m/s | m/s

m deep | 0.8 m deep | m deep

0.8 TF

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)	15.6	5	dipnet	SAND	75.2	5	dipnet
LEAFPACKS OF MATS	3.9	5	dipnet	MUD/MUCK/SILT	10		
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE				OTHER:			
UNDERCUT BANKS/ROOTS	5.14	5	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. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP								
MID-DEPTH	0.6	24.2	4.83	6.36	52	75%		0.7
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: ~mid 90's, sunny

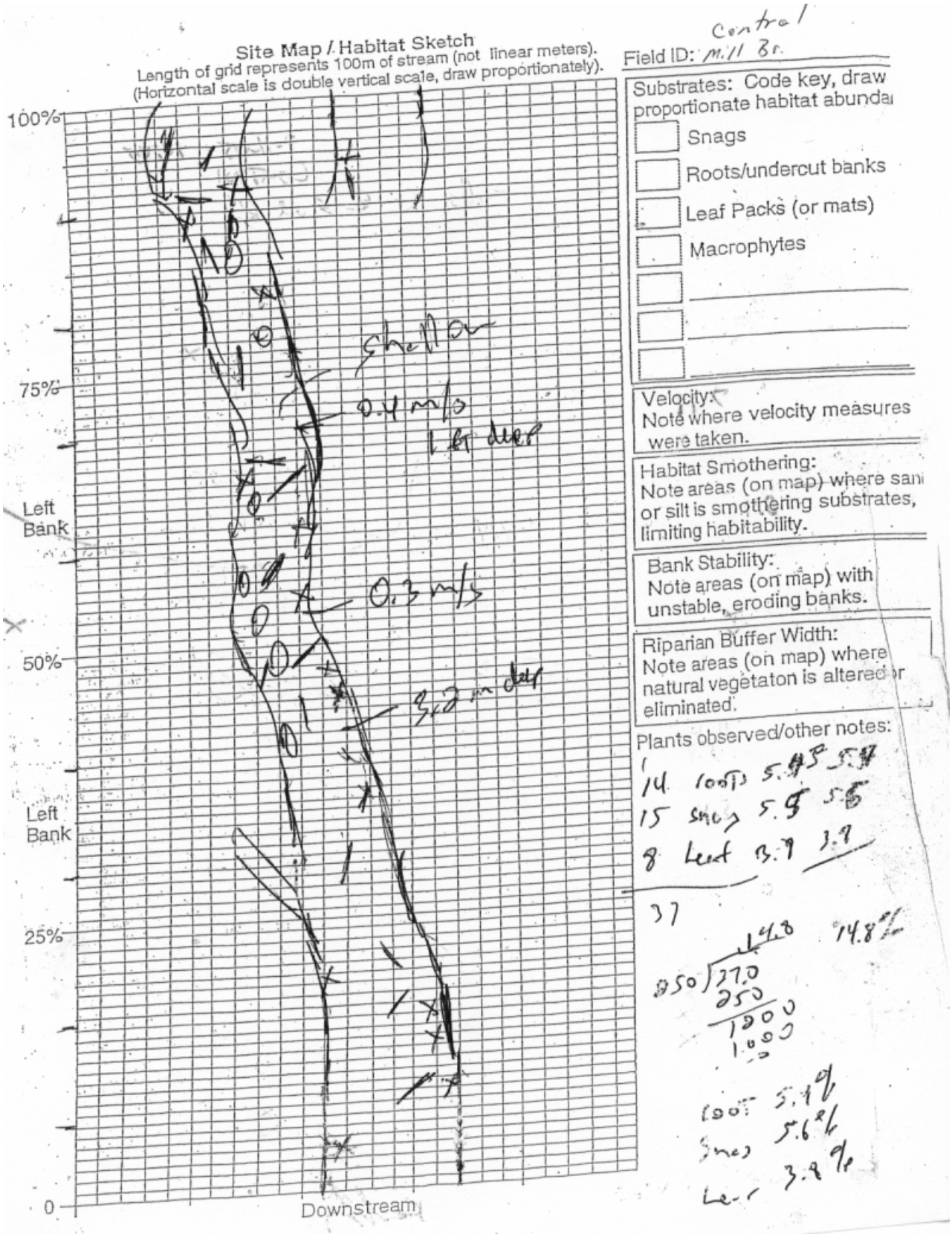
ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☒	☐	☐
FISH	☐	☒	☐	☐
AQUATIC MACROPHYTES	☒	☐	☐	☐
IRON/SULFUR BACTERIA	☒	☐	☐	☐

SAMPLING TEAM: Kellamy Evans

SIGNATURE: [signature]

DATE: 7-11-05

Appendix 7 Continued



Appendix 7 Continued

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): 7-11-05	RECEIVING BODY OF WATER: Black Creek
REMARKS: 10:45	COUNTY:	LOCATION: Control Mills Br @ Stud Rd	FIELD ID/NAME:

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 i obvious, substrates unst or smothered 5 4 3 2 1
Substrate Availability 10	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 17	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 Primary Score 53	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, a severe problem, pools abs 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, instrean habitat highly altered 5 4 3 2 1
Bank Stability Right Bank 6 Left Bank 8 (14)	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 72	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

125 TOTAL SCORE

ANALYSIS DATE: 7-11-05	ANALYST: Kallemeyn	SIGNATURE:

Appendix 7 Continued

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	RECEIVING BODY OF WATER:
		7-11-05	13:00	Black Cr

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	CLAY	Gum Br below 301 RR	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)
10	75					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

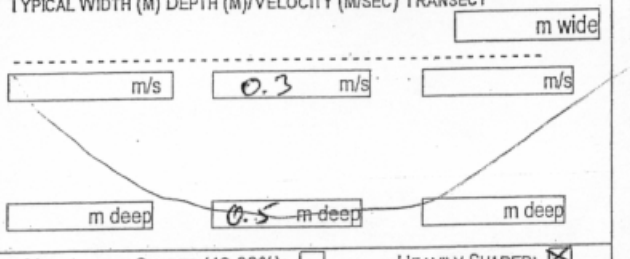
LIST & MAP DOMINANT VEGETATION ON BACK

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

ARTIFICIALLY IMPOUNDED ☐ yes more sinuous

HIGH WATER MARK: 2 (m above present water level) + 0.5 (present depth in m) = 2.5 (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 TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	3.0	5	dipnet	SAND	82.7	5	dipnet
LEAF PACKS OF MATS	2.0	5	dipnet	MUD/MUCK/SILT	10		
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE				OTHER:			
UNDERCUT BANKS/ROOTS	2.3	5	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. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP								
MID-DEPTH	0.4	27.1	6.36	7.33	221	92% DO		0.5
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: ~mid 90s & Sunny

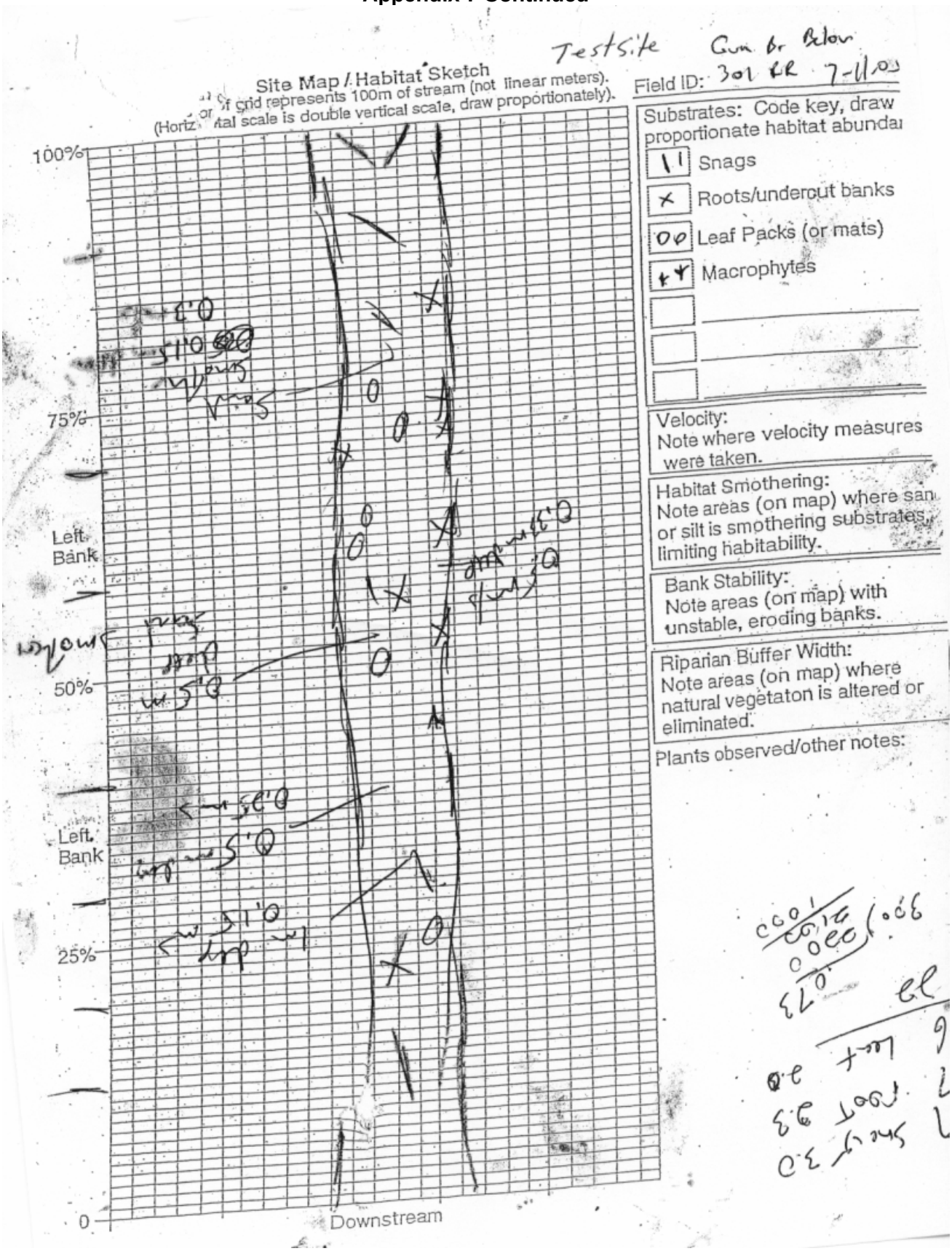
ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☐	☒	☐
FISH	☐	☐	☒	☐
AQUATIC MACROPHYTES	☐	☒	☐	☐
IRON/SULFUR BACTERIA	☒	☐	☐	☐

SAMPLING TEAM: Kallemeyn, Evans

SIGNATURE: T G Kallemeyn

DATE: 7-11-05

Appendix 7 Continued



Appendix 7 Continued

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:
		7-11-05	Black Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
30 8 34.7 82 2 3.5	Clay	Gum Br Below 301 RR	Test Site

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 unsta 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 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: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec 5 4 3 2 1
Habitat Smothering 4 Primary Score 42	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, a severe problem, pools abs 5 4 3 2 1
Secondary Habitat Components Artificial Channelization 5	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, instrean 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 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 53	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

95 TOTAL SCORE

ANALYSIS DATE:	ANALYST:	SIGNATURE:
7-11-05	Tom Kallemeyn	

Appendix 8

Taxa list and density (number/cm^2) for periphyton collected from glass microscope slides incubated for 28 days upstream and downstream of E.I. DuPont Maxville Mine facility discharge, July 11, 2005.

Taxon Name	Control Site	Test Site
Bacillariophyta		
Achnanthes sp.	1	1
Achnanthes clevei	-	6
Achnanthes exigua	-	7
Achnanthes lanceolata	-	6
Achnanthes lanceolata apiculata	3	2
Achnanthes lanceolata rostrata	1	-
Achnanthes minutissima	-	1
Achnanthes rupestoides	-	1
Amphora sp.	-	1
Aulacoseira sp.	-	2
Bacillariophyceae	4	10
Brachysira vitrea	1	-
Cocconeis disculus	-	4
Cocconeis scutellum	-	4
Coscinodiscophyceae	-	2
Cymbellaceae	1	-
Diadesmis contenta	78	-
Diploneis sp.	-	1
Diploneis ovalis	1	-
Encyonema sp.	1	-
Encyonema evergladianum	-	1
Encyonema neomesianum	-	1
Encyonema silesiacum	2	-
Encyonopsis microcephala	-	1
Eunotia sp.	85	97
Eunotia bilunaris	1	-
Eunotia incisa	3	1
Eunotia monodon	-	1
Eunotia pectinalis	1	-
Fragilariaceae	-	3
Frustulia sp.	-	2
Frustulia rhomboides	11	1
Frustulia saxonica	15	1
Gomphonema sp.	12	10
Gomphonema grunowii	-	2
Gomphonema parvulum	1	5
Hantzschia sp.	-	1
Hippodonta hungarica	-	1
Luticola sp.	2	2
Luticola mutica	-	1
Navicula sp.	5	10
Navicula clementis	1	1
Navicula constans	-	1

Appendix 8 Continued

Taxon Name	Control Site	Test Site
Navicula cryptocephala	-	4
Navicula elginensis	2	-
Navicula jaenefeltii	2	-
Navicula minima	1	-
Navicula peregrina	-	1
Navicula schroeteri	-	1
Navicula seminulum	2	-
Naviculaceae	2	12
Nitzschia sp.	7	5
Nitzschia nana	-	2
Nitzschia palea	-	4
Nitzschia recta	-	2
Pinnularia sp.	8	4
Pinnularia interrupta	1	13
Pleurosira laevis	-	2
Rhopalodia gibba	-	1
Rhopalodia gibberula	3	3
Sellaphora laevissima	-	1
Sellaphora pupula	2	2
Stauroneis sp.	1	2
Stauroneis smithii	-	1
Surirella sp.	-	2
Synedra ulna	1	2
Terpsinoe musica	-	1
Tryblionella sp.	1	2
Undetermined	9	-
Chlorophycota		
Chlorella sp.	7	-
Chlorococcum sp.	3	-
Cosmarium phaseolus phaseolus	-	1
Oocystis sp.	1	1
Enteromorpha sp.	3	-
Ulothrix sp.	-	1
Cyanophycota		
Cyanobium parvum	1	-
Geitlerinema sp.	-	3
Jaaginema sp.	2	12
Planktolyngbya sp.	5	7
Planktothrix sp.	1	5
Pseudanabaena sp.	13	8
Schizothrix calcicola	-	20

Appendix 9a

Benthic macroinvertebrates collapsed taxa list and density (average number of individuals/m^2 rounded to the nearest individual, Control Site n = 2 samples and Test Site n = 3 samples) from Hester-Dendy artificial substrates incubated for 28 days upstream and downstream of the E.I. DuPont Maxville Mine facility and collected July 11, 2005. See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

Taxon Name	Control Site	Test Site
Annelida		
Oligochaeta		
Haplotaxida		
Enchytraeidae	-	2
Arthropoda		
Crustacea		
Amphipoda		
Undetermined	-	2
Hexapoda		
Coleoptera		
Ancyronyx variegatus	24	-
Dineutus sp.	8	-
Macronychus glabratus	44	-
Microcylloepus pusillus	32	4
Stenelmis sp.	32	-
Diptera		
Atrichopogon sp.	-	4
Chironomus sp.	-	7
Cricotopus or Orthocladius	-	2
Hemerodromia sp.	12	-
Parametriocnemus sp.	4	-
Pentaneura inconspicua	-	5
Phaenopsectra punctipes grp.	4	-
Polypedilum aviceps	9	-
Polypedilum fallax	17	5
Polypedilum illinoense grp.	-	14
Polypedilum tritum	-	7
Rheocricotopus robacki	4	-
Stempellinella cf. leptocelloides	4	-
Tanytarsus sp. L Epler	-	2
Thienemannimyia grp.	13	2
Tribelos jucundum	-	2
Ephemeroptera		
Maccaffertium exiguum	44	-
Maccaffertium smithae	16	-
Paraleptophlebia volitans	4	-
Pseudocloeon sp.	-	6
Pseudocloeon propinquum	8	-
Megaloptera		
Corydalus cornutus	16	-

Appendix 9a Continued

Taxon Name	Control Site	Test Site
Trichoptera		
Cheumatopsyche sp.	107	12
Hydropsyche sp.	8	-
Lype diversa	4	-
Nyctiophylax sp.	40	-

Appendix 9b

Benthic macroinvertebrates taxa list and counts (number of individuals counted) collected from Hester-Dendy artificial substrates (Control Site n = 2 samples and Test Site n = 3 samples) incubated upstream and downstream of the E.I. DuPont Maxville Mine facility for 28 days and collected July 11, 2005.

Taxon Name	Control Site	Test Site
Annelida		
Oligochaeta		
Haplotaxida		
Enchytraeidae	-	1
Arthropoda		
Crustacea		
Amphipoda		
Undetermined	-	1
Hexapoda		
Coleoptera		
Ancyronyx variegatus	6	-
Dineutus sp.	2	-
Macronychus glabratus	11	-
Microcylloepus pusillus	8	2
Stenelmis sp.	8	-
Diptera		
Atrichopogon sp.	-	2
Chironomidae	1	3
Chironomus sp.	-	3
Cricotopus or Orthocladius	-	1
Hemerodromia sp.	3	-
Parametriocnemus sp.	1	-
Pentaneura inconspicua	-	2
Phaenopsectra punctipes grp.	1	-
Polypedilum aviceps	2	-
Polypedilum fallax	4	2
Polypedilum illinoense grp.	-	6
Polypedilum tritum	-	3
Rheocricotopus robacki	1	-
Stempellinella cf. leptocelloides	1	-
Tanytarsus sp.L Epler	-	1
Thienemannimyia grp.	3	1
Tribelos jucundum	-	1
Ephemeroptera		
Baetidae	-	1
Maccaffertium exiguum	11	-
Maccaffertium smithae	4	-
Paraleptophlebia volitans	1	-
Pseudocloeon sp.	1	2
Pseudocloeon propinquum	1	-

Appendix 9b Continued

Taxon Name	Control Site	Test Site
Megaloptera		
Corydalidae	2	-
Corydalus cornutus	2	-
Trichoptera		
Cheumatopsyche sp.	27	6
Hydropsyche sp.	2	-
Lype diversa	1	-
Nyctiophylax sp.	10	-

Appendix 10a

Qualitative benthic macroinvertebrate collapsed taxa list and number of individuals counted from 20-discrete-dipnet sweeps upstream and downstream of E.I. DuPont Maxville Mine facility (July 11, 2005). See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

Taxon Name	Control Site	Test Site
Annelida		
Oligochaeta		
Haplotaxida		
Enchytraeidae	4	-
Nais sp.	1	-
Tubificidae	2	2
Lumbriculida		
Eclipidrilus palustris	2	2
Arthropoda		
Crustacea		
Amphipoda		
Hyalella azteca	2	-
Decapoda		
Cambaridae	1	-
Hexapoda		
Coleoptera		
Ancyronyx variegatus	3	-
Dineutus sp.	1	-
Helichus fastigiatus	6	-
Macronychus glabratus	11	-
Microcylloepus pusillus	7	9
Prionocyphon sp.	2	-
Stenelmis sp.	5	1
Diptera		
Ablabesmyia mallochi	1	-
Goeldichironomus carus	1	-
Gymnometriocnemus sp.	1	-
Hemerodromia sp.	1	-
Natarsia sp. A Roback	1	-
Polypedilum halterale grp.	-	2
Polypedilum illinoense grp.	-	1
Simulium sp.	2	-
Stenochironomus	1	-
Tribelos jucundum	5	-
Ephemeroptera		
Leptophlebiidae	1	-
Maccaffertium exiguum	5	-
Maccaffertium smithae	1	-
Pseudocloeon sp.	-	17
Megaloptera		
Corydalus cornutus	3	-

Appendix 10a Continued

Taxon Name	Control Site	Test Site
Odonata		
Calopteryx sp.	1	-
Coenagrionidae	1	-
Plecoptera		
Neoperla clymene	1	-
Trichoptera		
Cheumatopsyche sp.	26	50
Chimarra sp.	-	1
Hydropsyche sp.	-	3
Lype diversa	3	-
Micrasema wataga	1	-
Neotrichia sp.	1	-
Oecetis georgia	1	-
Oxyethira sp.	-	3
Triaenodes sp.	-	1
Mollusca		
Bivalvia		
Bivalvia		
Undetermined	-	3
Gastropoda		
Basommatophora		
Ancylidae	-	2
Physidae	-	4

…

Appendix 10b

Qualitative benthic macroinvertebrate taxa list and number of individuals counted from 20-discrete-dipnet sweeps upstream and downstream of E.I. DuPont Maxville Mine facility (July 11, 2005).

Taxon Name	control site	test site
Annelida		
Oligochaeta		
Haplotaxida		
Enchytraeidae	4	-
Nais(animal) sp.	1	-
Tubificidae	2	2
Lumbriculida		
Eclipidrilus sp.	1	1
Eclipidrilus palustris	1	1
Arthropoda		
Crustacea		
Amphipoda		
Hyalella azteca	2	-
Decapoda		
Cambaridae	1	-
Hexapoda		
Coleoptera		
Ancyronyx variegatus	3	-
Dineutus sp.	1	-
Helichus fastigiatus	6	-
Macronychus glabratus	11	-
Microcylloepus pusillus	7	9
Prionocyphon sp.	2	-
Stenelmis sp.	5	1
Diptera		
Ablabesmyia mallochi	1	-
Chironomidae	1	-
Goeldichironomus carus	1	-
Gymnometriocnemus	1	-
Hemerodromia sp.	1	-
Natarsia sp. A Roback	1	-
Polypedilum halterale grp.	-	2
Polypedilum illinoense grp.	-	1
Simulium sp.	2	-
Stenochironomus sp.	1	-
Tribelos jucundum	4	-
Ephemeroptera		
Heptageniidae	1	-
Leptophlebiidae	1	-
Maccaffertium exiguum	4	-
Maccaffertium smithae	1	-
Pseudocloeon sp.	-	17

Appendix 10b Continued

Taxon Name	Control Site	Test Site
Megaloptera		
Corydalus cornutus	3	-
Odonata		
Calopteryx sp.	1	-
Coenagrionidae	1	-
Plecoptera		
Neoperla clymene	1	-
Trichoptera		
Cheumatopsyche sp.	26	47
Chimarra sp.	-	1
Hydropsyche sp.	-	3
Hydropsychidae	-	2
Lype diversa	3	-
Micrasema wataga	1	-
Neotrichia sp.	1	-
Oecetis georgia	1	-
Oxyethira sp.	-	3
Triaenodes sp.	-	1
Undetermined	-	1
Mollusca		
Bivalvia		
Bivalvia		
Undetermined	-	3
Gastropoda		
Basommatophora		
Ancylidae	-	2
Physidae	-	4

The Bioassay of the E. I. DuPont Maxville Mine effluent sampled on July 11, 2005, NPDES #FL0040274.

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

Transaction Code NPDES NUMBER
YR/MO/DA Insp Type Inspector Fac Type
1 N 2 5 3 F L 0 0 0 0 0 5 1 # # 0 5 0 7 1 8 # **B** # **S** # 2

Remarks

#

The Priority Pollutants Analysis for Bioassay of the E. I. DuPont Maxville Mine effluent sampled on July 11, 2005, NPDES #FL0040274.

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

Transaction Code NPDES NUMBER
YR/MO/DA Insp Type Inspector Fac Type
1 N 2 5 3 F L 0 0 0 0 0 5 1 # # 0 5 0 7 1 8 # **X** # **S** # 2

Remarks

#

Biological Analyses of the E. I. DuPont Maxville Mine effluent sampled on July 11, 2005, NPDES #FL0040274.

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

Transaction Code NPDES NUMBER
YR/MO/DA Insp Type Inspector Fac Type
1 N 2 5 3 F L 0 0 0 0 0 5 1 # 0 5 0 7 1 8 # **S** # **S** # 2

Remarks