

Biological Assessment of

E. I. DuPont – Trailridge Mine

Bradford County

NPDES #FL0000051

Sampled July 2005

January 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 – Trailridge Mine		
Physical Address:	State Road 230, Starke	County:	Bradford
NPDES Number:	FL0000051	Permit Expiration:	May 9, 2006

Toxics Sampling Inspection **(XSI)**

Date Sampled: July 18, 2005

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

Compliance Biomonitoring Inspection **(CBI)**

Date Sampled: July 18, 2005

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

Water Quality Inspection **(WQI)**

Date Sampled: July 18, 2005

Results: With the exception of nitrate+nitrite, all nutrients, were lower at the Test Site compared to the Control Site. Conductivity and temperature were higher at the Test Site (458 μmhos/cm, 30.8 ^{o}C) relative to the Control Site (248 μmhos/cm, 25.8 ^{o}C) and virtually identical to effluent values (458 μmhos/cm, 31 ^{o}C).

Impact Bioassessment Inspection **(IBI)**

Date Sampled: July 18, 2005

Results: AGP was less than the Method Detection Limit in the effluent and in the receiving water samples. Qualitative periphyton taxa richness was 66% lower at the Test Site compared to the Control Site and there was greater percentage of blue-green algae at the Test Site (68.7%) compared to the Control Site (6.4%).

There were several indications that the macroinvertebrate community at the Test Site was impaired relative to the Control Site. Diversity was 57% lower at the Test Site (1.24) compared to the Control Site (2.87) in the quantitative Hester-Dendy samples, which is a violation of the Biological Integrity Criterion 62-302.530 (11) F.A.C. There were relatively few individuals in the Control and Test Site samples which can result in a negative bias in Shannon-Weaver Diversity calculations; however, there were additional indications of an impaired macroinvertebrate community downstream of the outfall. Taxa richness was 63% lower, EPT taxa 80% lower, and the percent dominant taxon was 44% higher at the Test Site compared to the Control Site. In the qualitative macroinvertebrate samples, the Test Site received a SCI score of 16, which placed it in the “Very Poor” category compared to the Control Site SCI score of 44, which was considered “Poor”.

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 – Trailridge Mine is located in Bradford County, Florida (Appendix 1). This facility dredges heavy mineral sands to obtain ilmenite, zircon, and staurolite. Activities at this facility include acidification of mining wastewater with ferric chloride, sulfuric acid or ferric sulfate to a pH between 3.0 and 3.5 standard units. Flocculation of colloidal material is followed by settling in a series of diked ponds. The wastewater is then neutralized with hydrated lime to a pH between 6.0 and 8.5, with additional settling prior to final discharge into the Class III fresh waters of Alligator Creek. Upon Department approval, polymer addition may be provided after neutralization for aluminum reduction prior to final discharge to Alligator Creek. Storm water and rainfall runoff from mined areas are also collected and treated as described above. The treatment train consists of the addition of barium chloride to the wastewater at the location where ferric chloride and/or ferric sulfate is added (prior to the humate settling ponds). A substantial revision was made on April 4, 005 to redirect a portion of the effluent to the Southwest Quadrant Pond. Approximately 400 gallons per minute will be routed to an existing ditch with discharges into the Southwest Quadrant Pond and eventually into Blue Pond. This rerouting is part of an effort to improve lake water levels in the Keystone Heights area (see Facility Summary in Appendix 2).

The maximum design flow of the wastewater system is 30.0 million gallons per day (MGD). The actual mean flow during this survey was 7.58 MGD and the facility has an annual average permitted flow of 8.5 MGD (Appendix 2).

According to the facility's monthly discharge monitoring reports, the routine chronic *C. dubia* test in November 2004 failed acute and chronic endpoints; however, the follow-up test passed both acute and chronic endpoints (Appendix 2). In July 2004, the facility experienced an abnormal event when an estimated 5,000 gallons of turbid water exited the property boundary. An investigation determined that the transfer ditch that carries stormwater from the active mining area to the water treatment facilities had become restricted at a culvert which resulted in a portion of the water in the transfer ditch to back-up and flow outside of the water treatment transfer ditch. Immediate actions were taken to contain the turbid water remaining on site. Gypsum was used to reduce the turbidity of the impacted water on the site. During September and October 2004, the facility had exceedances of flow, pH, and length of longest pH excursion due to hurricanes Frances and Jeanne (Appendix 2). Surface Water Quality Criteria and facility permit limits are listed in Table 1.

Methods

The purpose of this investigation was to determine the potential effects of the facility's effluent on the biota of the receiving waters. Chemical and biological comparisons were made between a Control Site (below County Road 230 in a branch of Alligator Creek) and a Test Site (located in a separate branch of Alligator Creek approximately 60 meters downstream of the discharge), see Map in Appendix 1. 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/2002sops.htm for details) and met FDEP quality assurance/quality control standards (see http://www.floridadep.org/labs/qa/index.htm).

The following were involved in this investigation: Tom Kallemeyn, Jeremy Parrish, Eesa Ali, Lacey Smith, and Joe Jordan (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 & Discussion

- Specific chemical results are reported in Table 1 and a complete list of chemical analytes can be reviewed in Appendix 4. The iron concentration in the Control Site sample (1,490 mg/L) exceeded the Class III Water Quality Criteria (62-302.530 (39) F.A.C.). It is not clear from this study what is contributing to the elevated levels of iron at the Control Site.
- The metals nickel, selenium, and zinc were found in the effluent and Test Site samples at levels above the method detection limit (MDL) and below the practical quantitation limit (PQL). Aluminum and iron were detected in the effluent and Test Site samples at levels that complied with Class III Fresh Water Quality Criteria.
- Radium 226 and 228 were detected in the effluent at a level that complied with the facility's permit limit.
- No priority organic pollutants were detected in the effluent.
- Effluent conductivity, pH and dissolved oxygen 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, and toxicological data.

DuPont Trailridge 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	-	-	391	331	428 A
Arsenic	≤ 50	-	4 U	4 U	4 U
Cadmium	≤ 1.5 b	-	0.5 U	0.5 U	0.5 U
Calcium (mg/L)	-	-	52.6	14.6	51.4 A
Chromium-III	≤ 114.9 b	-	2 U	2 U	2 U
Copper	≤ 12.6 b	-	0.5 U	0.5 U	0.5 U
Iron	≤ 1000	≤ 1000	78	1490	91 A
Lead	≤ 5 b	-	2.1 U	2.1 U	0.075 U
Magnesium (mg/L)	-	-	2.6	2.3	2.5 A
Nickel	≤ 70.2 b	-	7.5 I	2 U	7.2 I
Selenium	≤ 5	-	0.66 I	0.5 U	0.79 I
Silver	≤ 0.07	-	0.025 U	0.025 U	0.025 U
Zinc	≤ 161.3 b	-	4.2 I	5.1 I	4.9 I
Nutrients (mg/L)					
Ortho-phosphate	-	-	0.004 U	0.004 U	0.004 U
Total Phosphorus	-	-	0.035 I	0.045 I	0.032 I
Ammonia	-	-	0.028	0.051	0.028
Unionized Ammonia	≤ 0.02	-	≤ 0.02 c	≤ 0.02 c	≤ 0.02 c
Nitrate+Nitrite	-	-	0.005 I	0.004 U	0.006 I
Total Kjeldahl Nitrogen	-	-	0.06 U	0.71	0.06 U
Organic Nitrogen	-	-	0.03 c	0.66 c	0.03 c
Total Nitrogen	-	-	0.07 c	0.71 c	0.07 c
General Physical and Chemical Parameters					
Radium 226 (pCi/L)	-	-	0.9	-	-
Radium 226-Counting Error (pCi/L)	-	-	0.2	-	-
Radium 228 (pCi/L)	-	-	1.4	-	-
Radium 228-Counting Error (pCi/L)	-	-	0.8	-	-
Combined Radium 226 and 228 (pCi/L)	-	≤ 5	1.3	-	-
Habitat Assessment	-	-	-	98	78
Dissolved Oxygen (mg/L)	≥ 5.0	-	7	7.2	6.7
pH (S.U.)	-	6.0-8.5	6.9	4.4	7.5
Conductivity (umhos/cm)	≤ 1275	-	458	248	458
Temperature (C)	-	-	31	25.8	30.8
Phytoplankton Chlorophyll *a* (µg/L)	-	-	0.85 U	2.4 I	0.85 U
Phytoplankton Phaeophytin (µg/L)	-	-	-	0.77 J	0.85 U
Flow (MGD)	-	≤ 30.0	7.4	-	-
Hardness (mg/L)	-	-	142 c	45.9 c	138.6 c
TSS (mg/L)	-	≤ 30.0	4 U	-	-
Toxicology Bioassays (96 hour Acute Screen Bioassays; % mortality in 100% effluent)					
Fish (*Pimephales promeles*)	-	NOEC	0%	-	-
Water flea (*Ceriodaphnia dubia*)	-	NOEC	0%	-	-

Value exceeds the Class III Water Quality Criteria

b - Value is calculated based on hardness

c - Value is calculated

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.

J - Estimated value

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

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

Table 2. Measured and predicted algal growth potential (AGP) for total soluble nitrogen (TSIN) and ortho phosphate (OP) limitation for 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 Sample	0.300 U	1.25 ± 0.25	0 ± 0 *	0.19 ± 0.038	15.05 ± 3.01	0.03	0.14
Control Site	0.300 U	1.94 ± 0.388	0 ± 0 *	26.98 ± 5.396	19.35 ± 3.87	0.05	15.78
Test Site	0.300 AU	1.29 ± 0.258	0 ± 0 *	0.23 ± 0.046	13.76 ± 2.752	0.03	0.19

A - Value reported is the mean of two or more determinations
U - Material analyzed for but not detected; value reported is the method detection limit
* - AGP could not be predicted due to undetected levels of ortho-phosphate

- Dissolved oxygen, pH and conductivity complied with Class III Water Quality Criteria (Table 1, 62-302.530 F.A.C.) at the receiving water sites, however, Test Site conductivity and temperature (458 μmhos/cm, 30.8 °C) were higher compared to the Control Site (248 μmhos/cm, 25.8 °C).
- The effluent sample was not acutely toxic to the fish, *Pimephales promelas,* 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 effluent total nitrogen concentration was 0.07 mg/L (Table 1). Effluent total phosphorus (0.035 mg/L), ortho-phosphate (0.004 mg/L), and total ammonia concentrations (0.028 mg/L, Table 1) did not contribute to Test Site levels. Nutrient levels at the Control Site were higher than those at the Test Site with the exception of nitrate+ nitrite. Total ammonia at the Test Site ranked above the 10th percentile of typical values for Florida streams while all other nutrients were undetected or below the practical quantitation limits (Appendix 5). Concentrations of total Kjehldahl nitrogen (TKN) and total ammonia at the Control Site ranked in the 20th and 30th percentiles of typical values for Florida streams, respectively.
- 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 wt/L represent a "problem" threshold for fresh receiving waters, implying nutrient enrichment. The AGP values at the Control and Test Sites were below the MDL indicating no nutrient enrichment related to the Trailridge discharge in this portion of Alligator Creek. There was no evidence of growth inhibition in the AGP data (Table 2).
- Chlorophyll-*a* was below the MDL in the effluent and in the sample from the Test Site and below the practical quantitation limit in the Control Site sample (Table 1). We note that nutrients in the water column may or may not fuel algal production immediately, depending upon the sum of environmental conditions that limit algal growth at the site (e.g. pH, shading, turbidity). Thus, it is not necessarily contradictory for ambient nutrient levels to be high and for no chlorophyll to be detected in water samples.
- There were differences in periphyton algal community composition between the Control and Test Sites (Table 3, Appendix 8). There were 32 taxa at the Control Site compared to 11 taxa at the Test Site and a shift away from a community dominated by diatoms at the Control Site (92.3%) to one dominated by blue-green algae at the Test Site (68.7%). Diatoms are indicative of a healthy flowing stream, while blue-green algae can be indicative of disturbance. Standard Operating Procedures call for 300 algal units to be identified per sample (SOP AB03), however, only 67 units were identified in the Test Site periphyton

Table 3. Periphyton composition

DuPont Trailridge Mine	Control Site	Test Site
Number of Taxa	32	11
Percent Dominant Taxon	43.6	20.9
Dominant Taxon (name)	*Eunotia* sp.	*Planktothrix* sp.
Number of Algal Units Identified	310	67
Percentage Composition		
Blue-green algae	6.4	68.7
Diatoms	92.3	31.3
Green algae	1.3	0

Table 4. Macroinvertebrate Hester-Dendy Samples - Quantitative

DuPont Trailridge Mine	Control Site	Test Site
Summary Statisics		
Shannon-Weaver Diversity	2.87	1.24
Number of Taxa	16	6
Florida Index	5	1
Number of EPT Taxa	0	0
Percent Dominant Taxon	33.5	77.4
Dominant Taxon (name)	*Thienemannimyia grp.*	*Polypedilum illinoense grp.*
Dominant Taxon (group)	Diptera	Diptera
Total Number of Individuals	116	80
Community Composition: Percent of total		
Acariformes	0	1.3
Coleoptera	25	0
Diptera	66.4	98.7
Ephemeroptera	0	0
Odonata	6.9	0
Oligochaeta	0.9	0
Plecoptera	0	0
Trichoptera	0	0
Other	0.8	0
Functional Feeding Groups: Percent of total		
Burrowing Deposit Feeders	0.9	0
Predators	50	2.5
Surface Deposit Feeders	29.3	53.1
Suspension Feeders	0.5	0
Scrapers	12.4	0
Shredders	6.9	44.3

communication with T. Kallemeyn (DEP Northeast District), suggest that large amounts of iron-sulfur bacteria may be responsible for the reduction in the algal communities at the Test Site.

- A habitat assessment score of 98 placed the Control Site in the "Sub-optimal" category while a score of 78 placed the Test Site in the "Marginal" category (Table 1, data sheets in Appendix 7). There were differences among all primary and secondary habitat parameters between the Control and Test sites. Tom Kallemeyn (personal communication) noted that stream banks at the Test Site were covered by 0.3-0.6 meters of iron-sulfur bacteria. Large amounts of the bacteria had sloughed off resulting in severe habitat smothering and little productive habitat at the Test Site. Large amounts of the bacteria were also seen at County Road 230, approximately 1.6 kilometers (1.0 mile) downstream of the outfall. The Trailridge treatment process involves the addition of ferric chloride and/or ferric sulfate, which may explain the excessive growth of iron-sulfur bacteria at the Test Site.
- Quantitative measures of benthic macroinvertebrate assemblages from Hester-Dendy samplers showed a 57% reduction in diversity from the Control Site (2.87) to the Test Site (1.24), a violation of the Biological Integrity Criterion 62-302.530 (11) F.A.C. (Table 4, Appendix 9). It should be noted that depending on the overall number of taxa present at a site, Shannon-Weaver Diversity does not become an unbiased estimator until +/-300 individuals have been identified. Therefore, diversity results at the Control and Test Site (with 116 and 80 individuals, respectively) may have been negatively biased by the small number of individuals and should be viewed with caution. There was, however, further evi-dence of degradation in the quantitative samples as seen in the reduction of taxa richness and the increase in the dominant taxa at the Test Site compared to the Control Site.
- 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 44 and the Test Site SCI score of 16 placed them in the "Poor" and "Very Poor" categories, respectively. Also, a larger portion of material was sorted at the Test Site in order to obtain the target number of individuals compared to the Control Site suggesting a less productive community at the Test Site. Very tolerant organisms, mostly dipterans, made up a majority of the Test Site community (88.5%) compared to the Control Site (21%).

Summary

The Shannon-Weaver Diversity Index was 57% lower at the Test Site compared to the Control Site, a violation of the Biological Integrity Criterion (62-302.530 (11) F.A.C.). As was noted earlier, this should be viewed with caution as the small numbers of individuals in the Control and Test Site samples may have resulted in a negative bias in the Shannon-Weaver Diversity calculations. There were, however, additional indications of impairment in the Test Site biological communities in both the quantitative and qualitative macroinvertebrate

Table 5. Macroinvertebrate Dipnet Samples - Qualitative

DuPont Trailridge Mine	Control Site	Test Site
Stream Condition Index (value)	44	16
Stream Condition Index (word)	Poor	Very Poor
Stream Condition Index Metrics		
Number of Total Taxa	28	11
Number of Ephemeroptera Taxa	1	1
Number of Trichoptera Taxa	4	2
Number of Clinger Taxa	4	2
Number of Long-lived Taxa	0	1
Number of Sensitve Taxa	4	3
Percent Dominant Taxon	16	84.62
Percent Suspension Feeders and Filterers	25	1.92
Percent Tanytarsini Individuals	0	0
Percent of Very Tolerant Individuals	21	88.46
Dominant Taxon (name)	*Stenelmis sp.*	*Cricotopus albiforceps*
Dominant Taxon (group)	Coleoptera	Diptera
Total Number of Individuals	100	104
Community Composition: Percent of total		
Amphipoda	9	0
Coleoptera	18	0
Diptera	19	94.2
Ephemeroptera	1	1
Odonata	11	0
Oligochaeta	17	1
Plecoptera	0	0
Trichoptera	24	2.9
Other	1	0.9
Functional Feeding Groups: Percent of total		
Burrowing Deposit Feeders	16	1
Predators	28.5	3.4
Surface Deposit Feeders	18	48.6
Suspension Feeders and Filterers	25	1.9
Scrapers	9	0.5
Shredders	2.5	44.7
Unknown	1	0

samples and the qualitative periphyton samples. Elevated conductivity, temperature and habitat smothering from silt and iron-sulfur bacteria, may have contributed to degraded biological communities at the Test Site. Re-evaluation of the monitoring frequency for these parameters and additional monitoring stations to assess impacts of the newly permitted discharge into Blue Pond may be warranted.

It should also be noted that the Test and Control Sites were located in separate branches of Alligator Creek and although a thorough attempt was made to find comparable water bodies, some of the differences seen between the sampling stations may be due to natural variation.

Literature Cited

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Table 6a. Stream Condition Index Metrics - Northeast

DuPont Trailridge Mine Control Site			
Metric:	Value	Raw Metric Score	Fixed Score 0 -10
Total Number of Taxa	28	4.6	4.6
Number of Ephemeroptera Taxa	1	2.9	2.9
Number of Trichoptera Taxa	4	6.2	6.2
Number of Clinger Taxa	4	4.4	4.4
Number of Long-lived Taxa	0	0.0	0.0
Number of Sensitive Taxa	4	3.6	3.6
Percent Contribution of Dominant Taxon	16	8.6	8.6
Percent Suspension Feeders and Filterers	25	5.9	5.9
Percent of Tanytarsini individuals	0	0.0	0.0
Percent of Very Tolerant individuals	21	3.0	3.0
Total Score		**Poor**	**44**
Interpretation of Scores		Good	73-100
		Fair	46-72
		Poor	19-45
		Very Poor	0-18

Table 6b. Stream Condition Index Metrics - Northeast

DuPont Trailridge Mine Test Site			
Metric:	Value	Raw Metric Score	Fixed Score 0 -10
Total Number of Taxa	11	-1.9	0.0
Number of Ephemeroptera Taxa	1	2.9	2.9
Number of Trichoptera Taxa	2	3.1	3.1
Number of Clinger Taxa	2	2.2	2.2
Number of Long-lived Taxa	1	3.3	3.3
Number of Sensitive Taxa	3	2.7	2.7
Percent Contribution of Dominant Taxon	84.62	-7.0	0.0
Percent Suspension Feeders and Filterers	1.92	0.2	0.2
Percent of Tanytarsini individuals	0	0.0	0.0
Percent of Very Tolerant individuals	88.46	-0.2	0.0
Total Score		**Very Poor**	**16**
Interpretation of Scores		Good	73-100
		Fair	46-72
		Poor	19-45
		Very Poor	0-18

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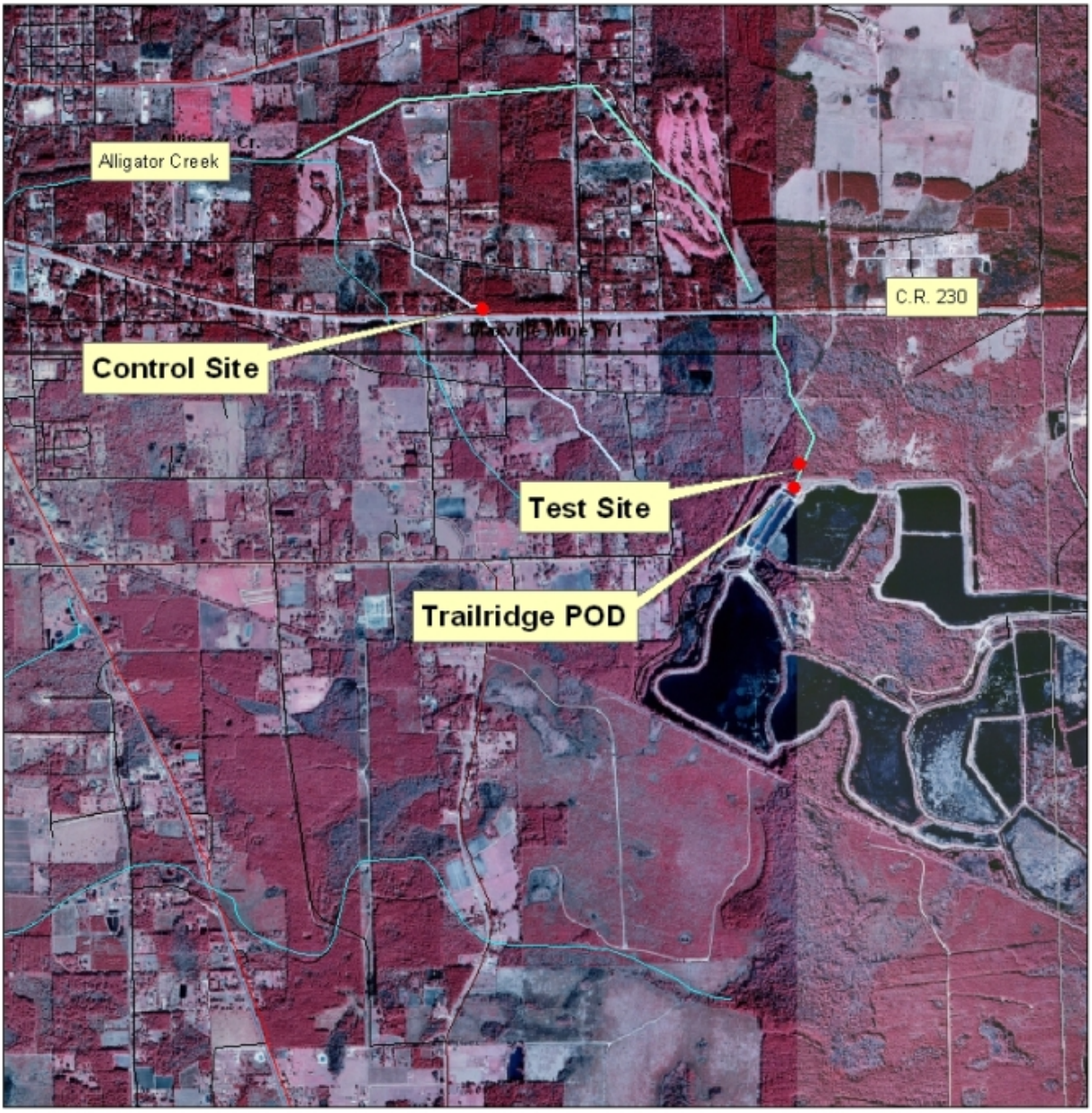
Appendices

- 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 8. 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

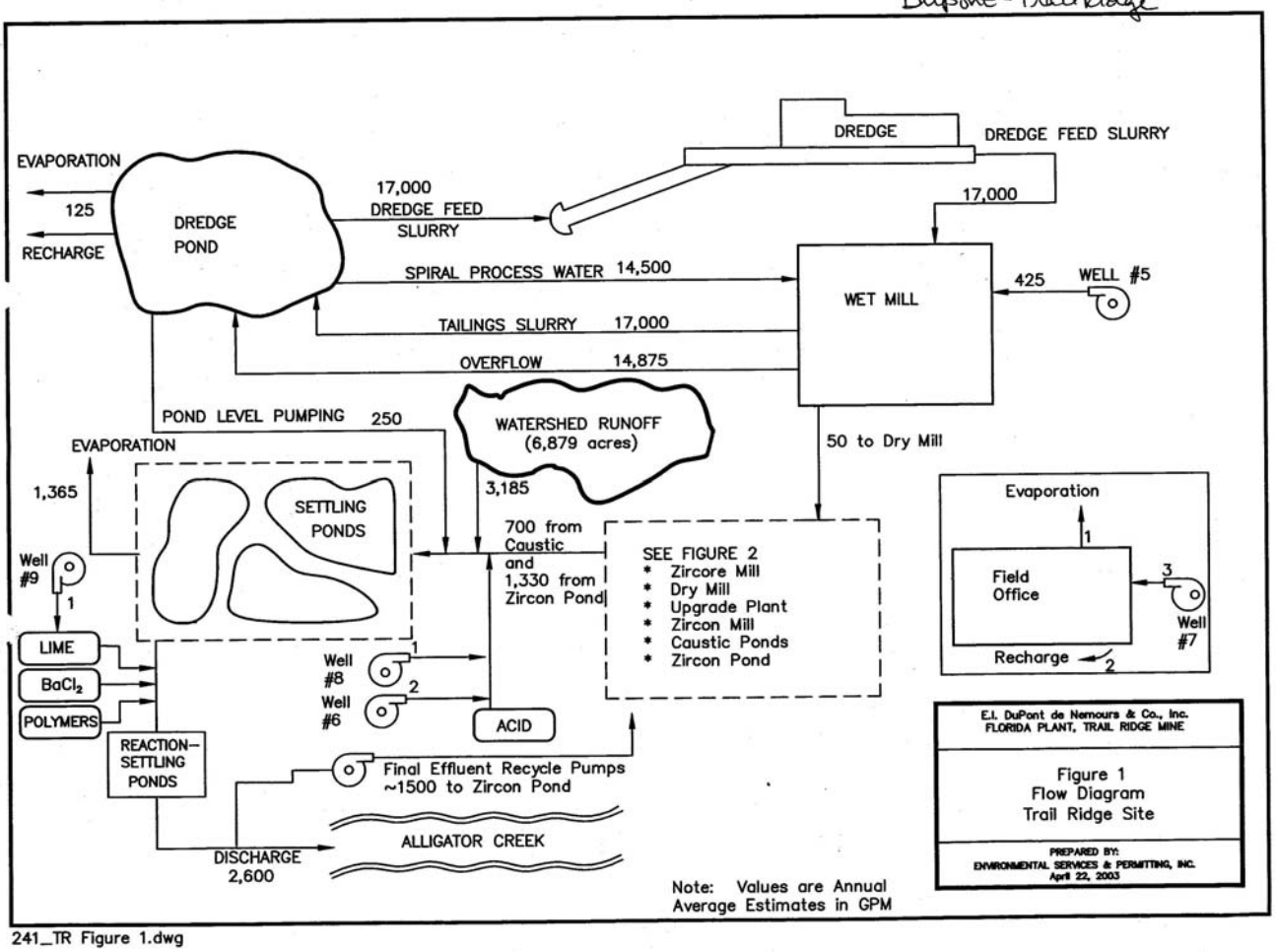
Appendix 1

Map of Facility

Trailridge FYI



Dupont-Trail Ridge



241_TR Figure 1.dwg

Appendix 2

Facility Summary and DMR data

State of Florida
Department of Environmental Protection
Facility Introduction

E.I. Dupont de Nemours & Company
Trailridge Mine
FL0000051

The Trailridge Mine 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 material, followed by settling in a series of diked ponds, neutralization with hydrated lime to a pH of between 6.0 to 8.5, and additional settling with final discharge to Alligator Creek. Upon Department approval, polymer addition may be provided after neutralization for aluminum reduction prior to final discharge to Alligator Creek. Storm water and rainfall runoff from mined areas are also collected and treated as described above. The treatment train consists of the addition of barium chloride to the wastewater at the location where ferric chloride and or ferric sulfate is added (prior to the humate settling ponds).

The facility is an existing 8.5 MGD annual average (30.0 MGD maximum) permitted discharge at Outfall D-001, to Alligator Creek, a Class III fresh surface water. The point of discharge is located approximately at latitude 29°55’25”N, longitude 82°03’43”W.

A new permitted discharge at Outfall D-002 to the Southwest Quadrant Pond then Blue Pond, a Class III fresh surface water. The point of discharge is located approximately at latitude 29°54’46”N, longitude 82°02’03”W.

A substantial revision was made on April 4, 2005 to redirect a portion of the effluent to the Southwest Quadrant Pond. The existing recycle line from D-001 will be tapped and a pipeline will be constructed to route approximately 400 gallons per minute (gpm) of the wastewater to an existing ditch which then discharges into the Southwest Quadrant Pond with eventual discharge into Blue Pond. This rerouting of final effluent is part of an effort of The Keystone Stakeholders Committee to help improve lake water levels in the Keystone Heights area.

The substantial revision also consists of providing additional treatment of the wastewater for the removal of combined radium 226 and 228 to below the water quality standard of 5.0 picocuries per liter [FAC Rule 62-302.530(58)(a)].

Land Application: Some percolation occurs through the wastewater treatment settling ponds. All discharges are to Class GII ground waters of the state. Ground water monitoring is required by Part III of the permit.

Facility Name (as it appears on permit): E.I. Dupont – Trailridge Mine		**Former Names:**
Physical Address: State Road 230 Starke, Florida	**NPDES Permit No.:** FL0000051 **Expiration Date:** May 9, 2006	**Prepared By:** Reza Shayan
County: Bradford	**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):
Outfall D-001 ⇒ Latitude 29°55'25"N Longitude 82°03'43"W
Outfall D-002 ⇒ Latitude 29°54'46"N Longitude 82°02'03"W

Description of permitted outfall: The existing 8.5 MGD annual average (30.0 MGD Maximum) Permitted discharge at Outfall D-001, to Alligator Creek, a Class III fresh surface water. A new permitted discharge at Outfall D-002 to the Southwest Quadrant Pond then Blue Pond, a Class III fresh surface water.

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 material, followed by settling in a series of diked ponds, neutralization with hydrated lime to a pH of between 6.0 to 8.5, and additional settling with final discharge to Alligator Creek. Upon Department approval, Polymer addition may be provided after neutralization for aluminum reduction prior to final discharge to Alligator Creek. Storm water and rainfall runoff from mined areas are also collected and treated as described above. The treatment train consists of the addition of barium chloride to the wastewater at the location where ferric chloride and or ferric sulfate is added (prior to the humate settling ponds).

Receiving Waters: Alligator Creek and Blue Pond.	**Classification (indicate whether fresh or marine):** Class III fresh surface waters.
Temperature (C):	**Design Flow:** 8.5 MGD annual average (30.0 MGD maximum).
pH (SU):	**Mean Flow:** 7.58 MGD from April 2004 through March 2005.
Conductivity (umhos/cm):	**Flow During Survey:**
Method of Chlorination	**Method of Dechlorination**
Dissolved Oxygen (mg/L):	**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 1st 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 accordance with Part I.C.2 of this permit 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 100% effluent, then "a minimum of 3" valid additional acute definitives are required.

Administrative or Consent Orders: None

Facility Mixing Zone Details:

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

(1) The routine chronic *C. dubia* test reported in November 2004 failed acute and chronic endpoints; however, the follow-up test passed both acute and chronic endpoints.

(2) On July 4, 2004, the facility experienced an abnormal event when an estimated 5,000 gallons of turbid water exited the property boundary. It was investigated that the transfer ditch that carries stormwater from the active mining area to the water treatment facilities had become restricted at a tube crossing and a portion of the turbid water in the transfer ditch had backed-up and sheetflowed outside of the water treatment transfer ditch. Immediate actions were taken to contain the turbid water remaining on site. Gypsum was used to reduce the turbidity of the impacted water on the site.

(3) During September and October 2004, the facility had the following exceedances due to Hurricane Frances and Jean: Flow, pH, and Length of Longest pH Excursion.

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions: FDEP has not conducted a 5^{th} -year bioassessment at the **Trailridge** mine. Two 3^{rd} -year sampling events were made in January 1983 and April 1995. The effluent was not toxic to any of the 4 test species in 1983. No chemical analyses were reported. Nor was the effluent toxic to either test species in 1995. No organics were detected and the metals were in compliance at that time.

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 Outfall D-001 and D-002 Alligator Creek and Blue Pond	Limit	Describe special permit conditions and permit modifications:
Flow (MGD)	Monthly Average: Report Daily Maximum: 30.0 Annual Average: 8.5	
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%.	
Chronic Whole Effluent Toxicity, (%)	NOEC ≥ 100%.	The pH at EFF-1 shall be monitored continuously via a recorder. The pH at EFF-2 shall be monitored weekly on a grab sample of the effluent. The pH values shall not deviate outside the range of 6.0 standard units to 8.5 standard units 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. Samples shall be taken at the monitoring site locations EFF-1 and EFF-2 at the nearest accessible point after final treatment but prior to the actual discharge with the receiving water: EFF-1: The nearest accessible point after final treatment but prior to actual discharge into Alligator Creek. EFF-2: At the discharge point into the unnamed ditch which discharges into the Southwest Quadrant Pond.
Combined radium 226 and 228, Picocuries/L	Daily Maximum: 5.0	
pH, standard units	Daily Minimum: 6.0 Daily Maximum: 8.5 See comments	

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, *Pimephales promeles* 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 not analyzed for the presence and concentration of total and fecal coliform bacteria for this study.

(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

DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Bio-AGP/LimNut	Algal Growth Potential	0.3	mg DryWt/L	U	0.3	0.9
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	2.4	ug/L	I	2.1	6.4
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0.77	ug/L	J	2.1	6.4
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Bio-Invertebrates	Macroinvert-FW-Qual-Dipnetx20-# Taxa	30	# Taxa			
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	8	# Taxa			
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Bio-Peri/Phyto	Periphyton-Qualitative-# Diatom Taxa	27	# Taxa			
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Bio-Peri/Phyto	Periphyton-Qualitative-# Wet Taxa	6	#Taxa			
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Aluminum	331	ug/L		5	20
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Arsenic	4	ug/L	U	4	16
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Cadmium	0.5	ug/L	U	0.5	2
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Calcium	14.6	mg/L		0.05	0.2
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Chromium	2	ug/L	U	2	8
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Copper	0.5	ug/L	U	0.5	2
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Iron	1.49E+03	ug/L		10	40
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Lead	2.1	ug/L	U	2.1	8.4
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Magnesium	2.3	mg/L		0.01	0.04
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Nickel	2	ug/L	U	2	8
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Selenium	0.5	ug/L	U	0.5	2
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Silver	0.025	ug/L	U	0.025	0.1
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Zinc	5.1	ug/L	I	3	12
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Nutrients-Liquid	Ammonia-N	0.051	mg N/L		0.01	0.02
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Nutrients-Liquid	Kjeldahl Nitrogen	0.71	mg N/L		0.12	0.4
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Nutrients-Liquid	NO2NO3-N	0.004	mg N/L	U	0.004	0.01
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	U	0.004	0.01
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Nutrients-Liquid	Total-P	0.045	mg P/L	I	0.02	0.06
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230 REP 2	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	13	# Taxa			
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230 REP 3	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	10	# Taxa			
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Bio-AGP/LimNut	Algal Growth Potential	0.3	mg DryWt/L	AU	0.3	0.9
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Bio-Invertebrates	Macroinvert-FW-Qual-Dipnetx20-# Taxa	12	# Taxa			
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	2	# Taxa			
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Bio-Peri/Phyto	Periphyton-Qualitative-# Diatom Taxa	7	# Taxa			
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Bio-Peri/Phyto	Periphyton-Qualitative-# Wet Taxa	4	#Taxa			
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Aluminum	428	ug/L	A	5	20
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Arsenic	4	ug/L	U	4	16
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Cadmium	0.5	ug/L	U	0.5	2
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Calcium	51.4	mg/L	A	0.05	0.2
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Chromium	2	ug/L	U	2	8
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Copper	0.5	ug/L	U	0.5	2
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Iron	91	ug/L	A	10	40
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Lead	0.075	ug/L	U	0.075	0.3
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Magnesium	2.5	mg/L	A	0.01	0.04
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Nickel	7.2	ug/L	I	2	8
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Selenium	0.79	ug/L	I	0.5	2
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Silver	0.025	ug/L	U	0.025	0.1
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Zinc	4.9	ug/L	I	3	12
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Nutrients-Liquid	Ammonia-N	0.028	mg N/L		0.01	0.02
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Nutrients-Liquid	Kjeldahl Nitrogen	0.06	mg N/L	U	0.06	0.2

DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Nutrients-Liquid	NO2NO3-N	0.006	mg N/L	I	0.004	0.01
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	U	0.004	0.01
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Nutrients-Liquid	Total-P	0.032	mg P/L	I	0.02	0.06
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD REP 2	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	4	# Taxa			
7/18/2005 12:50	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD REP 3	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	5	# Taxa			
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	1,2,4-Trichlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	1,2-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	1,3-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	1,4-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2,4,6-Trichlorophenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2,4-Dichlorophenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2,4-Dimethylphenol	48	ug/L	U	48	190
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2,4-Dinitrophenol	14	ug/L	U	14	58
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2,4-Dinitrotoluene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2,6-Dinitrotoluene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2-Chloronaphthalene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2-Chlorophenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	ug/L	U	2.9	12
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2-Nitrophenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	3,3'-Dichlorobenzidine	38	ug/L	U	38	150
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	4,4'-DDD	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	4,4'-DDE	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	4,4'-DDT	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	4-Bromophenyl phenyl ether	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	4-Chloro-3-methylphenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	4-Chlorophenyl phenyl ether	1.9	ug/L	U	1.9	7.7
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	4-Nitrophenol	14	ug/L	U	14	58
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Acenaphthene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Acenaphthylene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Aldrin	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Anthracene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Benzidine	96	ug/L	U	96	380
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Benzo(a)anthracene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Benzo(a)pyrene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Benzo(b)fluoranthene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Benzo(g,h,i)perylene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Benzo(k)fluoranthene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Bis(2-chloroethoxy)methane	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Bis(2-chloroethyl)ether	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	ug/L	U	2.9	12
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Bis(2-ethylhexyl)phthalate	14	ug/L	U	14	58
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Butyl benzyl phthalate	4.8	ug/L	U	4.8	19
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Chrysene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Di-n-butyl phthalate	4.8	ug/L	U	4.8	19
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Di-n-octyl phthalate	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Dibenzo(a,h)anthracene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Dieldrin	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Diethyl phthalate	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Dimethyl phthalate	48	ug/L	U	48	190
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Endosulfan I	3.8	ug/L	U	3.8	15
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Endosulfan II	3.8	ug/L	U	3.8	15
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Endosulfan sulfate	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Endrin	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Endrin aldehyde	3.8	ug/L	U	3.8	15

DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Fluoranthene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Fluorene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Heptachlor	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Heptachlor epoxide	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Hexachlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Hexachlorobutadiene	2.9	ug/L	U	2.9	12
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Hexachlorocyclopentadiene	2.9	ug/L	U	2.9	12
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Hexachloroethane	2.9	ug/L	U	2.9	12
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Indeno(1,2,3-cd)pyrene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Isophorone	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	N-Nitrosodi-n-propylamine	1.9	ug/L	U	1.9	7.7
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	N-Nitrosodimethylamine	1.9	ug/L	U	1.9	7.7
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	N-Nitrosodiphenylamine	2.9	ug/L	U	2.9	12
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Naphthalene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Nitrobenzene	1.9	ug/L	U	1.9	7.7
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Pentachlorophenol	2.9	ug/L	U	2.9	12
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Phenanthrene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Phenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Pyrene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	alpha-BHC	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	beta-BHC	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	delta-BHC	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	gamma-BHC	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Alachlor	0.58	ug/L	UJ	0.58	2.3
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Ametryn	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Atrazine	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Azinphos Methyl	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Bromacil	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Butylate	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Chlorpyrifos Ethyl	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Chlorpyrifos Methyl	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Diazinon	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Ethion	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Ethoprop	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Fenamiphos	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Fonofos	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Hexazinone	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Malathion	0.14	ug/L	UJ	0.14	0.56
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Metalaxyl	0.24	ug/L	UJ	0.24	0.96
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Metolachlor	0.48	ug/L	UJ	0.48	1.9
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Metribuzin	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Mevinphos	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Naled	0.77	ug/L	U	0.77	3.1
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Norflurazon	0.14	ug/L	U	0.14	0.56
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Parathion Ethyl	0.14	ug/L	U	0.14	0.56
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Parathion Methyl	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Phorate	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Prometryn	0.14	ug/L	UJ	0.14	0.56
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Simazine	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Aluminum	5	ug/L	U	5	20
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Arsenic	4	ug/L	U	4	16
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Cadmium	0.5	ug/L	U	0.5	2
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Calcium	0.05	mg/L	U	0.05	0.2
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Chromium	2	ug/L	U	2	8

DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Copper	0.5	ug/L	U	0.5	2
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Iron	10	ug/L	U	10	40
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Lead	0.075	ug/L	U	0.075	0.3
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Magnesium	0.01	mg/L	U	0.01	0.04
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Nickel	2	ug/L	U	2	8
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Selenium	0.5	ug/L	U	0.5	2
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Silver	0.025	ug/L	U	0.025	0.1
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Zinc	3	ug/L	U	3	12
7/18/2005 12:50	EQUIPMENT BLANK	Nutrients-Liquid	Ammonia-N	0.01	mg N/L	U	0.01	0.02
7/18/2005 12:50	EQUIPMENT BLANK	Nutrients-Liquid	Kjeldahl Nitrogen	0.12	mg N/L	U	0.12	0.4
7/18/2005 12:50	EQUIPMENT BLANK	Nutrients-Liquid	NO2NO3-N	0.004	mg N/L	U	0.004	0.01
7/18/2005 12:50	EQUIPMENT BLANK	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	U	0.004	0.01
7/18/2005 12:50	EQUIPMENT BLANK	Nutrients-Liquid	Total-P	0.02	mg P/L	U	0.02	0.06
7/18/2005 12:50	EQUIPMENT BLANK	Overflow	Radium 226	0.2	pCi/L			
7/18/2005 12:50	EQUIPMENT BLANK	Overflow	Radium 226-Counting Error	0.1	pCi/L			
7/18/2005 12:50	EQUIPMENT BLANK	Overflow	Radium 228	1	pCi/L	U		
7/18/2005 12:50	EQUIPMENT BLANK	Overflow	Radium 228-Counting Error	0.7	pCi/L			
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	1,2,4-Trichlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	1,2-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	1,3-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	1,4-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2,4,6-Trichlorophenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2,4-Dichlorophenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2,4-Dimethylphenol	48	ug/L	U	48	190
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2,4-Dinitrophenol	14	ug/L	U	14	58
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2,4-Dinitrotoluene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2,6-Dinitrotoluene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2-Chloronaphthalene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2-Chlorophenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	ug/L	U	2.9	12
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2-Nitrophenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	3,3'-Dichlorobenzidine	38	ug/L	U	38	150
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	4,4'-DDD	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	4,4'-DDE	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	4,4'-DDT	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	4-Bromophenyl phenyl ether	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	4-Chloro-3-methylphenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	4-Chlorophenyl phenyl ether	1.9	ug/L	U	1.9	7.7
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	4-Nitrophenol	14	ug/L	U	14	58
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Acenaphthene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Acenaphthylene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Aldrin	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Anthracene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Benzidine	96	ug/L	U	96	380
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Benzo(a)anthracene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Benzo(a)pyrene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Benzo(b)fluoranthene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Benzo(g,h,i)perylene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Benzo(k)fluoranthene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Bis(2-chloroethoxy)methane	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Bis(2-chloroethyl)ether	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	ug/L	U	2.9	12
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Bis(2-ethylhexyl)phthalate	14	ug/L	U	14	58
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Butyl benzyl phthalate	4.8	ug/L	U	4.8	19

DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Chrysene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Di-n-butyl phthalate	4.8	ug/L	U	4.8	19
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Di-n-octyl phthalate	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Dibenzo(a,h)anthracene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Dieldrin	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Diethyl phthalate	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Dimethyl phthalate	48	ug/L	U	48	190
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Endosulfan I	3.8	ug/L	U	3.8	15
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Endosulfan II	3.8	ug/L	U	3.8	15
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Endosulfan sulfate	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Endrin	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Endrin aldehyde	3.8	ug/L	U	3.8	15
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Fluoranthene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Fluorene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Heptachlor	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Heptachlor epoxide	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Hexachlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Hexachlorobutadiene	2.9	ug/L	U	2.9	12
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Hexachlorocyclopentadiene	2.9	ug/L	U	2.9	12
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Hexachloroethane	2.9	ug/L	U	2.9	12
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Indeno(1,2,3-cd)pyrene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Isophorone	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	N-Nitrosodi-n-propylamine	1.9	ug/L	U	1.9	7.7
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	N-Nitrosodimethylamine	1.9	ug/L	U	1.9	7.7
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	N-Nitrosodiphenylamine	2.9	ug/L	U	2.9	12
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Naphthalene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Nitrobenzene	1.9	ug/L	U	1.9	7.7
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Pentachlorophenol	2.9	ug/L	U	2.9	12
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Phenanthrene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Phenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Pyrene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	alpha-BHC	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	beta-BHC	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	delta-BHC	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	gamma-BHC	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	Bio-AGP/LimNut	Algal Growth Potential	0.3	mg DryWt/L	U	0.3	0.9
7/18/2005 12:50	FINAL EFFLUENT	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
7/18/2005 12:50	FINAL EFFLUENT	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
7/18/2005 12:50	FINAL EFFLUENT	Bio-Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	LC50	L		
7/18/2005 12:50	FINAL EFFLUENT	Bio-Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	LC50	L		
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Alachlor	0.58	ug/L	UJ	0.58	2.3
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Ametryn	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Atrazine	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Azinphos Methyl	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Bromacil	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Butylate	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Chlorpyrifos Ethyl	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Chlorpyrifos Methyl	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Diazinon	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Ethion	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Ethoprop	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Fenamiphos	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Fonofos	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Hexazinone	0.096	ug/L	U	0.096	0.38

DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Malathion	0.14	ug/L	UJ	0.14	0.56
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Metalaxyl	0.24	ug/L	UJ	0.24	0.96
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Metolachlor	0.48	ug/L	UJ	0.48	1.9
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Metribuzin	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Mevinphos	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Naled	0.77	ug/L	U	0.77	3.1
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Norflurazon	0.14	ug/L	U	0.14	0.56
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Parathion Ethyl	0.14	ug/L	U	0.14	0.56
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Parathion Methyl	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Phorate	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Prometryn	0.14	ug/L	UJ	0.14	0.56
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Simazine	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Aluminum	391	ug/L		5	20
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Arsenic	4	ug/L	U	4	16
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Cadmium	0.5	ug/L	U	0.5	2
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Calcium	52.6	mg/L		0.05	0.2
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Chromium	2	ug/L	U	2	8
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Copper	0.5	ug/L	U	0.5	2
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Iron	78	ug/L		10	40
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Lead	2.1	ug/L	U	2.1	8.4
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Magnesium	2.6	mg/L		0.01	0.04
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Nickel	7.5	ug/L	I	2	8
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Selenium	0.66	ug/L	I	0.5	2
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Silver	0.025	ug/L	U	0.025	0.1
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Zinc	4.2	ug/L	I	3	12
7/18/2005 12:50	FINAL EFFLUENT	Nutrients-Liquid	Ammonia-N	0.028	mg N/L		0.01	0.02
7/18/2005 12:50	FINAL EFFLUENT	Nutrients-Liquid	Kjeldahl Nitrogen	0.06	mg N/L	U	0.06	0.2
7/18/2005 12:50	FINAL EFFLUENT	Nutrients-Liquid	NO2NO3-N	0.005	mg N/L	I	0.004	0.01
7/18/2005 12:50	FINAL EFFLUENT	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	U	0.004	0.01
7/18/2005 12:50	FINAL EFFLUENT	Nutrients-Liquid	TSS	4	mg/L	U	4	16
7/18/2005 12:50	FINAL EFFLUENT	Nutrients-Liquid	Total-P	0.035	mg P/L	I	0.02	0.06
7/18/2005 12:50	FINAL EFFLUENT	Overflow	Radium 226	0.9	pCi/L			
7/18/2005 12:50	FINAL EFFLUENT	Overflow	Radium 226-Counting Error	0.2	pCi/L			
7/18/2005 12:50	FINAL EFFLUENT	Overflow	Radium 228	1.4	pCi/L			
7/18/2005 12:50	FINAL EFFLUENT	Overflow	Radium 228-Counting Error	0.8	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
Periphyton Chlorophyll *a* (mg/m^2)	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85	**ND**
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	**2.87**
Hester-Dendy Taxa Richness	6	6.5	9	11.5	13	**15**	17	21.5	26	29	32	**16**
Dipnet Taxa Richness	9	12	17	20	22	24.5	26	**28**	31	37	53	**28**
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	**0.71**
Total Ammonia	0.02	0.02	0.04	**0.05**	0.06	0.08	0.11	0.14	0.20	0.34	0.60	**0.051**
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 U**
Total Phosphorus	0.02	**0.03**	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51	**0.045 I**
Orthophosphate	**0.01**	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37	**0.004 U**
Turbidity (NTU)	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30	**ND**

TEST SITE

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	Measured
Periphyton Chlorophyll *a* (mg/m^2)	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85	**ND**
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	**1.24**
Hester-Dendy Taxa Richness	**6**	6.5	9	11.5	13	15	17	21.5	26	29	32	**6**
Dipnet Taxa Richness	**9**	12	17	20	22	24.5	26	28	31	37	53	**11**
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	**0.06 U**
Total Ammonia	0.02	**0.02**	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60	**0.028**
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	**0.006 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	**0.032 I**
Orthophosphate	**0.01**	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37	**0.004 U**
Turbidity (NTU)	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30	**ND**

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.

FDEP Biology Section - Acute Bioassay Bench Sheets

Facility: E.I Dupont de Nemours - Trailridge Mine
Address: State Road 230
City: Starke County: Florida
Contact/District: Reza Shayan / Northeast
NPDES Permit #: FL 0000051
LIMS Job #: TLH-2005-07-19-89 LIMS Sample #: 850145
Lims Data Entry: 7.29.05MF Data Entry Verification: 7.29.05 JD

Sample Collection: Date: 7-18-05 Time: 1250
Hold time Start: Date: 7-18-05 Time: 1250

Comments:

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
Aeration : yes (no) Initial DO: mg/L Final DO: mg/L Duration: minutes Rate: bubbles/min
Salinity adjusted (Test 1): yes (no) Initial Salinity: Final Salinity: Salts Hypersaline brine
Salinity adjusted (Test 2): yes (no) Initial Salinity: Final Salinity: Salts Hypersaline brine
Dechlorination: yes (no) mL of 0.025N Sodium thiosulfate per liter of sample. Final TRC

Temperature Range °C
Incubator # 3 Range 25.6 - 26.7
Room B246: 23.6 - 24.3
Waterbath: 25 N/A

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)

Investigators' Signatures
Sarah Pritchard
Dena Nicholson
James Smith
Marshall Faircloth
Nigel Wellendorf
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	—	—	MF
Lab Total Residual Cl2 (mg/L):	<0.03				<0.03	<0.03	HACH	SP	MF
Alkalinity (mg/L as $CaCO_3$):	95				84	30	HACH	SP / DN	MF
Hardness (mg/L as $CaCO_3$):	103				84	139	HACH	SP / DN	MF
Total Ammonia (mg/L as N):	<0.017				<0.017	<0.017	DENVER	MF	DN
Salinity (ppth)	<1				<1	<1	YSI Mettler	DN	SP

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FDEP Biology Section - - Bioassay Bench Sheet

Survival

LIMS Sample #: 850145 Test #: 1 Test Started: Date 7-19-05 Time: 1330

Organism: C. dubia Test Ended: Date 7-23-05 Time: 1245

Organism Batch: 25-05 Diluent/ Batch: DMW 121-05

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

Chamber Size 30 mL Batch: 03-05 02-05

Test Volume 20 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	A	5	5	5	5	5	5
	B	B	5	5	5	5	5	5
	C	C	5	5	5	5	5	5
	D	D	5	5	5	5	5	5
100%	A	A	5	5	5	5	5	5
	B	B	5	5	5	5	5	5
	C	C	5	5	5	5	5	5
	D	D	5	5	5	5	5	5
Organisms loaded by: DN		Checked by: [redacted]	DN	DN	JO	JO	MF	
Loading verified at 0 hours by: SP		(initials)						

Comments:

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

Test Results:

% mortality in 100% sample 0

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 #: 850145 Test #: 2 Test Started: Date 7-19-05 Time: 1345

Organism: P. promelas Test Ended: Date 7-23-05 Time: 1245

Organism Batch: 8-05 Diluent/ Batch: MHW / 5-05

Organism Age: 8 days Food: YCT *P. subcapitata* (Artemia) 351384.25 GR

Chamber Size 1000 mL Batch: ___ ___

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	B1	5	5	5	5	5	4 D
	B	B2	5	5	5	5	5	5
	C	B3	5	5	5	5	5	5
	D	B4	5	5	5	5	4 D	4
100%	A	B5	5	5	5	5	5	5
	B	B6	5	5	5	5	5	5
	C	B7	5	3 2D	3	3	3	3
	D	B8	5	5	4 D	4	4	4
Organisms loaded by: JD		Checked by: [redacted]		DN	JD	[redacted]	JD	MF
Loading verified at 0 hours by: [redacted]		(initials)						

Comments:

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

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).

v1.2 3/8/05

Bioassay Parameters

LIMS Sample # : 850145 **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.)	8.2		~~7.6~~ 8.1 (A)	~~7.7~~ 8.1 (A)		8.1
Temperature °C	24.3		24.7	25.2		24.4
Dissolved Oxygen mg/L	7.7		7.8	7.7		7.6
Conductivity ~~µmhos~~ mmhos	180		195	175		200
(initials) Measured by:	DN		DN	DN		MF
(initials) Recorded by:	DN		DN/SP	DN/SP		MF

Comments: (A) transcription error SP 48hr before & after renewal pH 8.1

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.)	7.5		~~7.8~~ 7.5 (B)	7.5		7.7
Temperature °C	24.5		24.4	24.5		24.6
Dissolved Oxygen mg/L	7.8		7.7	7.2		7.6
Conductivity ~~µmhos~~ mmhos	445		535	450		520
(initials) Measured by:	DN		DN	DN		MF
(initials) Recorded by:	DN		DN/SP	DN/SP		MF

Comments: (B) transcription error SP 48hr before renewal pH 7.5

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

Comments:

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

Comments:

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Bioassay Parameters

LIMS Sample # : 850145 **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.)	8.0	8.1	7.9	8.0	7.8	7.9
Temperature °C	25.4	25.8	24.9	24.0	24.7	25.1
Dissolved Oxygen mg/L	7.9	7.5	7.8	7.7	6.6	7.2
Conductivity ~~µmhos~~ mmhos	~~325~~ 270 (A)	359	360	330	345	350
(initials) Measured by:	JD	DN/BP	JD	BP	JD	MF
(initials) Recorded by:	JD	BP	JD	BP	JD	MF

Comments: (A) correct conductivity 325 µmhos taken from wrong vial BP

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.)	7.0	7.4	7.4	7.4	7.3	7.3
Temperature °C	25.1	26.3	24.8	24.4	25.5	25.1
Dissolved Oxygen mg/L	8.1	7.6	7.7	7.3	6.8	7.0
Conductivity ~~µmhos~~ mmhos	460	476	493	455	470	475
(initials) Measured by:	JD	DN/BP	JD	BP	JD	MF
(initials) Recorded by:	JD	BP	JD	BP	JD	MF

Comments:

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

Comments:

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

Comments:

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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):	TIME	RECEIVING BODY OF WATER:
		7-18-05	10.00	Lake Rowell

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Bradford	Alligator Cr Below CR230 Control	Control 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)
35	10	5		50			

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

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

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

LIST & MAP DOMINANT VEGETATION ON BACK

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

ARTIFICIALLY IMPOUNDED ☐ yes

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

20 m wide

m/s | 0.15 m/s | m/s

m deep | 0.5 m deep | m deep

HIGH WATER MARK: 0.75 + 0.5 = 1.25

(m above present water level) (present depth in m) (m above bed)

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)	35	5	dip net	SAND	71	5	dip net
LEAF PACKS OF MATS	3.5	5	dip net	MUD/MUCK/SILT	20		
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE				OTHER:			
UNDERCUT BANKS/ROOTS	2	5	dip net	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	0.75	35.9	4.43	7.23	248	88.1%		0.7
BOTTOM	1.5							

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

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

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

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

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

WEATHER CONDITIONS/NOTES:

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

SAMPLING TEAM: Kallenegger, Percival, Jordan

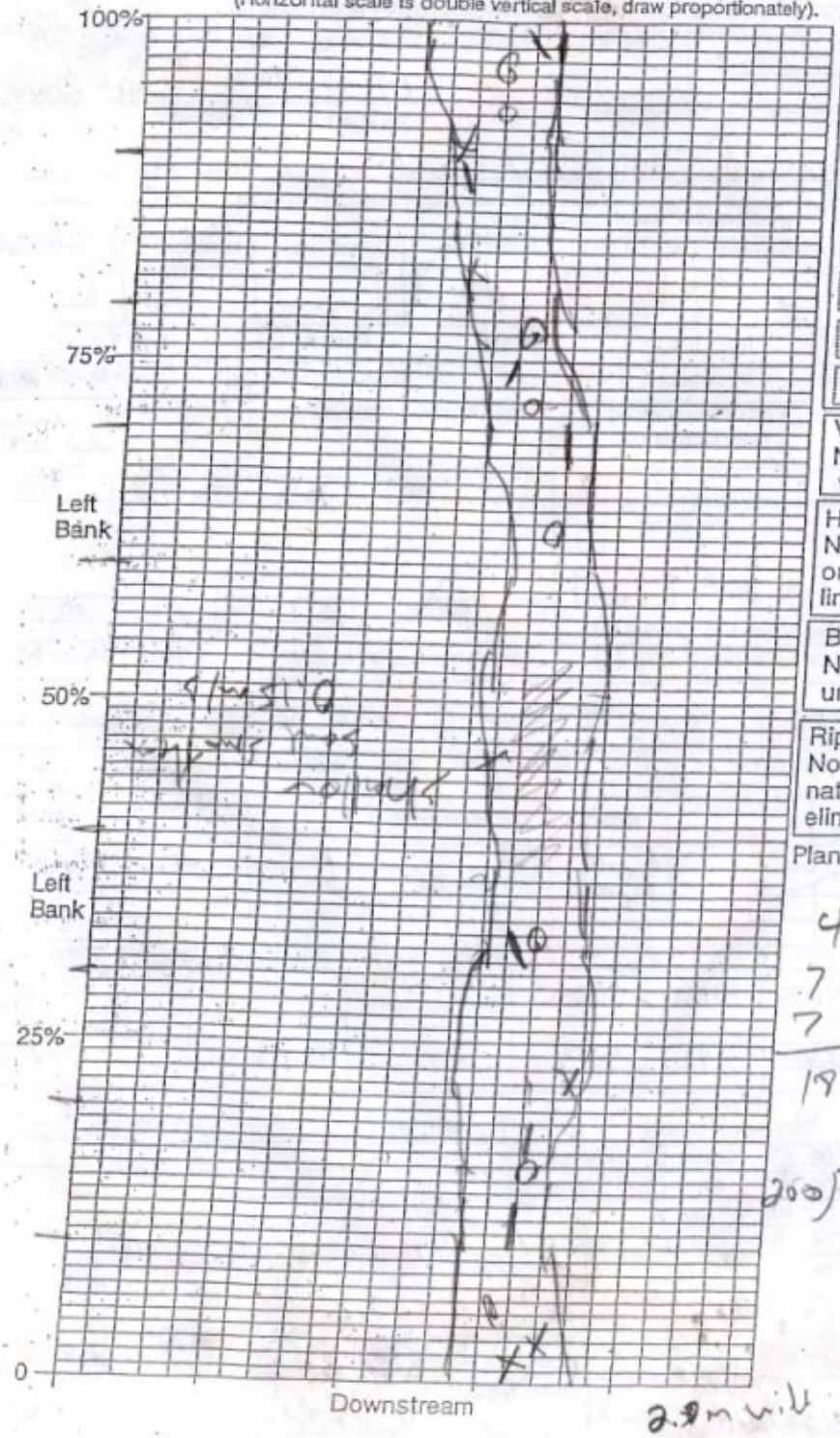
SIGNATURE: R C Kallenegger

DATE: 7-18-05

Alligator & Bates
CR 230

Site Map / Habitat Sketch

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



Field ID:

Substrates: Code key, draw proportionate habitat abunda

- [ ] Snags
- [ ] Roots/undercut banks
- [ ] Leaf Packs (or mats)
- [ ] Macrophytes
- [ ] _____
- [ ] _____
- [ ] _____

Velocity:
Note where velocity measures were taken.

Habitat Smothering:
Note areas (on map) where san or silt is smothering substrates, limiting habitability.

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

Riparian Buffer Width:
Note areas (on map) where natural vegetaton is altered or eliminated.

Plants observed/other notes:

4 roots/undercut 2 %
7 Snags 3.5 %
7 leaf 2.5 %
18

.09
200 / 180

2.9 m wide

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): 7-18-05	RECEIVING BODY OF WATER: Lake Rowell
REMARKS:	COUNTY: Bradford	LOCATION: Alligator Below CR230	FIELD ID/NAME: Control

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity 11	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 8	Greater than 30% productive habitat present at site 20 19 18 17 16	16% to 30% productive habitat, by aerial extent 15 14 13 12 11	6% to 15% productive habitat 10 9 8 7 6	Less than 5% productive habitat 5 4 3 2 1
Water Velocity 12	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec 5 4 3 2 1
Habitat Smothering 8 Primary Score 39	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 10	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 7 Left Bank 7 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. Obviou bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank 10 Left Bank 10 20	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 7 Left Bank 8 15 Secondary Score 59	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

99 TOTAL SCORE

ANALYSIS DATE: 7-18-05	ANALYST: Kallemeyn	SIGNATURE:

DEF-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:
		7-18-05	12:30	Lake Powell

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Bradford	All: 3-10 Ck 60m below pond	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)
	20					50	30 wet land

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: >12

LIST & MAP DOMINANT VEGETATION ON BACK

TYPICAL WIDTH (M) DEPTH (M)/VELOCITY (M/SEC) TRANSECT: 2 m wide

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

ARTIFICIALLY IMPOUNDED ☐ yes more sinuous

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

HIGH WATER MARK: 1.0 (m above present water level) + 1.2 (present depth in m) = 2.2 (m above bed)

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: Bacteria growth

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	30	7	dip net	SAND	10	6	dip net
LEAF PACKS OF MATS				MUD/MUCK/SILT			
AQUATIC VEGETATION	25	7	dip net	OTHER: bacteria	85		
ROCK OR SHELL RUBBLE				OTHER: grass			
UNDERCUT BANKS/ROOTS				DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION			

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP								
MID-DEPTH								
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: webstoria found in long strand (Dr. Hall ID)

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

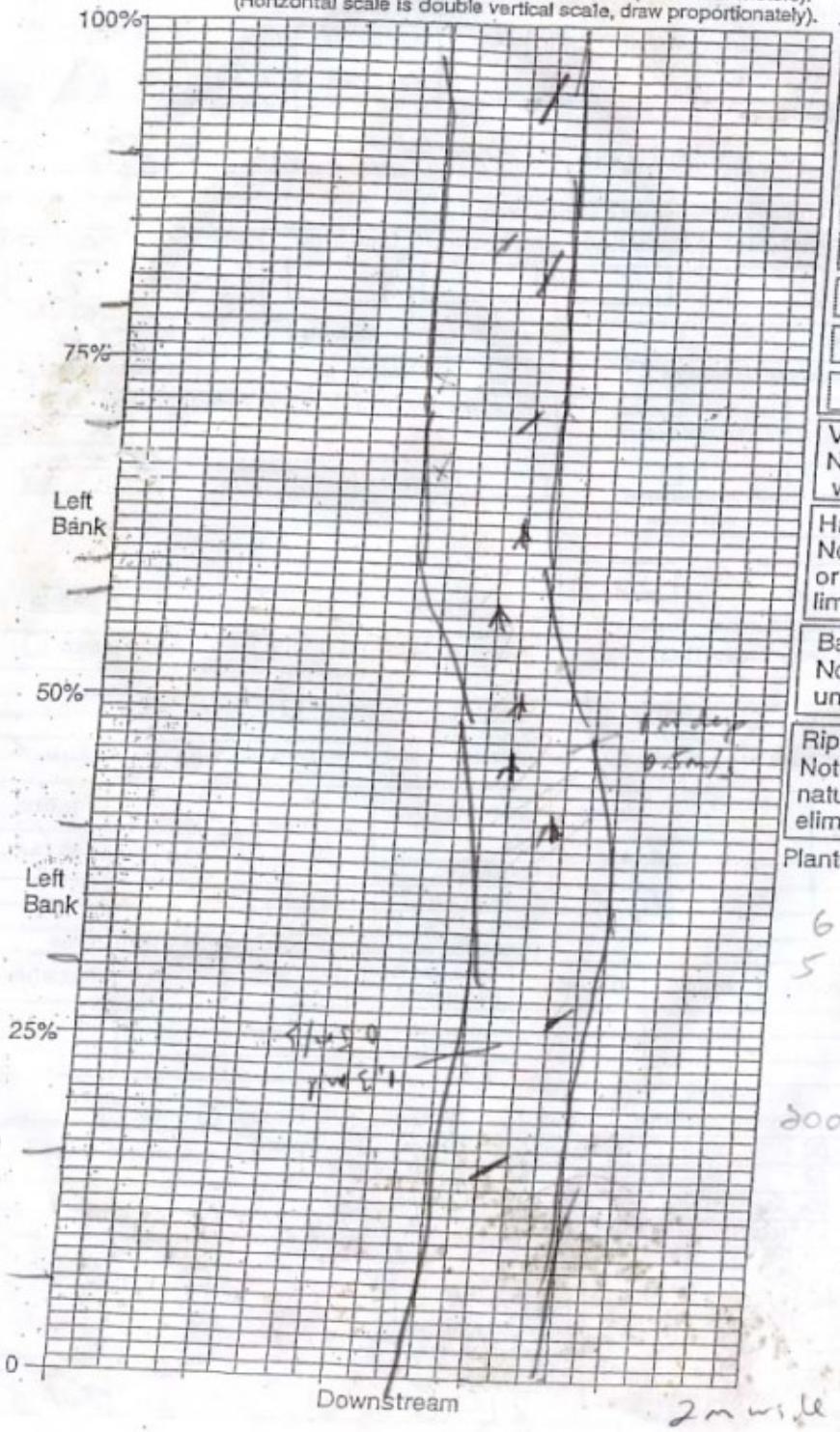
SAMPLING TEAM: Kallemeyn, Parrish, Jordan

SIGNATURE: [signature]

DATE: 7-18-05

Site Map / Habitat Sketch

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



Field ID:

Substrates: Code key, draw proportionate habitat abundar

- ☐ Snags
- ☐ Roots/undercut banks
- ☐ Leaf Packs (or mats)
- ☐ Macrophytes
- ☐ _____
- ☐ _____
- ☐ _____

Velocity:
Note where velocity measures were taken.

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

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

Riparian Buffer Width:
Note areas (on map) where natural vegetaton is altered or eliminated.

Plants observed/other notes:

6 snags 3.0
5 logs 2.5

.055
200)11.00
1000
100

2m wide

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): 7/18/05	RECEIVING BODY OF WATER: Lake Rowell
REMARKS:	COUNTY: Bradford	LOCATION: Trail Ridge Below Pond	FIELD ID/NAME: Test Site

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity 6	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 unst or smothered 5 4 3 2 1
Substrate Availability 4	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 3 Primary Score 31	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of the habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools abs 5 4 3 2 1
Secondary Habitat Components Artificial Channelization 3	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 (80%-80% raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank 9 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 3 Left Bank 3 Secondary Score 48÷47	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

77 TOTAL SCORE

ANALYSIS DATE: 7/19-05	ANALYST: Kellemeyn	SIGNATURE:

Appendix 8

Taxa list and number counted for periphyton collected from natural substrates upstream and downstream of E. I. Dupont – Trailridge Mine discharge, July 18, 2005.

	Control Site	Test Site
Bacillariophyta		
Achnanthes exigua	2	-
Brachysira sp.	-	2
Brachysira vitrea	-	9
Diadesmis confervacea	1	-
Encyonema sp.	1	-
Encyonopsis microcephala	-	4
Eunotia sp.	135	-
Eunotia femoriformis	9	-
Eunotia flexuosa	4	-
Eunotia incisa	2	-
Eunotia pectinalis	4	-
Eunotia zygodon	1	-
Frustulia sp.	6	1
Frustulia rhomboides	12	-
Frustulia saxonica	8	1
Hippodonta sp.	2	-
Hippodonta hungarica	2	-
Luticola sp.	1	-
Navicula sp.	6	-
Navicula exigua	1	-
Navicula kotschyi	2	-
Naviculaceae	7	-
Nitzschia sp.	17	1
Nitzschia palea	41	3
Nitzschia prolongata	2	-
Pinnularia sp.	11	-
Stauroneis sp.	2	-
Surirella sp.	6	-
Surirella minuta	1	-
Chlorophycota		
Chlorococcum sp.	3	-
Cosmarium sp.	1	-
Cyanophycota		
Jaaginema sp.	-	8
Planktolyngbya sp.	6	12
Planktothrix sp.	1	14
Pseudanabaena sp.	10	12
Synechocystis sp.	3	-

…

Appendix 9a

Benthic macroinvertebrates collapsed taxa list and density (average number of individuals/m^2 rounded to the nearest individual, n = 3 samples) from Hester-Dendy artificial substrates incubated for 28 days upstream and downstream of the E. I. Dupont – Trailridge Mine and collected July 18, 2005. See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site	Test Site
Annelida		
Oligochaeta		
Naididae	3	-
Arthropoda		
Arachnida		
Acariformes		
Hygrobates sp.	-	3
Crustacea		
Amphipoda		
Crangonyx sp.	3	-
Insecta		
Coleoptera		
Stenelmis sp.	77	-
Diptera		
Ablabesmyia mallochi	3	-
Ceratopogonidae	3	5
Chironomus sp.	-	16
Cricotopus albiforceps	-	16
Cryptochironomus sp.	20	-
Dicrotendipes modestus	3	-
Hemerodromia sp.	5	-
Kiefferulus sp.	3	-
Larsia sp.	3	-
Polypedilum illinoense grp.	11	164
Polypedilum scalaenum grp.	25	-
Polypedilum tritum	6	8
Thienemannimyia grp.	103	-
Tribelos jucundum	20	-
Odonata		
Argia tibialis	21	-

Appendix 9b

Benthic macroinvertebrates taxa list and counts (number of individuals counted) collected from Hester-Dendy artificial substrates (n= 3 samples) incubated upstream and downstream of the E. I. Dupont – Trailridge Mine and collected July 18, 2005

	Control Site	Test Site
Annelida		
Oligochaeta		
Naididae	1	-
Arthropoda		
Arachnida		
Acariformes		
Hygrobates sp.	-	1
Crustacea		
Amphipoda		
Crangonyx sp.	1	-
Insecta		
Coleoptera		
Stenelmis sp.	29	-
Diptera		
Ablabesmyia mallochi	1	-
Ceratopogonidae	1	2
Chironomus sp.	-	6
Cricotopus albiforceps	-	6
Cryptochironomus sp.	7	-
Dicrotendipes modestus	1	-
Hemerodromia sp.	2	-
Kiefferulus sp.	1	-
Larsia sp.	1	-
Polypedilum illinoense grp.	4	62
Polypedilum scalaenum grp.	10	-
Polypedilum tritum	2	3
Thienemannimyia grp.	40	-
Tribelos jucundum	7	-
Odonata		
Argia tibialis	8	-

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 – Trailridge Mine and collected July 18, 2005. See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site	Test Site
Annelida		
Oligochaeta		
Eclipidrilus sp.	3	1
Limnodrilus hoffmeisteri	11	-
Pristina aequiseta	1	-
Pristinella longidentata	1	-
Pristinella osborni	1	-
Arthropoda		
Crustacea		
Amphipoda		
Crangonyx sp.	9	-
Insecta		
Coleoptera		
Carabidae	1	-
Dubiraphia vittata	1	-
Stenelmis sp.	16	-
Diptera		
Ceratopogonidae	1	2
Chlorotabanus sp.	1	-
Cricotopus albiforceps	-	88
Cryptochironomus sp.	-	1
Hemerodromia sp.	1	-
Labrundinia pilosella	1	-
Nilothauma sp.	-	3
Orthocladius annectens	1	-
Polypedilum halterale grp.	1	-
Polypedilum illinoense grp.	2	3
Rheocricotopus robacki	-	1
Simulium sp.	2	-
Stenochironomus sp.	1	-
Thienemannimyia grp.	8	-
Ephemeroptera		
Maccaffertium sp.	-	1
Pseudocloeon sp.	1	-
Megaloptera		
Corydalus cornutus	-	1
Odonata		
Argia sedula	8	-
Hetaerina sp.	2	-
Libellulidae	1	-
Trichoptera		
Cheumatopsyche sp.	11	-
Chimarra sp.	-	2
Hydropsyche sp.	11	-
Oecetis sp.	1	1
Oxyethira sp.	1	-
Mollusca		
Bivalvia		
Undetermined Bivalvia	1	-

Appendix 10b

Qualitative benthic macroinvertebrate taxa list and number of individuals counted from 20-discrete-dipnet sweeps upstream and downstream of E. I. Dupont – Trailridge Mine and collected July 18, 2005.

	Control Site	Test Site
Annelida		
Oligochaeta		
Eclipidrilus sp.	3	1
Limnodrilus hoffmeisteri	1	-
Pristina aequiseta	1	-
Pristinella longidentata	1	-
Pristinella osborni	1	-
Tubificidae	10	-
Arthropoda		
Crustacea		
Amphipoda		
Crangonyx sp.	9	-
Insecta		
Coleoptera		
Carabidae	1	-
Dubiraphia vittata	1	-
Elmidae	1	-
Stenelmis sp.	15	-
Diptera		
Ceratopogonidae	1	2
Chironomidae	2	4
Chlorotabanus sp.	1	-
Cricotopus albiforceps	-	84
Cryptochironomus sp.	-	1
Hemerodromia sp.	1	-
Labrundinia pilosella	1	-
Nilothauma sp.	-	3
Orthocladius annectens	1	-
Polypedilum halterale grp.	1	-
Polypedilum illinoense grp.	2	3
Rheocricotopus robacki	-	1
Simulium sp.	2	-
Stenochironomus sp.	1	-
Thienemannimyia grp.	6	-
Ephemeroptera		
Maccaffertium sp.	-	1
Pseudocloeon sp.	1	-
Megaloptera		
Corydalus cornutus	-	1
Odonata		
Argia sedula	2	-
Coenagrionidae	6	-
Hetaerina sp.	2	-
Libellulidae	1	-
Trichoptera		
Cheumatopsyche sp.	11	-
Chimarra sp.	-	2
Hydropsyche sp.	11	-
Oecetis sp.	1	1
Oxyethira sp.	1	-
Mollusca		
Bivalvia		
Undetermined Bivalvia	1	-

The Bioassay of the E. I. DuPont Trailridge Mine effluent sampled on July 18, 2005, NPDES #FL0000051.

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 Trailridge Mine effluent sampled on July 18, 2005, NPDES #FL0000051.

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 Trailridge Mine effluent sampled on July 18, 2005, NPDES #FL0000051.

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

#