

Biological Assessment of

IFF Chemical Holdings, Inc.

(formerly known as Bush, Boake and Allen)

Duval County

NPDES #FL0001040

Sampled February 3, 2003

August 2003

Biology Section

Bureau of Laboratories

Division of Resource Assessment and Management

Quality Manual No. 870346G

NELAC Certification No. E31780

Florida Department of Environmental Protection
Fifth Year Inspection Summary

Discharger:	IFF Chemical Holdings, Inc.
County:	Duval
NPDES Number:	FL0001040
Permit Expiration:	11/20/03

Toxics Sampling Inspection **(XSI)**

Date Sampled: 03 February 2003

Results: No organic constituents were detected in the effluent. Chromium, iron and zinc were detected in the effluent at levels that complied with Class III Water Quality Criteria and facility permit limits. Conductivity of the effluent was elevated (951 umhos/cm). Effluent pH (8.4 S. U.) and temperature (30.1 °C) were elevated, but complied with facility permit limits. Effluent dissolved oxygen concentration was <5.0 mg/L (4.1 mg/L).

Compliance Biomonitoring Inspection **(CBI)**

Date Sampled: 03 February 2003

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

Water Quality Inspection **(WQI)**

Date Sampled: 03 February 2003

Results: Fecal and total coliforms did not exceed Class III Water Quality Criteria in water samples from the effluent or the Test Site. Total coliforms exceeded the Class III Water Quality Criteria (2400/100 ml, single sample) in the water sample from the Control Site (8500/100 ml, see 62-302.530 (7) F.A.C.) although the result was qualified as "results based on colony counts outside the acceptable range". The pH at the Test Site (8.3 S.U.) was 1.1 S.U. above the pH at the Control Site (7.2 S.U.), an exceedance of Class III Criteria (62-302.530 (52)(c) F.A.C.). Water temperature at the Test Site was 19.2 °C higher than at the Control Site, an exceedance of 62-302.530 Thermal Surface Water Criteria (F.A.C.) for a heated water discharge. Dissolved oxygen levels at the Test Site (4.4 mg/L) did not meet Class III Water Quality Criteria 62-302.530 (31). Conductivity was elevated at the Test Site (812 μmhos/cm) and in the effluent (951 μmhos/cm) but did not exceed Class III Water Quality Criteria. Exceedances of Class III Water Quality Criteria for pH, dissolved oxygen and temperature at the Test Site are attributed to the facility, because effluent was the major component of flow at the Test Site. Nutrients were relatively low in the effluent and at both Test and Control Sites, although there were additional inputs of nitrate + nitrite at the Test Site that were not related to the facility's effluent. Algal growth potential data did not suggest enrichment of the receiving water by the effluent.

Impact Bioassessment Inspection **(IBI)**

Date Sampled: 03 February 2003

Results: Habitat assessments yielded marginal rankings for both Test and Control Sites. The biota at both Control and Test Sites were degraded and both sites ranked "poor" according to the Stream Condition Index. However, there were strong shifts in the distribution and abundance of periphyton and benthic macroinvertebrates between Control and Test Sites. Green algae were replaced with blue-green algae and there were ~25% fewer taxa on periphytometers from the Test Site as compared with the Control Site. In both quantitative and qualitative macroinvertebrate samples, there was a strong community shift towards more degraded conditions at the Test Site compared with the Control Site. Data suggesting this shift included the dominance of the Test Site dipnet sample by oligochaeta (91.9%) and the absence of dipterans. Hester-Dendy samplers from the Test Site were colonized mostly by predaceous mites. Results suggest that the heated, high pH and low dissolved oxygen effluent has degraded the resident biological assemblages present in the receiving water.

Biological assessments are prepared by FDEP staff to provide information for review of NPDES permit renewal applications. Biological assessments, in conjunction with other information concerning the subject facility and its receiving-water body, are used to determine appropriate permit conditions.

Introduction

The IFF Chemical Holdings, Inc. (formerly Bush, Boake and Allen) Industrial Plant is located in Duval County, Florida (Appendix 1). This facility manufactures organic chemicals. Activities at this plant include treating wastewater from non-contact cooling water, boiler blowdown, boiler deionization reject water and stormwater. Treatment is by retention basins for stormwater and aeration of cooling water (see Facility Summary in Appendix 2). The discharge is continuous, but varies depending on the quantity of stormwater being discharged with the cooling water. The effluent is then discharged into a ditch that flows into Little Six Mile Creek. The design flow of the wastewater system is 4 million gallons per day (MGD). The mean flow is 1.0337 MGD and the actual flow during this survey was 0.692 MGD (J. Lucas, Northeast District, personal communication).

Surface Water Quality Criteria and facility permit limits are listed in Table 1. According to the facility's monthly discharge monitoring reports, the plant has had no exceedances or plant upsets during the past year, but failed a 48-hour static acute bioassay in 1998 (Appendix 2).

Methods

The purpose of this investigation was to determine the discharger's effects on the biota of the receiving waters. Chemical and biological comparisons were made between a control site (located in a ditch upstream, but not feeding directly into the plant) and a test site (located in a ditch approximately 10-100 meters downstream of the discharge). The facility outfall formed the headwaters of the Test Site ditch. The Control Site was located in a ditch above the plant that was joined by the Test Site ditch further down the reach (see map in Appendix 1). Detailed methods are given in Appendix 3.

All field and laboratory biological methods followed Biology Section Standard Operating Procedures (SOPs, see http://www.floridadep.org/labs/qa/2002sops.htm for details) and met DEP quality assurance/quality control standards (see http://www.floridadep.org/labs/qa/index.htm).

The following were involved in this investigation: Pat O'Connor, James Wright and James Lucas (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, Chuck Ziegmont and Michael Tanski).

Results and Discussion

- Specific chemical results are reported in Table 1 and a list of chemical analytes can be reviewed in Appendix 4. No organic constituents were detected in the effluent. Chromium, iron and zinc were detected in the effluent at levels that complied with Class III Water Quality Criteria (Chapter 62-302 F.A.C.) and facility permit limits. Chromium and zinc were detected in the effluent at levels above the minimum detection limit and below the practical quantitation limit. Effluent conductivity (µmhos/cm), pH (Standard Units) and temperature (degrees Celsius) did not exceed facility permit limits. However, effluent conductivity (951 µmhos/cm), pH (8.4 S.U.) and temperature (30.1°C) were elevated. Dissolved oxygen in the effluent was <5.0 mg/L (4.1 mg/L).
- Habitat assessment scores were 56 at the Control Site and 77 at the Test Site on 2/3/2003, placing both sites into the marginal category (Table 1, data sheets in Appendix 8). Both sites were highly channelized and had <6 m of riparian buffer zone and areas of bank instability. The Control Site lost additional points for low water velocity, substrate availability and substrate diversity.
- Dissolved oxygen (DO as mg/L), water temperature (degrees Celsius), pH (Standard Units), and conductivity (µmhos/cm) at the Control Site complied with Class III Water Quality Criteria (Table 1, 62-302.530 F.A.C.). Water temperature, pH and conductivity were elevated at the Test Site. The pH at the Test Site was more than 1 S. U. higher than pH at the Control Site, an exceedance of 62-302.530 (52)(c) F.A.C. (Table 1). Temperature at the Test Site was more than 5°C higher than that of the Control Site (31.5°C vs. 12.3°C, Table 1), an exceedance of 62-302.520 F.A.C., Thermal Surface Water Criteria, for a heated water discharge. Dissolved oxygen at the Test Site was 4.4 mg/L, which failed to meet the 5.0 mg/L minimum dissolved oxygen Class III Water Quality Criteria (62-302.530 (31) F.A.C., Table 1). These exceedances were attributable to the facility's discharge, which formed the majority of stream flow at the Test Site. Conductivity was elevated at the Test Site (812 µmhos/cm) and in the effluent (951 µmhos/cm) but did not exceed Class III Water Quality Criteria.
- The effluent sample was not toxic to the fish, *Cyprinella leedsi,* or to the water flea, *Ceriodaphnia dubia,* during 96-hour static renewal screening bioassays (See Table 1 for percent mortality and

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

IFF Chemical Holdings, Inc.	Class III Criteria	Effluent Limits **	Effluent Samples	Control Site	Test Site
Organic Constituents (ug/L)					
None detected	-	-	-	-	-
Metals (ug/L unless otherwise noted, Class III Criteria are less than or equal to the value given)					
Aluminum	-	-	24 U	-	-
Arsenic	50	-	3 U	-	-
Cadmium	b	2.915 b	0.025 U	-	-
Calcium (mg/L)	-	-	82.6	-	-
Chromium	b	230.6 b	2.4 I	-	-
Copper	b	26.1 b	2 U	-	-
Iron	1000	1000	64	-	-
Lead	b	14.7 b	0.1 U	-	-
Magnesium (mg/L)	-	-	30.7	-	-
Nickel	b	144 b	2 U	-	-
Selenium	5.0	-	1 U	-	-
Silver	0.07	-	0.02 U	-	-
Zinc	b	332 b	5 I	-	-
Nutrients (mg/L)					
Ortho-phosphate	-	-	0.054	0.027	0.067
Total Phosphorus	-	Report	0.063	0.082	0.078
Ammonia	-	-	0.095	0.018 I	0.066
Un-ionized Ammonia	≤ 0.02 s	-	0.0176	0.0001	0.0118
Nitrate and Nitrite	-	-	0.009 I	0.015	0.029
Total Kjeldahl Nitrogen	-	-	0.2	0.5	0.15 I
Organic Nitrogen	-	-	0.105	0.482	0.084
Total Nitrogen	-	-	0.21	0.52	0.18
Organic Carbon		Report	1.50 I	-	-
General Physical and Chemical Parameters					
Habitat Assessment	-	-	-	56	77
Dissolved Oxygen (mg/L)	≥ 5.0 s	-	**4.1**	7.6	**4.4**
pH (SU)	6.2-8.2 s	6.0-8.5 s	8.4	7.2	**8.3**
Conductivity (µmhos/cm)	1275 s	-	951	469	812
Temperature (°C)	17.3	38.0 s	30.1	12.3	**31.5**
Total Suspended Solids (mg/L)	-	Report	1	2	2
Residual Chlorine (mg/L)	≤ 0.01	≤ 0.01	≤ 0.03	-	-
COD (mg/L)	-	Report	9.6 U	-	-
BOD, 5 day (mg/L)	-	Report	2 K	2 K	2 K
Chlorophyll *a* (ug/L)	-	-	0.85 U	0.85 U	0.85 U
Phaeophytin (ug/L)	-	-	0.85 U	0.85 U	0.85 U
Oils and Greases (mg/L)	5	5	0.7 I	-	-
Flow (MGD)	-	Report	0.692	-	-
Hardness (mg $CaCO_3$)	-	Report	332.7	-	-
Microbiology (number of counts/100ml)					
Fecal Coliforms	800	-	10 K	30 B	10 B
Total Coliforms	2400	-	50 B	**8500** B	250
Toxicity (96-hour static, screening bioassay, percent mortality in 100% effluent)					
Bioassay - Water flea	*	LC50-100%	5%	-	-
Bioassay - Fish	*	LC50-100%	0%	-	-

Value is an exceedance of Class III Water Quality Criteria.

* Class III Criteria: no acute or chronic toxicity (for definitions see 62.302.200 F.A.C.)

** Effluent limits from permit dated November 21, 1998.

b - Value is calculated based on hardness.

B - Results based on colony counts outside the acceptable range.

K - Actual value is known to be less than the value given.

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

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

s - Single sample

LC50-100% - The LC50 shall not be less than 100%.

Table 2. Measured and predicted algal growth potential (AGP) for total soluble inorganic nitrogen (TSIN) limitation

Location	AGP (measured)	Predicted AGP (TSIN) ± 20%	Inorganic N:P ratio
Control (mg dry wt/L)	2.23 J	1.3 ± 0.3	1.2
Test (mg dry wt/L)	4.69 J	3.6 ± 0.7	1.4
Effluent (mg dry wt/L)	2.41 J	4.0 ± 0.8	1.9

J - Estimated value

Appendix 7 for bioassay bench sheets).

- Fecal and total coliforms did not exceed Class III Water Quality Criteria in water samples of the effluent and Test Site. Total coliform levels in the water sample from the Control Site exceeded Class III Water Quality Criteria (62-302.530 (7) F.A.C.), although the value was qualified as "results based on colony counts outside the acceptable range" (See Table 1 for results and Appendix 7 for laboratory worksheets).
- The effluent total nitrogen concentration was 0.21 mg/L, while total phosphorus concentration was 0.063 mg/L (Table 1). Levels of orthophosphate, total phosphorus and nitrate + nitrite increased in the receiving water relative to the effluent, indicating additional inputs of nutrients at the Test Site. Levels of ammonia and total Kjeldahl nitrogen (TKN) declined, indicating some dilution of the effluent at the Test Site. Comparing nutrient levels measured in typical Florida streams, nutrient levels at the Test Site were in the 20% percentile or less for TKN and nitrate + nitrite but were in the 50% percentile for ammonia and orthophosphate (Appendix 6). Total phosphorus levels were in the 40% percentile. Nutrient levels at the Control Site were in the 20% percentile or less of typical Florida streams, except for total phosphorus, which was in the 40% percentile (Appendix 6).
- Algal growth potential (AGP) is a measure of nutrients available for algal growth (Miller *et al.* 1978, see Appendix 5 for discussion). Raschke and Shultz (1987) found that AGP above 5.0 mg dry weight/L represent a "problem" threshold for fresh receiving waters, implying nutrient enrichment. There were two temperature exceedances during the incubation of the algal cultures; so all AGP values from this inspection are estimates. The AGP value at the Control Site was 2.23 mg dry weight/L, below the suggested "problem" threshold (Table 2). The AGP values of water samples from the Test Site (4.69 mg dry weight/L) and the effluent (2.41 mg dry weight/L) were also below this threshold. There was no evidence of growth inhibition in AGP data from the Control and Test Sites (Table 2). AGP was slightly less than predicted in the effluent water sample, but because of the temperature exceedance, these data may not indicate the presence of growth inhibition.
- Chlorophyll *a* was not detected in water samples from the effluent, Test Site or Control Site (Table 1).
- There were differences between Test and Control Sites in algal community composition (Table 3, Appendix 9). There were 25% fewer taxa at the Test Site compared with the Control Site, and Shannon-Weaver diversity was ~10% lower. Diatoms were equally abundant in samples from both Control and Test Sites (~70% of total), but there were differences in the distribution of green and blue-green algae. Green algae were common on Control Site periphytometers (20.5% of the total) while blue-green algae were more abundant at the Test Site (29.3% of the total, Table 3). Periphyton chlorophyll *a* concentration was 29 mg/m^2 at the Test Site but no chlorophyll *a* was detected on the periphytometer from the Control Site.
- Hester-Dendy multi-plate samplers had <100 individuals after 28 days of incubation at both the Test and Control Sites, making estimates of Shannon-Weaver diversity unreliable (Table 4, Appendix 10). However, the diversity score was ~10% lower at the Test Site compared with the Control Site. Almost half the Test Site sample was composed of one genus of mites, and mites comprised 56.8% of the total sample. In contrast, the Control Site assemblage was comprised of dipterans (44.1%) and oligochaeta (36.8%), with smaller contributions from other groups. Predators were the most abundant functional feeding group at the Test Site (55.4%) while surface and burrowing deposit feeders (56.6%) were the most abundant group at the Control Site. The

Table 3. Periphyton composition at control and test sites.

IFF Chemical Holdings, Inc.	Control Site	Test Site
Number of Taxa	40	30
Shannon-Weaver Diversity	4.09	3.71
Chlorophyll *a* (mg/m^2)	0.3 U	29
Phaeophytin (mg/m^2)	0.3 U	0
Algal Density ($number/cm^2$)	309,287	884,975
Percent Dominant Taxon	26.7	21.1
Dominant Taxon (name)	Fragilariaceae	*Navicula rostellata*
Number of Algal Units Identified	303	304
Percentage Composition:		
Blue-green algae	7.9	29.3
Green algae	20.5	1.3
Diatoms	71.0	69.4
Other	0.7	0

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

lack of overlap in the assemblages suggests major community shifts between Control and Test Sites.

- Qualitative measures of benthic macroinvertebrate assemblages from dipnet samples are summarized in Tables 5 and 6 and in Appendix 11 and indicated degraded invertebrate assemblages at both sites. The Control Site SCI score of 19 and the Test Site SCI score of 15 placed them both in the "Poor" category. More than 50% of both samples were comprised of oligochaetes and both had 14 taxa (seven of which were oligochaetes), three Florida Index points and one EPT taxa. However, dipterans were absent from the Test Site, which had 91.9% oligochaetes. The Control Site had 9.3% ephemeropterans and 30% dipterans (three taxa). Oligochaetes are small worms, tolerant of poor, stagnant or anoxic conditions; their high abundance is usually an indicator of very low environmental quality. Thus even though macroinvertebrate assemblages at both sites were degraded, the Control Site had a higher proportion of non-oligochaetes in the 20-dipnet sample.

Summary

No organic constituents were detected in the facility's effluent. Chromium, iron and zinc were detected in the effluent at levels that complied with Class III Water Quality Criteria and facility permit limits. The effluent sample was not toxic in 96-hour static renewal screening bioassays. Total coliform levels in a water sample from the Control Site exceeded Class III Water Quality Criteria (62-302.530 (7) F.A.C.).

Effluent from the facility was responsible for exceedances of Class III Water Quality Criteria for water temperature, pH and dissolved oxygen (62-302.520, 62-302.530 (52)(c) and 62-302.530 (31) F.A.C., respectively) at the Test Site. Biological assemblages were degraded at both the Control and Test Sites. However, major shifts in both algal and macroinvertebrate assemblages at the Test Site relative to the Control Site suggest the effluent has also further degraded resident biological communities.

Literature Cited

American Public Health Association (APHA). 1992. Standard methods for the examination of water and wastewater. 18th edition.

Barbour, M. T., J. Gerritsen, G. E. Griffith, R. Frydenborg, E. McCarron, J. S. White and M. L. Bastian. 1996a. A framework for biological criteria for Florida streams using benthic macroinvertebrates. J. N. Am. Benthol. Soc. 15(2): 185-211.

Barbour, M. T., J. Gerritsen, and J. S. White. 1996b. Development of the Stream Condition Index for Florida. Prepared for the Florida Department of Environmental Protection. 105 p.

Barbour, M. T. and J. B. Stribling. 1994. A technique for assessing stream habitat structure. In: Proceedings of Riparian Ecosystems in the Humid United States: Functions and Values. U. S. Dept. Agriculture. 15-18 March 1993, Atlanta, Ga. 22 pp.

Beck, W. M. Jr. 1954. Studies in stream pollution biology 1. A simplified ecological classification of organisms. Quart. J. Fla. Acad. Sci. 17(4): 211-227.

Table 4. Macroinvertebrate Hester-Dendy Samples - Quantitative

IFF Chemical Holdings, Inc.	Control Site	Test Site
Summary Statistics		
Shannon-Weaver Diversity	3.03	2.76
Number of Taxa	17	15
Florida Index	5	8
Number of EPT Taxa	1	1
Percent Dominant Taxon	30.9	47.3
Dominant Taxon (name)	*Cricotopus bicinctus*	*Hygrobates*
Dominant Taxon (group)	Diptera	Acariformes
Total Number of Individuals	68	74
Community Composition: Percent of total		
Acariformes	0.0	56.8
Amphipoda	2.9	0.0
Diptera	44.1	24.3
Ephemeroptera	5.9	0.0
Gastropoda	5.9	13.5
Odonata	1.5	1.4
Oligochaeta	36.8	2.7
Trichoptera	0.0	1.4
Other	2.9	0.0
Functional Feeding Groups: Percent of total		
Burrowing Deposit Feeders	30.9	2.7
Predators	11.0	55.4
Surface Deposit Feeders	25.7	18.2
Suspension Feeders	2.2	2.7
Scrapers	6.9	13.5
Shredders	19.9	7.4
Unknown	3.4	0.0

EA Engineering, Science, and Technology and Tetra Tech, Inc. 1994. Bioassessment for the nonpoint source program (draft). Prepared for the Florida Department of Environmental Protection. Unpaginated.

FDEP. 1994. Lake bioassessments for the determination of nonpoint source impairment in Florida. Florida Department of Environmental Protection, Biology Section, Tallahassee, Fla. 73 p.

Magurran, A. E. 1988. Ecological diversity and its measurement. Princeton University Press, Princeton, New Jersey.

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

Plafkin, J. L., M. T. Barbour, K. D. Porter, S. K. Gross and R. M. Hughes. 1989. Rapid bioassessment protocols for use in streams and rivers: Benthic macroinvertebrates and fish. U. S. EPA, Office of Water Regulations and Standards, Washington D.C., EPA 440-4-89-001

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

Ross, L. T. 1990. Methods for aquatic biology. Florida Department of Environmental Regulation Technical Series 10(1): 1-47.

Sokal, R. R. and F. J. Rohlf. 1995. Biometry, Third edition. W. H. Freeman and Company, New York.

Stevenson, R. J. and L. L. Bahls. 1999. Periphyton protocols. Pp. 6.1-6.22 in: Rapid bioassessment protocols for use in wadeable streams and rivers. 2nd edition. By: M. T. Barbour, J. Gerritsen, B. D. Snyder and J. B. Stribling. EPA 841-B-99-002. U. S. Environmental Protection Agency, Office of Water, Washington, D. C.

Wallace, J. B., J. W. Grubaugh and M. R. Whiles. 1996. Biotic indices and stream ecosystem processes: results from an experimental study. Ecol. Appl. 6(1): 140-151.

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

USEPA. 2002. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms. 4th Edition. EPA-821-R-02-013.

Table 5. Macroinvertebrate Dipnet Samples - Qualitative

IFF Chemical Holdings, Inc.	Control Site	Test Site
Stream Condition Index (value)	19	15
Stream Condition Index (word)	Poor	Poor
Stream Condition Index Metrics		
Florida Index	3	3
Number of EPT Taxa	1	1
Number of Taxa	14	14
Number of Chironomid Taxa	2	0
Percent Dominant Taxon	28.0	41.4
Percent Dipterans	30.0	0
Percent Suspension Feeders and Filterers	2.0	0.9
Total Number of Individuals	150	111
Community Composition: Percent of total		
Dominant Taxon (name)	*Cricotopus bicinctus*	*Allonais pectinata*
Dominant taxon (group)	Diptera	Oligochaeta
Acariformes	0.0	3.6
Pelecypoda	2.0	0.0
Diptera	30.0	0.0
Ephemeroptera	9.3	0.0
Gastropoda	1.3	1.8
Oligochaeta	56.7	91.9
Tricoptera	0.0	0.9
Other	0.7	1.8
Functional Feeding Groups: Percent of total		
Burrowing Deposit Feeders	56.0	91.9
Predators	1.0	4.5
Surface Deposit Feeders	18.0	0.9
Suspension Feeders and Filterers	2.0	0.9
Scrapers	6.0	1.8
Shredders	13.0	0.0
Unknown	4.0	0.0

IFF Chemical Holdings, Inc. Control Site

Table 6. Stream Condition Index Metrics: Northeast, Winter index					
Metric:	Value	5	3	1	Score
Total Number of Taxa	14	≥18	17-9	<9	3
Number of EPT Taxa	1	-	≥3	<3	1
Number of Chironomid Taxa	2	≥4	3-2	<2	3
Percent Contribution of Dominant Taxon	28.0	≤37	38-69	>69	5
Percent Diptera	30.0	-	≤67	>67	3
Florida Index	3	≥6	5-3	<3	3
Percent Suspension Feeders and Filterers	2.0	≥25	25-13	<13	1
Total Score		IFF Inc., Control Site			**19**
Interpretation of Scores		Excellent			26-31
		Good			20-25
		Poor			**14-19**
		Very Poor			7-13

IFF Chemical Holdings, Inc. Test Site

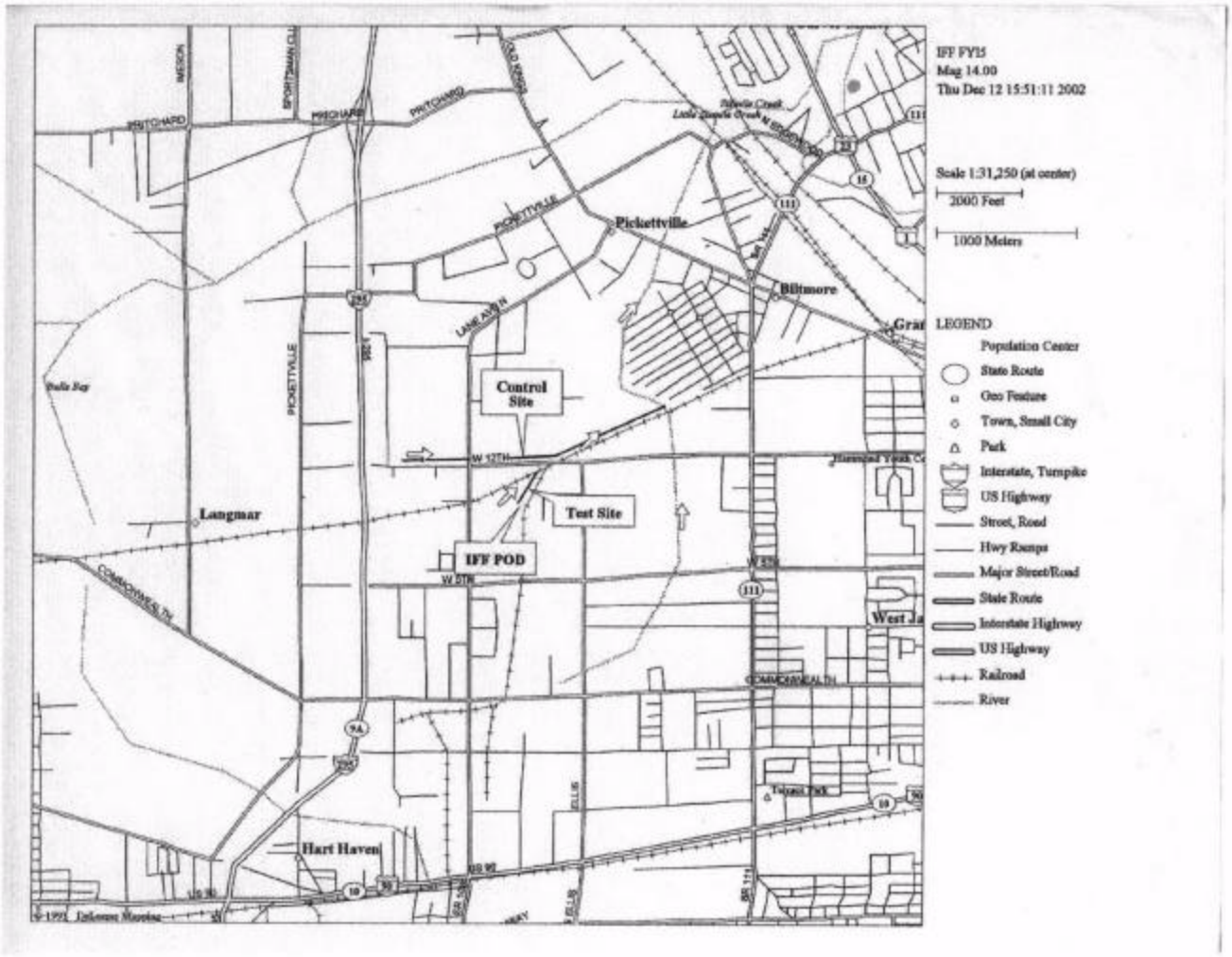
Table 6. Stream Condition Index Metrics: Northeast, Winter index					
Metric:	Value	5	3	1	Score
Total Number of Taxa	14	≥18	17-9	<9	3
Number of EPT Taxa	1	-	≥3	<3	1
Number of Chironomid Taxa	0	≥4	3-2	<2	1
Percent Contribution of Dominant Taxon	41.4	≤37	38-69	>69	3
Percent Diptera	0	-	≤67	>67	3
Florida Index	3	≥6	5-3	<3	3
Percent Suspension Feeders and Filterers	0.9	≥25	25-13	<13	1
Total Score		IFF, Inc. Test Site			**15**
Interpretation of Scores		Excellent			26-31
		Good			20-25
		Poor			**14-19**
		Very Poor			7-13

Appendices

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

Appendix 1

Map of IFF Chemical Holdings, Inc. (formerly known as Bush, Boake and Allen)



Appendix 2

State of Florida
Department of Environmental Protection
Facility Summary

Facility Name: IFF Chemical Holdings, Inc. (fka Bush Boake Allen)		**Prepared By:** James Lucas **Date:** 12/09/02
Location: 2051 N. Lane Ave Jacksonville, Florida	**County:** 16-Duval	**District:** Northeast
Federal Permit No.: FL0001040 **Expiration Date:** 11/20/03	**State GMS #:** **State Expiration Date:** N/A	**Facility Type:** Industrial
Function of Facility: organic chemicals manufacturer		
Description of treatment process: The facility operates a 4.0 MGD industrial wastewater treatment and disposal facility for wastewater from non-contact cooling water, boiler blowdown, boiler deionization reject water and storm water. Treatment is by retention basins for storm water and aeration of cooling water.		
Receiving Waters: Little Six Mile Creek		**Classification:** Class III - Fresh
Design Flow: 4.0 MGD	**Mean Flow:** 1.0337 MGD	**Flow during survey:**
Discharge is: *Continuous* Intermittent Seasonal *Rainfall Dependent* Other		
Facility Mixing Zone Details:		
List effluent limits:		

Parameter	Limit	Describe special permit conditions and permit modifications:
Flow (MGD)	Report Monthly Average Report Daily Max	
Flow (MGD)	Report Daily Max	Estimate. Monitoring for this parameter is required when stormwater is discharge to the culvert downstream from the recording flow meter.
Chemical Oxygen Demand (COD), mg/L	Report Daily Max	
Total Organic Carbon, mg/L	Report Daily Max	
Temperature Degrees C	Monthly Average 35.0 Daily Max 38.0	
Oil & Grease mg/L	Daily Maximum 5.0	
pH,(s.u)	Daily Min. 6.0 Daily Max 8.5	

*Total Recoverable Iron, mg/L	Daily Max 1.0	*Monitoring for these parameters is required only when they are subject to being discharged as a result of chemical additions by the facility. If none are added during a given month, it must be so stated on the discharge monitoring report (DMR).
*Total Residual Chlorine, mg/L	*Daily Maximum 0.01	* " "
*Total Recoverable Zinc, mg/L	*Daily Max $\leq e^{(0.8473[\ln H]+0.7614)}$	* " "
*Total Recoverable Chromium III, ug/L	*Daily Max $\leq e^{(0.819[\ln H]+1.561)}$	* " "
*Hardness, Total as CaCo3, mg/L	*Report Daily Max	* " "
**Biochemical Oxygen Demand, 5-day, (BOD5), mg/L	**Report Daily Max	**These parameters shall be monitored only when stormwater is being discharged through outfall D-001. For storm water samples only, all tests shall be conducted on two separate grab samples. The grab samples shall be collected from a discharge resulting from a storm event that is greater than 0.1 inches and at least 72 hours from the previous measurable (greater than 0.1 inch rainfall) storm event. The first grab sample shall be collected within the first 30 minutes of the discharge event. The second grab sample shall be collected after 2 hours of the discharge event or upon termination of the rainfall, whichever occurs first. The reported value shall be the higher one obtained between the two samples.
**Total Suspended Solids, mg/L	**Report Daily Max	
**Total Phosphorus, mg/L	**Report Daily Max	
Acute Whole Effluent Toxicity	The LC50 shall not be less than 100%.	**Type of test:** 96-hour acute static renewal. **Concentration Species:** Ceriodaphnia dubia and Pimephales Promelas. **Effluent concentrations:** All tests shall be conducted on one grab sample of 100% final effluent and a control (0% effluent). **Toxicity triggers:** LC50<100%. **Follow up:** If unacceptable acute toxicity (greater than 20% mortality in any grab sample of 100% effluent) is determined in a routine test, the permittee shall conduct a minimum of three (3) valid additional 96-hour acute static renewal definitive tests on the species indicating toxicity. The additional definitive tests shall be conducted

		with a control 0% and effluent concentrations of 6.25%, 12.5%, 25%, 50%, and 100% effluent concentrations. The first test should begin within 7 days of the end of the "routine" test and be conducted weekly thereafter until three valid additional tests are complete.

Description of permitted outfall: Outfall D001 - Discharge to a ditch which flows to Little Six Mile Creek, a Class III surface water of the state.

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

The facility has reported no exceedances of effluent limitations or plant upsets in the past year.

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:

A compliance sampling inspection was conducted by the department on July 13, 1998. The sample results indicated that all of the parameters tested were below detectable limits or within the limits established by the permit and chapter 62-302, FAC. 48-hour static renewal bioasssays were conducted on the mysid shrimp and inland silverside minnow at salinity values of 8.4ppt and 2.4 ppt, respectively. The shrimp exhibited 30% mortality and the minnow exhibited 5% mortality. High calcium concentrations in the effluent may have contributed to the mortality in the mysid shrimp.

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

Additional Information: N/A

Appendix 3

Methods

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

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

Ninety-six hour static renewal screening toxicity bioassays were performed on the effluent sample using the water flea, *Ceriodaphnia dubia,* and the fish, *Cyprinella leedsi* (Weber 1993). The effluent and water from control and test sites were analyzed for the presence and concentration of total and fecal coliform bacteria (APHA 1992, methods 9222 B, 9222 D).

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

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

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

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

Appendix 4

Chemial analyses of effluent and receiving water

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
2/3/03 10:05	CONTROL SITE	Bio-AGP/LimNut	Algal Growth Potential	2.23	mg DryWt/L	J	0.1	0.3
2/3/03 10:05	CONTROL SITE	Bio-Chl-a	Chlorophyll-A, Monochromatic, Periphyton	0.3	mg/m2	U	0.3	0.9
2/3/03 10:05	CONTROL SITE	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
2/3/03 10:05	CONTROL SITE	Bio-Chl-a	Phaeophytin-A, Monochromatic, Periphyton	0.3	mg/m2	U	0.3	0.9
2/3/03 10:05	CONTROL SITE	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
2/3/03 10:05	CONTROL SITE	Bio-Invertebrates	Macroinvert-FW-Qual-Dipnetx20-# Taxa	15	# Taxa			
2/3/03 10:05	CONTROL SITE	Bio-Peri/Phyto	Periphyton-Quantitative-# Diatom Taxa	23	#Taxa			
2/3/03 10:05	CONTROL SITE	Bio-Peri/Phyto	Periphyton-Quantitative-# Wet Taxa	17	#Taxa			
2/3/03 10:05	CONTROL SITE	Nutrients-Liquid	Ammonia-N	0.018	mg N/L	I	0.01	0.02
2/3/03 10:05	CONTROL SITE	Nutrients-Liquid	NO2NO3-N	0.015	mg N/L		0.004	0.01
2/3/03 10:05	CONTROL SITE	Nutrients-Liquid	N_KJEL_TOT	0.5	mg N/L		0.06	0.2
2/3/03 10:05	CONTROL SITE	Nutrients-Liquid	O-Phosphate-P	0.027	mg P/L		0.004	0.01
2/3/03 10:05	CONTROL SITE	Nutrients-Liquid	Total-P	0.082	mg P/L		0.015	0.04
2/3/03 10:05	CONTROL SITE REP.1	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	4	# Taxa			
2/3/03 10:05	CONTROL SITE REP.2	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	13	# Taxa			
2/3/03 10:05	CONTROL SITE REP.3	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	7	# Taxa			
2/3/03 7:00	EQUIP BLANK	BNA-Water	1,2,4,5-Tetrachlorobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	1,2,4-Trichlorobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	1,2-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	1,3,5-Trinitrobenzene	3.8	ug/L	U	3.8	15
2/3/03 7:00	EQUIP BLANK	BNA-Water	1,3-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	1,3-Dinitrobenzene	1.9	ug/L	U	1.9	7.6
2/3/03 7:00	EQUIP BLANK	BNA-Water	1,4-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	1,4-Naphthoquinone	19	ug/L	UJ	19	76
2/3/03 7:00	EQUIP BLANK	BNA-Water	1-Naphthylamine	9.5	ug/L	U	9.5	38
2/3/03 7:00	EQUIP BLANK	BNA-Water	2,3,4,6-Tetrachlorophenol	1.9	ug/L	U	1.9	7.6
2/3/03 7:00	EQUIP BLANK	BNA-Water	2,4,5-Trichlorophenol	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	2,4,6-Trichlorophenol	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	2,4-Dichlorophenol	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	2,4-Dimethylphenol	48	ug/L	U	48	190
2/3/03 7:00	EQUIP BLANK	BNA-Water	2,4-Dinitrophenol	14	ug/L	U	14	57
2/3/03 7:00	EQUIP BLANK	BNA-Water	2,4-Dinitrotoluene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	2,6-Dichlorophenol	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	2,6-Dinitrotoluene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	2-Acetylaminofluorene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	2-Chloronaphthalene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	2-Chlorophenol	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	ug/L	U	2.9	11
2/3/03 7:00	EQUIP BLANK	BNA-Water	2-Methylnaphthalene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	2-Naphthylamine	9.5	ug/L	U	9.5	38
2/3/03 7:00	EQUIP BLANK	BNA-Water	2-Nitroaniline	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	2-Nitrophenol	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	2-Picoline	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	3,3'-Dichlorobenzidine	38	ug/L	U	38	150
2/3/03 7:00	EQUIP BLANK	BNA-Water	3,3'-Dimethylbenzidine	19	ug/L	U	19	76
2/3/03 7:00	EQUIP BLANK	BNA-Water	3-Methylcholanthrene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	3-Nitroaniline	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	4,4'-DDD	1.4	ug/L	U	1.4	5.7
2/3/03 7:00	EQUIP BLANK	BNA-Water	4,4'-DDE	1.4	ug/L	U	1.4	5.7
2/3/03 7:00	EQUIP BLANK	BNA-Water	4,4'-DDT	1.4	ug/L	U	1.4	5.7
2/3/03 7:00	EQUIP BLANK	BNA-Water	4-Aminobiphenyl	3.8	ug/L	U	3.8	15
2/3/03 7:00	EQUIP BLANK	BNA-Water	4-Bromophenyl phenyl ether	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	4-Chloro-3-methylphenol	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	4-Chloroaniline	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	4-Chlorophenyl phenyl ether	1.9	ug/L	U	1.9	7.6
2/3/03 7:00	EQUIP BLANK	BNA-Water	4-Nitroaniline	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	4-Nitrophenol	14	ug/L	U	14	57
2/3/03 7:00	EQUIP BLANK	BNA-Water	5-Nitro-o-toluidine	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	7,12-Dimethylbenz(a)anthracene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Acenaphthene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Acenaphthylene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Acetophenone	1.4	ug/L	I	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Aldrin	1.4	ug/L	U	1.4	5.7
2/3/03 7:00	EQUIP BLANK	BNA-Water	Aniline	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Anthracene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Azobenzene/1,2-Diphenylhydrazine	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Benzidine	95	ug/L	U	95	380
2/3/03 7:00	EQUIP BLANK	BNA-Water	Benzo(a)anthracene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Benzo(a)pyrene	0.95	ug/L	U	0.95	3.8

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
2/3/03 7:00	EQUIP BLANK	BNA-Water	Benzo(b)fluoranthene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Benzo(g,h,i)perylene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Benzo(k)fluoranthene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Benzyl alcohol	3.2	ug/L	I	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Bis(2-chloroethoxy)methane	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Bis(2-chloroethyl)ether	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	ug/L	U	2.9	11
2/3/03 7:00	EQUIP BLANK	BNA-Water	Bis(2-ethylhexyl)phthalate	14	ug/L	U	14	57
2/3/03 7:00	EQUIP BLANK	BNA-Water	Butyl benzyl phthalate	4.8	ug/L	U	4.8	19
2/3/03 7:00	EQUIP BLANK	BNA-Water	Chrysene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Di-n-butyl phthalate	4.8	ug/L	U	4.8	19
2/3/03 7:00	EQUIP BLANK	BNA-Water	Di-n-octyl phthalate	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Dibenzo(a,h)anthracene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Dibenzofuran	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Dieldrin	1.4	ug/L	U	1.4	5.7
2/3/03 7:00	EQUIP BLANK	BNA-Water	Diethyl phthalate	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Dimethyl phthalate	48	ug/L	U	48	190
2/3/03 7:00	EQUIP BLANK	BNA-Water	Dimethylaminoazobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Dinoseb	3.8	ug/L	U	3.8	15
2/3/03 7:00	EQUIP BLANK	BNA-Water	Diphenylamine	2.9	ug/L	U	2.9	11
2/3/03 7:00	EQUIP BLANK	BNA-Water	Endosulfan I	3.8	ug/L	U	3.8	15
2/3/03 7:00	EQUIP BLANK	BNA-Water	Endosulfan II	3.8	ug/L	U	3.8	15
2/3/03 7:00	EQUIP BLANK	BNA-Water	Endosulfan sulfate	1.4	ug/L	U	1.4	5.7
2/3/03 7:00	EQUIP BLANK	BNA-Water	Endrin	1.4	ug/L	UJ	1.4	5.7
2/3/03 7:00	EQUIP BLANK	BNA-Water	Endrin aldehyde	3.8	ug/L	U	3.8	15
2/3/03 7:00	EQUIP BLANK	BNA-Water	Ethyl methanesulfonate	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Fluoranthene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Fluorene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Heptachlor	1.4	ug/L	U	1.4	5.7
2/3/03 7:00	EQUIP BLANK	BNA-Water	Heptachlor epoxide	1.4	ug/L	U	1.4	5.7
2/3/03 7:00	EQUIP BLANK	BNA-Water	Hexachlorobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Hexachlorobutadiene	2.9	ug/L	U	2.9	11
2/3/03 7:00	EQUIP BLANK	BNA-Water	Hexachlorocyclopentadiene	2.9	ug/L	U	2.9	11
2/3/03 7:00	EQUIP BLANK	BNA-Water	Hexachloroethane	2.9	ug/L	U	2.9	11
2/3/03 7:00	EQUIP BLANK	BNA-Water	Hexachloropropene	1.9	ug/L	U	1.9	7.6
2/3/03 7:00	EQUIP BLANK	BNA-Water	Indeno(1,2,3-cd)pyrene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Isophorone	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Isosafrole	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Methapyrilene	3.8	ug/L	UJ	3.8	15
2/3/03 7:00	EQUIP BLANK	BNA-Water	Methyl methanesulfonate	0.95	ug/L	UJ	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	N-Nitrosodi-n-butylamine	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	N-Nitrosodi-n-propylamine	1.9	ug/L	U	1.9	7.6
2/3/03 7:00	EQUIP BLANK	BNA-Water	N-Nitrosodiethylamine	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	N-Nitrosodimethylamine	1.9	ug/L	U	1.9	7.6
2/3/03 7:00	EQUIP BLANK	BNA-Water	N-Nitrosodiphenylamine	2.9	ug/L	U	2.9	11
2/3/03 7:00	EQUIP BLANK	BNA-Water	N-Nitrosomethylethylamine	1.9	ug/L	U	1.9	7.6
2/3/03 7:00	EQUIP BLANK	BNA-Water	N-Nitrosomorpholine	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	N-Nitrosopiperidine	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	N-Nitrosopyrrolidine	1.9	ug/L	U	1.9	7.6
2/3/03 7:00	EQUIP BLANK	BNA-Water	Naphthalene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Nitrobenzene	1.9	ug/L	U	1.9	7.6
2/3/03 7:00	EQUIP BLANK	BNA-Water	Nitroquinoline-1-oxide	19	ug/L	U	19	76
2/3/03 7:00	EQUIP BLANK	BNA-Water	Pentachlorobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Pentachloroethane	48	ug/L	U	48	190
2/3/03 7:00	EQUIP BLANK	BNA-Water	Pentachloronitrobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Pentachlorophenol	2.9	ug/L	U	2.9	11
2/3/03 7:00	EQUIP BLANK	BNA-Water	Phenacetin	3.8	ug/L	U	3.8	11
2/3/03 7:00	EQUIP BLANK	BNA-Water	Phenanthrene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Phenol	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Pyrene	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	Pyridine	3.8	ug/L	U	3.8	15
2/3/03 7:00	EQUIP BLANK	BNA-Water	Safrole	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	BNA-Water	alpha-BHC	1.4	ug/L	U	1.4	5.7
2/3/03 7:00	EQUIP BLANK	BNA-Water	beta-BHC	1.4	ug/L	U	1.4	5.7
2/3/03 7:00	EQUIP BLANK	BNA-Water	delta-BHC	1.4	ug/L	U	1.4	5.7
2/3/03 7:00	EQUIP BLANK	BNA-Water	gamma-BHC	1.4	ug/L	U	1.4	5.7
2/3/03 7:00	EQUIP BLANK	BNA-Water	m,p-Cresols	1.9	ug/L	U	1.9	7.6
2/3/03 7:00	EQUIP BLANK	BNA-Water	o-Cresol	1.9	ug/L	U	1.9	7.6
2/3/03 7:00	EQUIP BLANK	BNA-Water	o-Toluidine	0.95	ug/L	U	0.95	3.8
2/3/03 7:00	EQUIP BLANK	GC-Water	Alachlor	0.61	ug/L	U	0.61	2.44
2/3/03 7:00	EQUIP BLANK	GC-Water	Ametryn	0.051	ug/L	U	0.051	0.204
2/3/03 7:00	EQUIP BLANK	GC-Water	Atrazine	0.051	ug/L	U	0.051	0.204
2/3/03 7:00	EQUIP BLANK	GC-Water	Azinphos Methyl	0.051	ug/L	U	0.051	0.204
2/3/03 7:00	EQUIP BLANK	GC-Water	Bromacil	0.2	ug/L	U	0.2	0.8

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
2/3/03 7:00	EQUIP BLANK	GC-Water	Butylate	0.2	ug/L	U	0.2	0.8
2/3/03 7:00	EQUIP BLANK	GC-Water	Chlorpyrifos Ethyl	0.051	ug/L	U	0.051	0.204
2/3/03 7:00	EQUIP BLANK	GC-Water	Chlorpyrifos Methyl	0.1	ug/L	U	0.1	0.4
2/3/03 7:00	EQUIP BLANK	GC-Water	Diazinon	0.051	ug/L	U	0.051	0.204
2/3/03 7:00	EQUIP BLANK	GC-Water	Ethion	0.051	ug/L	U	0.051	0.204
2/3/03 7:00	EQUIP BLANK	GC-Water	Ethoprop	0.1	ug/L	U	0.1	0.4
2/3/03 7:00	EQUIP BLANK	GC-Water	Fenamiphos	0.2	ug/L	U	0.2	0.8
2/3/03 7:00	EQUIP BLANK	GC-Water	Fonofos	0.1	ug/L	U	0.1	0.4
2/3/03 7:00	EQUIP BLANK	GC-Water	Hexazinone	0.1	ug/L	U	0.1	0.4
2/3/03 7:00	EQUIP BLANK	GC-Water	Malathion	0.15	ug/L	U	0.15	0.6
2/3/03 7:00	EQUIP BLANK	GC-Water	Metalaxyl	0.26	ug/L	U	0.26	1.04
2/3/03 7:00	EQUIP BLANK	GC-Water	Metolachlor	0.51	ug/L	U	0.51	2.04
2/3/03 7:00	EQUIP BLANK	GC-Water	Metribuzin	0.1	ug/L	U	0.1	0.4
2/3/03 7:00	EQUIP BLANK	GC-Water	Mevinphos	0.2	ug/L	U	0.2	0.8
2/3/03 7:00	EQUIP BLANK	GC-Water	Naled	0.82	ug/L	U	0.82	3.28
2/3/03 7:00	EQUIP BLANK	GC-Water	Norflurazon	0.1	ug/L	U	0.1	0.4
2/3/03 7:00	EQUIP BLANK	GC-Water	Parathion Ethyl	0.15	ug/L	U	0.15	0.6
2/3/03 7:00	EQUIP BLANK	GC-Water	Parathion Methyl	0.1	ug/L	U	0.1	0.4
2/3/03 7:00	EQUIP BLANK	GC-Water	Phorate	0.051	ug/L	U	0.051	0.204
2/3/03 7:00	EQUIP BLANK	GC-Water	Prometryn	0.15	ug/L	U	0.15	0.6
2/3/03 7:00	EQUIP BLANK	GC-Water	Simazine	0.051	ug/L	U	0.051	0.204
2/3/03 7:00	EQUIP BLANK	Metals-Water	Aluminum	10	ug/L	U	10	40
2/3/03 7:00	EQUIP BLANK	Metals-Water	Arsenic	3	ug/L	U	3	12
2/3/03 7:00	EQUIP BLANK	Metals-Water	Cadmium	0.025	ug/L	U	0.025	0.1
2/3/03 7:00	EQUIP BLANK	Metals-Water	Calcium	0.05	mg/L	U	0.05	0.2
2/3/03 7:00	EQUIP BLANK	Metals-Water	Chromium	2	ug/L	U	2	8
2/3/03 7:00	EQUIP BLANK	Metals-Water	Copper	0.75	ug/L	U	0.75	3
2/3/03 7:00	EQUIP BLANK	Metals-Water	Iron	7	ug/L	U	7	28
2/3/03 7:00	EQUIP BLANK	Metals-Water	Lead	0.1	ug/L	U	0.1	0.4
2/3/03 7:00	EQUIP BLANK	Metals-Water	Magnesium	0.086	mg/L	U	0.01	0.04
2/3/03 7:00	EQUIP BLANK	Metals-Water	Nickel	2	ug/L	U	2	8
2/3/03 7:00	EQUIP BLANK	Metals-Water	Selenium	1	ug/L	U	1	4
2/3/03 7:00	EQUIP BLANK	Metals-Water	Silver	0.02	ug/L	U	0.02	0.08
2/3/03 7:00	EQUIP BLANK	Metals-Water	Zinc	4	ug/L	U	4	16
2/3/03 7:00	EQUIP BLANK	Nutrients-Liquid	Ammonia-N	0.01	mg N/L	U	0.01	0.02
2/3/03 7:00	EQUIP BLANK	Nutrients-Liquid	NO2NO3-N	0.004	mg N/L	U	0.004	0.01
2/3/03 7:00	EQUIP BLANK	Nutrients-Liquid	N_KJEL_TOT	0.06	mg N/L	U	0.06	0.2
2/3/03 7:00	EQUIP BLANK	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	U	0.004	0.01
2/3/03 7:00	EQUIP BLANK	Nutrients-Liquid	Organic Carbon	1	mg C/L	U	1	5
2/3/03 7:00	EQUIP BLANK	Nutrients-Liquid	TSS	4	mg/L	U	4	16
2/3/03 7:00	EQUIP BLANK	Nutrients-Liquid	Total-P	0.015	mg P/L	U	0.015	0.04
2/3/03 7:00	EQUIP BLANK	Overflow	COD	9.6	mg/L	U		
2/3/03 7:00	EQUIP BLANK	Overflow	Oil and Grease	0.6	mg/L	I		
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	1,2,4,5-Tetrachlorobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	1,2,4-Trichlorobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	1,2-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	1,3,5-Trinitrobenzene	3.8	ug/L	U	3.8	15
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	1,3-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	1,3-Dinitrobenzene	1.9	ug/L	U	1.9	7.6
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	1,4-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	1,4-Naphthoquinone	19	ug/L	UJ	19	76
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	1-Naphthylamine	9.5	ug/L	U	9.5	38
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2,3,4,6-Tetrachlorophenol	1.9	ug/L	U	1.9	7.6
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2,4,5-Trichlorophenol	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2,4,6-Trichlorophenol	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2,4-Dichlorophenol	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2,4-Dimethylphenol	48	ug/L	U	48	190
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2,4-Dinitrophenol	14	ug/L	U	14	57
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2,4-Dinitrotoluene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2,6-Dichlorophenol	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2,6-Dinitrotoluene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2-Acetylaminofluorene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2-Chloronaphthalene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2-Chlorophenol	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	ug/L	U	2.9	11
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2-Methylnaphthalene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2-Naphthylamine	9.5	ug/L	U	9.5	38
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2-Nitroaniline	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2-Nitrophenol	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	2-Picoline	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	3,3'-Dichlorobenzidine	38	ug/L	U	38	150
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	3,3'-Dimethylbenzidine	19	ug/L	U	19	76
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	3-Methylcholanthrene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	3-Nitroaniline	0.95	ug/L	U	0.95	3.8

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	4,4'-DDD	1.4	ug/L	U	1.4	5.7
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	4,4'-DDE	1.4	ug/L	U	1.4	5.7
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	4,4'-DDT	1.4	ug/L	U	1.4	5.7
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	4-Aminobiphenyl	3.8	ug/L	U	3.8	15
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	4-Bromophenyl phenyl ether	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	4-Chloro-3-methylphenol	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	4-Chloroaniline	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	4-Chlorophenyl phenyl ether	1.9	ug/L	U	1.9	7.6
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	4-Nitroaniline	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	4-Nitrophenol	14	ug/L	U	14	57
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	5-Nitro-o-toluidine	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	7,12-Dimethylbenz(a)anthracene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Acenaphthene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Acenaphthylene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Acetophenone	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Aldrin	1.4	ug/L	U	1.4	5.7
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Aniline	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Anthracene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Azobenzene/1,2-Diphenylhydrazine	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Benzidine	95	ug/L	U	95	380
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Benzo(a)anthracene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Benzo(a)pyrene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Benzo(b)fluoranthene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Benzo(g,h,i)perylene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Benzo(k)fluoranthene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Benzyl alcohol	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Bis(2-chloroethoxy)methane	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Bis(2-chloroethyl)ether	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	ug/L	U	2.9	11
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Bis(2-ethylhexyl)phthalate	14	ug/L	U	14	57
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Butyl benzyl phthalate	4.8	ug/L	U	4.8	19
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Chrysene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Di-n-butyl phthalate	4.8	ug/L	U	4.8	19
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Di-n-octyl phthalate	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Dibenzo(a,h)anthracene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Dibenzofuran	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Dieldrin	1.4	ug/L	U	1.4	5.7
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Diethyl phthalate	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Dimethyl phthalate	48	ug/L	U	48	190
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Dimethylaminoazobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Dinoseb	3.8	ug/L	U	3.8	15
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Diphenylamine	2.9	ug/L	U	2.9	11
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Endosulfan I	3.8	ug/L	U	3.8	15
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Endosulfan II	3.8	ug/L	U	3.8	15
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Endosulfan sulfate	1.4	ug/L	U	1.4	5.7
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Endrin	1.4	ug/L	UJ	1.4	5.7
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Endrin aldehyde	3.8	ug/L	U	3.8	15
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Ethyl methanesulfonate	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Fluoranthene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Fluorene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Heptachlor	1.4	ug/L	U	1.4	5.7
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Heptachlor epoxide	1.4	ug/L	U	1.4	5.7
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Hexachlorobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Hexachlorobutadiene	2.9	ug/L	U	2.9	11
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Hexachlorocyclopentadiene	2.9	ug/L	U	2.9	11
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Hexachloroethane	2.9	ug/L	U	2.9	11
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Hexachloropropene	1.9	ug/L	U	1.9	7.6
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Indeno(1,2,3-cd)pyrene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Isophorone	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Isosafrole	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Methapyrilene	3.8	ug/L	UJ	3.8	15
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Methyl methanesulfonate	0.95	ug/L	UJ	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	N-Nitrosodi-n-butylamine	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	N-Nitrosodi-n-propylamine	1.9	ug/L	U	1.9	7.6
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	N-Nitrosodiethylamine	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	N-Nitrosodimethylamine	1.9	ug/L	U	1.9	7.6
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	N-Nitrosodiphenylamine	2.9	ug/L	U	2.9	11
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	N-Nitrosomethylethylamine	1.9	ug/L	U	1.9	7.6
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	N-Nitrosomorpholine	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	N-Nitrosopiperidine	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	N-Nitrosopyrrolidine	1.9	ug/L	U	1.9	7.6
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Naphthalene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Nitrobenzene	1.9	ug/L	U	1.9	7.6
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Nitroquinoline-1-oxide	19	ug/L	U	19	76

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Pentachlorobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Pentachloroethane	48	ug/L	U	48	190
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Pentachloronitrobenzene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Pentachlorophenol	2.9	ug/L	U	2.9	11
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Phenacetin	3.8	ug/L	U	3.8	11
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Phenanthrene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Phenol	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Pyrene	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Pyridine	3.8	ug/L	U	3.8	15
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	Safrole	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	alpha-BHC	1.4	ug/L	U	1.4	5.7
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	beta-BHC	1.4	ug/L	U	1.4	5.7
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	delta-BHC	1.4	ug/L	U	1.4	5.7
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	gamma-BHC	1.4	ug/L	U	1.4	5.7
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	m,p-Cresols	1.9	ug/L	U	1.9	7.6
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	o-Cresol	1.9	ug/L	U	1.9	7.6
2/3/03 9:00	IFF FINAL EFFLUENT	BNA-Water	o-Toluidine	0.95	ug/L	U	0.95	3.8
2/3/03 9:00	IFF FINAL EFFLUENT	Bio-AGP/LimNut	Algal Growth Potential	2.41	mg DryWt/L	J	0.1	0.3
2/3/03 9:00	IFF FINAL EFFLUENT	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
2/3/03 9:00	IFF FINAL EFFLUENT	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
2/3/03 9:00	IFF FINAL EFFLUENT	Bio-Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	LC50	L		
2/3/03 9:00	IFF FINAL EFFLUENT	Bio-Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	LC50	L		
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Alachlor	0.57	ug/L	U	0.57	2.28
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Ametryn	0.048	ug/L	U	0.048	0.192
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Atrazine	0.048	ug/L	U	0.048	0.192
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Azinphos Methyl	0.048	ug/L	U	0.048	0.192
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Bromacil	0.19	ug/L	U	0.19	0.76
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Butylate	0.19	ug/L	U	0.19	0.76
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Chlorpyrifos Ethyl	0.048	ug/L	U	0.048	0.192
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Chlorpyrifos Methyl	0.095	ug/L	U	0.095	0.38
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Diazinon	0.048	ug/L	U	0.048	0.192
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Ethion	0.048	ug/L	U	0.048	0.192
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Ethoprop	0.095	ug/L	U	0.095	0.38
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Fenamiphos	0.19	ug/L	U	0.19	0.76
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Fonofos	0.095	ug/L	U	0.095	0.38
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Hexazinone	0.095	ug/L	U	0.095	0.38
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Malathion	0.14	ug/L	U	0.14	0.56
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Metalaxyl	0.24	ug/L	U	0.24	0.96
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Metolachlor	0.48	ug/L	U	0.48	1.92
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Metribuzin	0.095	ug/L	U	0.095	0.38
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Mevinphos	0.19	ug/L	U	0.19	0.76
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Naled	0.76	ug/L	U	0.76	3.04
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Norflurazon	0.095	ug/L	U	0.095	0.38
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Parathion Ethyl	0.14	ug/L	U	0.14	0.56
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Parathion Methyl	0.095	ug/L	U	0.095	0.38
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Phorate	0.048	ug/L	U	0.048	0.192
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Prometryn	0.14	ug/L	U	0.14	0.56
2/3/03 9:00	IFF FINAL EFFLUENT	GC-Water	Simazine	0.048	ug/L	U	0.048	0.192
2/3/03 9:00	IFF FINAL EFFLUENT	Metals-Water	Aluminum	24	ug/L	U	10	40
2/3/03 9:00	IFF FINAL EFFLUENT	Metals-Water	Arsenic	3	ug/L	U	3	12
2/3/03 9:00	IFF FINAL EFFLUENT	Metals-Water	Cadmium	0.025	ug/L	U	0.025	0.1
2/3/03 9:00	IFF FINAL EFFLUENT	Metals-Water	Calcium	82.6	mg/L		0.05	0.2
2/3/03 9:00	IFF FINAL EFFLUENT	Metals-Water	Chromium	2.4	ug/L	I	2	8
2/3/03 9:00	IFF FINAL EFFLUENT	Metals-Water	Copper	2	ug/L	U	0.75	3
2/3/03 9:00	IFF FINAL EFFLUENT	Metals-Water	Iron	64	ug/L		7	28
2/3/03 9:00	IFF FINAL EFFLUENT	Metals-Water	Lead	0.1	ug/L	U	0.1	0.4
2/3/03 9:00	IFF FINAL EFFLUENT	Metals-Water	Magnesium	30.7	mg/L		0.01	0.04
2/3/03 9:00	IFF FINAL EFFLUENT	Metals-Water	Nickel	2	ug/L	U	2	8
2/3/03 9:00	IFF FINAL EFFLUENT	Metals-Water	Selenium	1	ug/L	U	1	4
2/3/03 9:00	IFF FINAL EFFLUENT	Metals-Water	Silver	0.02	ug/L	U	0.02	0.08
2/3/03 9:00	IFF FINAL EFFLUENT	Metals-Water	Zinc	5	ug/L	I	4	16
2/3/03 9:00	IFF FINAL EFFLUENT	Nutrients-Liquid	Ammonia-N	0.095	mg N/L		0.01	0.02
2/3/03 9:00	IFF FINAL EFFLUENT	Nutrients-Liquid	NO2NO3-N	0.009	mg N/L	I	0.004	0.01
2/3/03 9:00	IFF FINAL EFFLUENT	Nutrients-Liquid	N_KJEL_TOT	0.2	mg N/L		0.06	0.2
2/3/03 9:00	IFF FINAL EFFLUENT	Nutrients-Liquid	O-Phosphate-P	0.054	mg P/L		0.004	0.01
2/3/03 9:00	IFF FINAL EFFLUENT	Nutrients-Liquid	Organic Carbon	1.5	mg C/L	I	1	5
2/3/03 9:00	IFF FINAL EFFLUENT	Nutrients-Liquid	TSS	4	mg/L	U	4	16
2/3/03 9:00	IFF FINAL EFFLUENT	Nutrients-Liquid	Total-P	0.063	mg P/L		0.015	0.04
2/3/03 9:00	IFF FINAL EFFLUENT	Overflow	COD	9.6	mg/L	U		
2/3/03 9:00	IFF FINAL EFFLUENT	Overflow	Oil and Grease	0.7	mg/L	I		
2/3/03 11:45	TEST SITE	Bio-AGP/LimNut	Algal Growth Potential	4.69	mg DryWt/L	J	0.1	0.3
2/3/03 11:45	TEST SITE	Bio-Chl-a	Chlorophyll-A, Monochromatic, Periphyton	29	mg/m2		0.57	1.7
2/3/03 11:45	TEST SITE	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
2/3/03 11:45	TEST SITE	Bio-Chl-a	Phaeophytin-A, Monochromatic, Periphyton	0	mg/m2		0.57	1.7

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
2/3/03 11:45	TEST SITE	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
2/3/03 11:45	TEST SITE	Bio-Invertebrates	Macroinvert-FW-Qual-Dipnetx20-# Taxa	15	# Taxa			
2/3/03 11:45	TEST SITE	Bio-Peri/Phyto	Periphyton-Quantitative-# Diatom Taxa	18	#Taxa			
2/3/03 11:45	TEST SITE	Bio-Peri/Phyto	Periphyton-Quantitative-# Wet Taxa	12	#Taxa			
2/3/03 11:45	TEST SITE	Nutrients-Liquid	Ammonia-N	0.066	mg N/L		0.01	0.02
2/3/03 11:45	TEST SITE	Nutrients-Liquid	NO2NO3-N	0.029	mg N/L		0.004	0.01
2/3/03 11:45	TEST SITE	Nutrients-Liquid	N_KJEL_TOT	0.15	mg N/L	I	0.06	0.2
2/3/03 11:45	TEST SITE	Nutrients-Liquid	O-Phosphate-P	0.067	mg P/L		0.004	0.01
2/3/03 11:45	TEST SITE	Nutrients-Liquid	Total-P	0.078	mg P/L		0.015	0.04
2/3/03 11:45	TEST SITE REP.1	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	5	# Taxa			
2/3/03 11:45	TEST SITE REP.2	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	11	# Taxa			
2/3/03 11:45	TEST SITE REP.3	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	10	# Taxa			

Appendix 5

Explanation of Biological Measures

(1) Habitat Assessment:

Eight aspects of the physical structure and extent of disturbance are ranked, with 20 possible points for each factor (FDEP SOP FT 3100, based on Plafkin *et al.*, 1989 and Barbour and Stribling, 1994). The Habitat Assessment score includes types and amounts of benthic substrates, water velocity, amount of sand or silt accumulation, extent of artificial channelization, bank stability, and riparian zone width and vegetation type. All scores are summed to yield an overall Habitat Assessment score. Habitat Assessment score ranges from 11-160 and overall habitat quality is assigned to one of four categories: Optimal (120-160 points), Suboptimal (80-119 points), Marginal (40-79 points), and Poor (11-39 points).

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

Algal Growth Potential (AGP): The effluent and water from control and test sites are autoclaved, filtered (0.45μm), inoculated with the unicellular green alga, *Pseudokirchneriella subcapitata* (formerly *Selenastrum capricornutum*, USEPA 2002), and incubated for 14 days. The algal growth potential (AGP) value is the peak growth of the alga within that 14-day period, recorded as mg dry weight/L (Miller *et al.* 1978). Raschke and Shultz (1987) found that an AGP above 5.0 mg dry weight/L represents a "problem" threshold for fresh receiving waters, implying nutrient enrichment. High AGP values may constitute one line of evidence for violation of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C. and/or 62-302.530(48)(b) F.A.C..

The concentration of nutrients in a water sample may be used to calculate the expected yield of AGP under the assumption that other required nutrients (e.g. silicon, micronutrients) are present in excess (Miller *et al.* 1978). The expected amount of production is calculated as 38 times the total soluble inorganic nitrogen (nitrate and nitrite plus ammonia) under nitrogen limitation or 430 times the ortho-phosphate (OP) concentration under phosphorus limitation with an error of ± 20%. When the ratio of nitrogen to phosphorus (N:P) is less than 11:1, nitrogen limitation of algal production is likely. When the N:P ratio is above 11:1, phosphorus limitation is likely. Production of lower biomass than expected may be evidence of growth inhibition related to toxic compounds present in the water sample tested and may be a violation of 62-302.530(62) F.A.C..

(3) Algal Phytoplankton and Periphyton Assemblages

Chlorophyll *a* Content: Chlorophyll *a* content is measured in both phytoplankton and periphyton samples to estimate algal biomass (APHA 1992, modified from *Standard Methods* 10200H). High algal biomass implies nutrient stress (Stevenson and Bahls 1999) and may be a violation of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C. and/or 62-302.530(48)(b) F.A.C.. An annual average chlorophyll *a* content of 20 mg/L or greater in water samples is one ground for listing a stream or river as an impaired water under the Impaired Waters Rule (chapter 62-303 F.A.C.).

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

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

Community Composition: Shifts in relative proportions of major groups of algae downstream of a point source, compared to upstream, control conditions, may indicate negative effects of a discharge (Stevenson and Bahls 1999) and may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

Shannon-Weaver Diversity Index: This index is specified in the Florida Administrative Code 62-302 as a measure of biological integrity. Low diversity scores are undesirable. Where diversity is low, only a few taxa are abundant as compared to an area where many taxa are present with more equitable abundance among taxa (Magurran 1988). Low diversity scores related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

(4) Benthic Macroinvertebrate Assemblages

Taxa richness: Taxa richness is the number of distinct macroinvertebrate taxa present in a sample. Stress, habitat destruction and pollution tend to reduce the number of different types of organisms present (Karr and Chu 1998). Decreases in taxa richness related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

Percent Contribution of Dominant Taxon: Percent contribution of the dominant taxon is calculated by dividing the number of individuals in the most abundant taxa by the total number of individuals counted. Percent contribution of the dominant taxon tends to increase with increasing perturbation (Plafkin *et al.*, 1989). Increases in the percent contribution of the dominant taxon related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C. and/or 62-302.530(48)(b) F.A.C..

Shannon-Weaver Diversity Index: This index is specified in the Florida Administrative Code 62-302 as a measure of biological integrity. Low diversity scores are undesirable. Where diversity is low, only a few taxa are abundant as compared to an area where many taxa are present in equitable abundance among taxa (Magurran 1988). A difference of 25% in Shannon-Weaver diversity between results from Hester-Dendy multiplate samplers incubated for 28 days at test and control sites constitutes a violation of 62-302.530(11) F.A.C..

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

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

Community Composition: Shifts in proportions of major groups of organisms downstream of a point source, compared to upstream, control conditions, may indicate negative effects of a discharge (Karr and Chu 1998). Shifts in community composition related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

Functional Feeding Groups: Environmental degradation may differentially affect groups of invertebrates based on how the group feeds (e.g. predators, deposit feeders, etc.). In Florida, pollution may be responsible for reducing the numbers of filter feeders (FDEP 1994) and shredders (EA Engineering 1994). Changes in the proportions of functional feeding groups related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

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

Appendix 6

Typical Values for Selected Parameters in Florida Waters

Percentile Distribution (1617 stations)

CONTROL SITE

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	Measured
Periphyton Chlorophyll *a* (mg/m^2)	**0.31**	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85	**0.3 U**
Hester-Dendy Diversity	0.84	2.12	2.48	2.74	2.88	**3.09**	3.25	3.40	3.52	3.76	3.90	**3.03**
Hester-Dendy Taxa Richness	6	6.5	9	11.5	13	15	**17**	21.5	26	29	32	**17**
Dipnet Taxa Richness	9	12	**17**	20	22	24.5	26	28	31	37	53	**14**
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	**0.5**
Ammonia	**0.02**	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60	**0.018**
Nitrate plus nitrite	0.01	0.01	**0.03**	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05	**0.015**
Total Phosphorus	0.02	0.03	0.05	0.06	**0.10**	0.13	0.18	0.25	0.39	0.74	1.51	**0.082**
Orthophosphate	0.01	0.01	**0.03**	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37	**0.027**
Turbidity (NTU)	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30	**N.D.**

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	**17.0**	39.51	60.85	**29**
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	**2.76**
Hester-Dendy Taxa Richness	6	6.5	9	11.5	13	**15**	17	21.5	26	29	32	**15**
Dipnet Taxa Richness	9	12	**17**	20	22	24.5	26	28	31	37	53	**14**
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	**0.15**
Ammonia	0.02	0.02	0.04	0.05	0.06	**0.08**	0.11	0.14	0.20	0.34	0.60	**0.066**
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	**0.029**
Total Phosphorus	0.02	0.03	0.05	0.06	**0.10**	0.13	0.18	0.25	0.39	0.74	1.51	**0.078**
Orthophosphate	0.01	0.01	0.03	0.04	0.05	**0.08**	0.11	0.17	0.27	0.59	1.37	**0.067**
Turbidity (NTU)	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30	**N.D.**

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

Appendix 7

Additional physical, chemical, toxicological and microbiological results

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

SAMPLE ID : 030116 STATION : DATE: 02/03/03 TIME: 09:00
SAMPLE SOURCE IFF SAMPLER: O'Connor/Wright/Lucas
STATION LOCATION: Final Effluent
PROGRAM MOD.: IW COMPLIANCE: ☒ ENFORCEMENT: ☐
FIELD MEASUREMENTS

Tot. Depth:	0.5	Sample Depth:	0.25	W.Temp. °C:	30.05
Conductivity: µmoh/cm (EPA 120.1) :	951	Diss. Oxygen (EPA 360.1)	4.07	EPA 170.1	
Stream Velocity:	0.3	Salinity:	0.45	T.R.C.:	
pH:(EPA 150.1)	8.35	Secchi:	0.15 L	EPA 330.5	

WEATHER CONDITIONS:

LABORATORY MEASUREMENTS

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

The following values are in mg/L

B.O.D : EPA 405.1	2 K	C.B.O.D : SM 5210-B		C.O.D : EPA 410.4	
Tot. S.S : EPA 160.2	1	Vol. S.S: EPA 160.4	1	Fix. S.S :	1 K
Tot.Solids : EPA 160.3		T.D.S EPA 160.1			
T. Alkalinity: EPA 310.1		Settleable Matter: EPA 160.5		Diss. Oxygen: EPA 360.2	

COMMENTS:

Sample Custody
Sample Released to: Bipin Adhyaru Date: 02/03/2003

Preservation: Ice Time: 14:00

Reported by: Bipin Adhyaru Date:: 02/10/2003

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

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

SAMPLE ID : 030115 STATION : DATE: 02/03/03 TIME: 07:00
SAMPLE SOURCE IFF SAMPLER: O'Connor/Wright/Lucas
STATION LOCATION: Equipment Blank
PROGRAM MOD.: IW COMPLIANCE: ☒ ENFORCEMENT: ☐
FIELD MEASUREMENTS

Tot. Depth:		Sample Depth:		W.Temp. °C:	25.2
Conductivity: µmoh/cm (EPA 120.1) :	1	Diss. Oxygen (EPA 360.1)		EPA 170.1	
Stream Velocity:		Salinity:		T.R.C.:	
pH:(EPA 150.1)	5.48	Secchi:		EPA 330.5	

WEATHER CONDITIONS:

LABORATORY MEASUREMENTS

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

The following values are in mg/L

B.O.D : EPA 405.1	2 U	C.B.O.D : SM 5210-B		C.O.D : EPA 410.4	
Tot. S.S : EPA 160.2	1 U	Vol. S.S: EPA 160.4	1 U	Fix. S.S :	1 U
Tot.Solids : EPA 160.3		T.D.S EPA 160.1			
T. Alkalinity: EPA 310.1		Settleable Matter: EPA 160.5		Diss. Oxygen: EPA 360.2	

COMMENTS:

Sample Custody
Sample Released to: Bipin Adhyaru Date: 02/03/2003

Preservation: Ice Time: 14:00

Reported by: Bipin Adhyaru Date:: 02/10/2003

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

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

SAMPLE ID : 030117 STATION : DATE: 02/03/03 TIME: 10:05
SAMPLE SOURCE IFF SAMPLER: O'Connor/Wright/Lucas
STATION LOCATION: IFF Control
PROGRAM MOD.: IW COMPLIANCE: ☒ ENFORCEMENT: ☐
FIELD MEASUREMENTS

Tot. Depth:	2.6	Sample Depth:	1.3	W.Temp. °C:	12.32
Conductivity: µmoh/cm (EPA 120.1) :	469	Diss. Oxygen (EPA 360.1)	7.58	EPA 170.1	
Stream Velocity:		Salinity:	0.23	T.R.C.:	
pH:(EPA 150.1)	7.19	Secchi:	0.7	EPA 330.5	

WEATHER CONDITIONS:

LABORATORY MEASUREMENTS

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

The following values are in mg/L

B.O.D : EPA 405.1	2 K	C.B.O.D : SM 5210-B		C.O.D : EPA 410.4	
Tot. S.S : EPA 160.2	2	Vol. S.S: EPA 160.4	1	Fix. S.S :	1
Tot.Solids : EPA 160.3		T.D.S EPA 160.1			
T. Alkalinity: EPA 310.1		Settleable Matter: EPA 160.5		Diss. Oxygen: EPA 360.2	

COMMENTS:

Sample Custody
Sample Released to: Bipin Adhyaru Date: 02/03/2003

Preservation: Ice Time: 14:00

Reported by: Bipin Adhyaru Date:: 02/10/2003

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

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

SAMPLE ID : 030118 STATION : DATE: 02/03/03 TIME: 11:45
SAMPLE SOURCE IFF SAMPLER: O'Connor/Wright/Lucas
STATION LOCATION: IFF Test Site
PROGRAM MOD.: IW COMPLIANCE: ☒ ENFORCEMENT: ☐
FIELD MEASUREMENTS

Tot. Depth:	0.8	Sample Depth:	0.4	W.Temp. °C:	31.48
Conductivity: µmoh/cm (EPA 120.1) :	812	Diss. Oxygen (EPA 360.1)	4.44	EPA 170.1	
Stream Velocity:		Salinity:	0.39	T.R.C.:	
pH:(EPA 150.1)	8.29	Secchi:	0.3 L	EPA 330.5	

WEATHER CONDITIONS:

LABORATORY MEASUREMENTS

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

The following values are in mg/L

B.O.D : EPA 405.1	2 K	C.B.O.D : SM 5210-B		C.O.D : EPA 410.4	
Tot. S.S : EPA 160.2	2	Vol. S.S: EPA 160.4	1	Fix. S.S :	1
Tot.Solids : EPA 160.3		T.D.S EPA 160.1			
T. Alkalinity: EPA 310.1		Settleable Matter: EPA 160.5		Diss. Oxygen: EPA 360.2	

COMMENTS:

Sample Custody
Sample Released to: Bipin Adhyaru Date: 02/03/2003

Preservation: Ice Time: 14:00

Reported by: Bipin Adhyaru Date:: 02/10/2003

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

Table 1. Data recorded during the 96-hour acute screening bioassays of a sample of effluent from Bush Boake Allen, 2051 N. Lane Ave., Jacksonville, Duval County, Florida, NPDES# FL0001040, performed from 4 to 8 February 2003.

Facility:	**Bush Boake Allen**		**NPDES #:**	**FL0001040**	Facility Type: **Industrial**	**Analysts:**	Jacquelyn Brynda
Location:	2051 N. Lane Ave.		Contact/District:	O'Connor/NE			Joshua Ayres
County:	Duval		Test type:	acute screen			James Daniels
Sample Collection Date:	2/3/2003	Time: 0900	# tests:	2	Receiving Water: Little Six Mile Creek		Marshall Faircloth
Test Beginning Date:	2/4/2003	Time: 1500	Chlorination Type:	non-chlorinated			Travis Hill
Test Ending Date:	2/8/2003	Time: 1300	FDEP SOP#:	TA07_01	**Page 1 of 2**	**Reviewer:**	Rob Buda

Organism: ***Ceriodaphnia dubia*** Life stage: <24 hours [B]Feeding: YCT/Algae
0-48 hours (before renewal) Chamber size: 30mL

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[A]			Dissolved Oxygen			Conductivity Uncorrected µmhos/cm	
Concentrations	Volume(mL)	0 hr	24 hr	48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control A	0/20	5	5	5	8.1	-	8.0	25.7	-	24.9	7.7	-	7.7	180	210
Control B	0/20	5	5	5	-	-	8.0	-	-	24.7	-	-	7.5	-	210
Control C	0/20	5	5	5	-	-	8.0	-	-	24.6	-	-	7.5	-	210
Control D	0/20	5	5	5	-	-	8.0	-	-	24.6	-	-	7.3	-	215
100% A	20/0	5	5	4	8.4	-	8.3	25.1	-	25.5	7.6	-	7.4	895	960
100% B	20/0	5	5	5	-	-	8.3	-	-	25.0	-	-	7.4	-	1000
100% C	20/0	5	5	5	-	-	8.3	-	-	24.9	-	-	7.4	-	1040
100% D	20/0	5	5	5	-	-	8.3	-	-	24.9	-	-	7.3	-	1055

Organism: ***Ceriodaphnia dubia***
48-96 hours (after renewal)

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[A]			Dissolved Oxygen			Conductivity Uncorrected µmhos/cm	
Concentrations	Volume(mL)	48 hr	72 hr	96 hr	48 hour	72 hour	96 hour	48 hour	72 hour	96 hour	48 hour	72 hour	96 hour	48 hour	96 hour
Control A	0/20	5	5	5	7.8	-	8.6	25.1	-	25.3	7.5	-	7.0	190	200
Control B	0/20	5	5	5	-	-	8.6	-	-	25.1	-	-	7.0	-	200
Control C	0/20	5	5	5	-	-	8.6	-	-	24.7	-	-	7.1	-	205
Control D	0/20	5	5	5	-	-	8.6	-	-	24.3	-	-	7.1	-	220
100% A	20/0	4	4	4	8.4	-	8.6	24.8	-	25.0	6.7	-	7.0	855	930
100% B	20/0	5	5	5	-	-	8.6	-	-	24.9	-	-	7.0	-	970
100 % C	20/0	5	5	5	-	-	8.6	-	-	24.6	-	-	7.0	-	990
100% D	20/0	5	5	5	-	-	8.6	-	-	24.3	-	-	7.0	-	1050

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 25.0-26.5°C.
Incubator #3 temperature range for the test period was 25.0-25.5°C.
[B] Organisms fed prior to testing and before renewal.

Continued

LIMS	
Job number:	TLH-2003-02-04-11
sample number:	651041

Data Transcription Verification	
date:	5/19/2003
by:	Cathy Oaks
	Brad Richardson

Total Residual CL2	mg/L	Method
Field:	-	-
Lab:	<0.03	Hach

Ammonia	Total (mg/L)	Unionized (mg/L)
Control water (water flea):	<0.017	<0.017
100% Sample:	<0.017	<0.017

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control water (water flea):	82	80
100% Sample:	145	315

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

Table 1. Data recorded during the 96-hour acute screening bioassays of a sample of effluent from Bush Boake Allen, 2051 N. Lane Ave., Jacksonville, Duval County, Florida, NPDES# FL0001040, performed from 4 to 8 February 2003.
Concluded

Facility:	**Bush Boake Allen**		**NPDES #:**	**FL0001040**	Facility Type: **Industrial**	**Analysts:**	Jacquelyn Brynda
Location:	2051 N. Lane Ave.		Contact/District:	O'Connor/NE			Joshua Ayres
County:	Duval		Test type:	acute screen			James Daniels
Sample Collection Date:	2/3/2003	Time: 0900	# tests:	2	Receiving Water: Little Six Mile Creek		Marshall Faircloth
Test Beginning Date:	2/4/2003	Time: 1515	Chlorination Type:	non-chlorinated			Travis Hill
Test Ending Date:	2/8/2003	Time: 1330	FDEP SOP#:	TA07_02	**Page 2 of 2**	**Reviewer:**	Rob Buda

Organism: ***Pimephales promelas*** Life stage: 9 days [D]Feeding: artemia
0-48 hours (before renewal) Chamber size: 1L

Concentrations	Sample/Diluent Volume(mL)	SURVIVAL # Alive 0 hr	24 hr	48 hr	pH 0 hour	24 hour	48 hour	Temperature[A] 0 hour	24 hour	48 hour	Dissolved Oxygen 0 hour	24 hour	48 hour	Conductivity Uncorrected µmhos/cm 0 hour	48 hour
Control A	0/500	5	5	5	8.2	7.6	7.7	24.9	23.8	27.5	7.9	7.6	6.1	315	355
Control B	0/500	5	5	5	8.2	7.7	7.8	24.8	25.2	24.3	8.0	7.6	7.1	315	345
Control C	0/500	5	5	5	8.2	7.4	7.8	24.8	24.8	26.9	8.0	7.6	6.7	315	360
Control D	0/500	5	5	5	8.2	7.4	7.8	24.8	24.3	25.1	8.0	7.7	6.7	315	360
100% A	500/0	5	5	5	8.4	8.3	8.3	25.3	24.7	26.1	7.9	7.6	6.7	905	940
100% B	500/0	5	5	5	8.4	8.3	8.3	25.4	24.4	25.5	8.0	7.7	6.6	920	955
100% C	500/0	5	5	5	8.4	8.3	8.3	25.4	24.4	26.6	8.0	7.8	6.5	920	980
100% D	500/0	5	5	5	8.4	8.3	8.3	25.5	26.0	25.6	8.0	7.7	6.6	920	970

LIMS	
Job number:	TLH-2003-02-04-11
sample number:	651041

Data Transcription Verification	
date:	5/19/2003
by:	Cathy Oaks
	Brad Richardson

Total Residual CL2	mg/L	Method
Field:	-	-
Lab:	<0.03	Hach

Ammonia	Total (mg/L)	Unionized (mg/L)
Control water (fish):	<0.017	<0.017
100% Sample:	<0.017	<0.017

Organism: ***Pimephales promelas***
48-96 hours (after renewal)

Concentrations	Sample/Diluent Volume(mL)	SURVIVAL # Alive 48 hr	72 hr	96 hr	pH 48 hour	72 hour	96 hour	Temperature[A] 48 hour	72 hour	96 hour	Dissolved Oxygen 48 hour	72 hour	96 hour	Conductivity Uncorrected µmhos/cm 48 hour	96 hour
Control A	0/500	5	5	5	7.5	7.7	8.2	25.4	24.5	25.0	7.8	7.3	6.6	320	330
Control B	0/500	5	5	5	7.8	7.8	8.2	25.4	25.3	24.9	7.8	7.2	6.7	325	330
Control C	0/500	5	5	5	8.0	7.8	8.2	25.3	25.2	25.4	7.7	7.3	6.4	325	330
Control D	0/500	5	5	5	8.0	7.8	8.2	25.3	25.1	25.4	7.7	7.2	6.4	325	330
100% A	500/0	5	5	5	8.3	8.2	8.3	25.1	25.0	24.9	7.7	7.2	6.7	890	925
100% B	500/0	5	5	5	8.3	8.3	8.4	25.0	24.8	25.4	7.0	7.1	6.6	905	920
100 % C	500/0	5	5	5	8.4	8.3	8.4	25.0	24.8	25.3	6.9	7.0	6.5	910	930
100% D	500/0	5	5	5	8.4	8.3	8.4	25.0	24.6	25.7	6.6	7.0	6.5	905	930

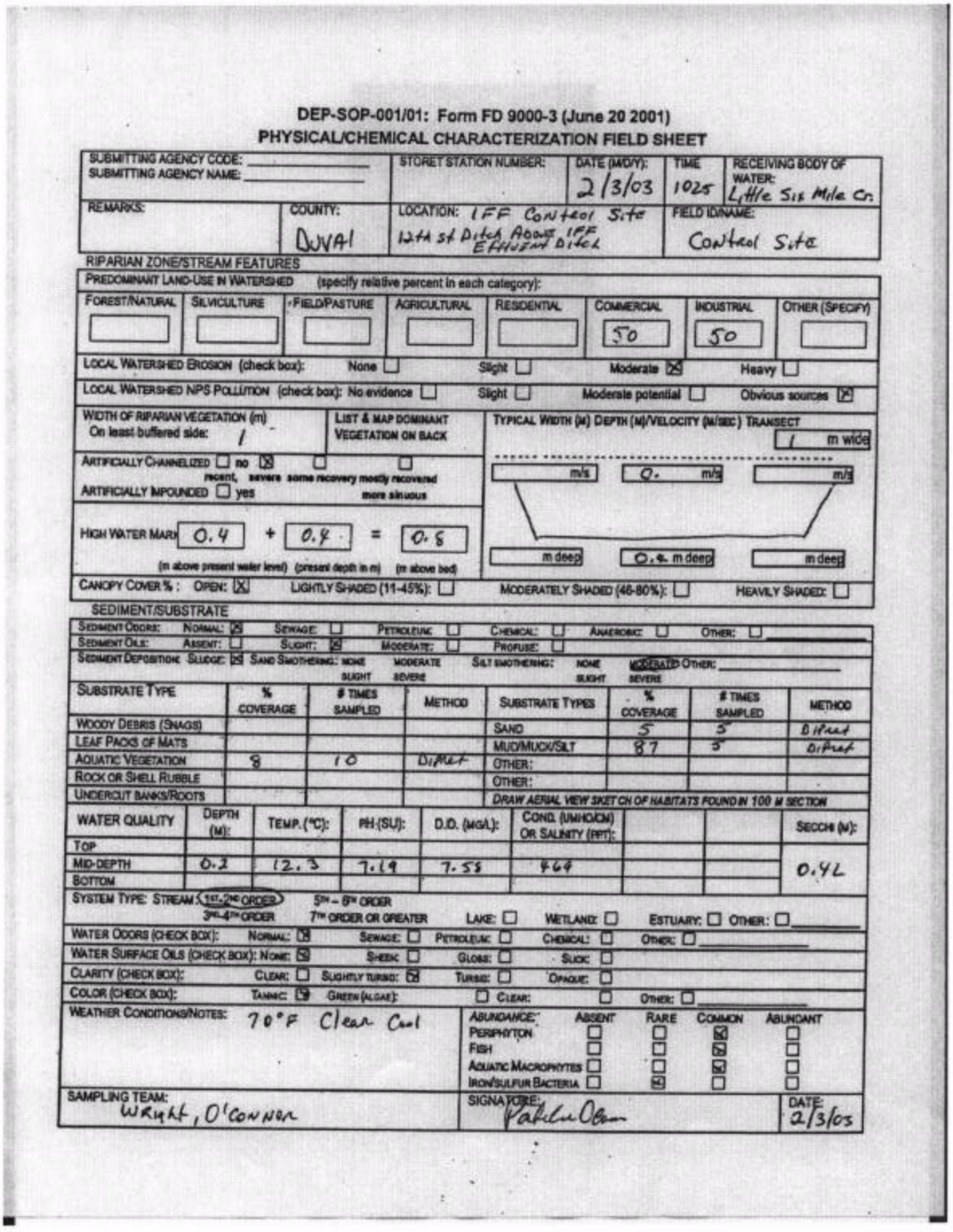
Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control water (fish):	140	130
100% Sample:	145	315

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

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 25.0-26.5°C.
Incubator #3 temperature range for the test period was 25.0-25.5°C.
[B] Organisms fed prior to testing and before renewal.

Appendix 8

Habitat Assessment Field Sheets.



DEP-SOP-001/01: Form FD 9000-3 (June 20 2001)
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y): 2/3/03	TIME: 1025	RECEIVING BODY OF WATER: Little Six Mile Cr.
REMARKS:	COUNTY: DUVAL	LOCATION: IFF Control Site 12th St Ditch About IFF Effluent Ditch		FIELD ID/NAME: 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)
					50	50	

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: 1

LIST & MAP DOMINANT VEGETATION ON BACK

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

ARTIFICIALLY IMPOUNDED ☐ yes

HIGH WATER MARK: 0.4 + 0.4 = 0.8
(m above present water level) (present depth in m) (m above bed)

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

1 m wide

m/s | 0. m/s | m/s

m deep | 0.4 m deep | m deep

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

SEDIMENT/SUBSTRATE

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

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

SEDIMENT DEPOSITION: SLUDGE: ☒ SAND SMOTHERING: NONE SLIGHT MODERATE SEVERE SILT SMOTHERING: NONE SLIGHT MODERATED SEVERE OTHER:

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)				SAND	5	5	D Pheat
LEAF PACKS OR MATS				MUD/MUCK/SILT	87	5	D Pheat
AQUATIC VEGETATION	8	10	D Pheat	OTHER:			
ROCK OR SHELL RUBBLE				OTHER:			
UNDERCUT BANKS/ROOTS				DRAW AERIAL VIEW SKET CH 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	0.2	12.3	7.19	7.55	464			0.4L
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: 70°F Clear Cool

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

SAMPLING TEAM: Wright, O'Connor

SIGNATURE: Patricia O'Connor

DATE: 2/3/03

FDEP-SOP-001/01: Form FD 9000-5 (June 1, 2001)

STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		2/3/03	Little Six Mile Cr.

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	DUVAL	12th St. Ditch Above IFF Effluent Ditch	Control Site

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity 5	Four or more productive habitats present (snags, tree roots/undercut banks, aquatic vegetation, leaf packs (partially decayed), rock). 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Substrate Availability 7	Greater than 30% productive habitat present at site. 20 19 18 17 16	16% to 30% productive habitat, by aerial extent. 15 14 13 12 11	6% to 15% productive habitat 10 9 8 7 6	Less than 5% productive habitat. 5 4 3 2 1
Water Velocity 6	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec. Or spate occurring: > 1 m/sec 5 4 3 2 1
Habitat Smothering 9 Primary Score 27	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of the habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, as severe problem, pools absent 5 4 3 2 1
Secondary Habitat Components Artificial Channelization 5	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	Many have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability Right Bank 5 Left Bank 7	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank 2 Left Bank 2	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12m 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 4 Left Bank 4 Secondary Score 29	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 ozone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of streambank surfaces are vegetated and/or poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 3 2 1

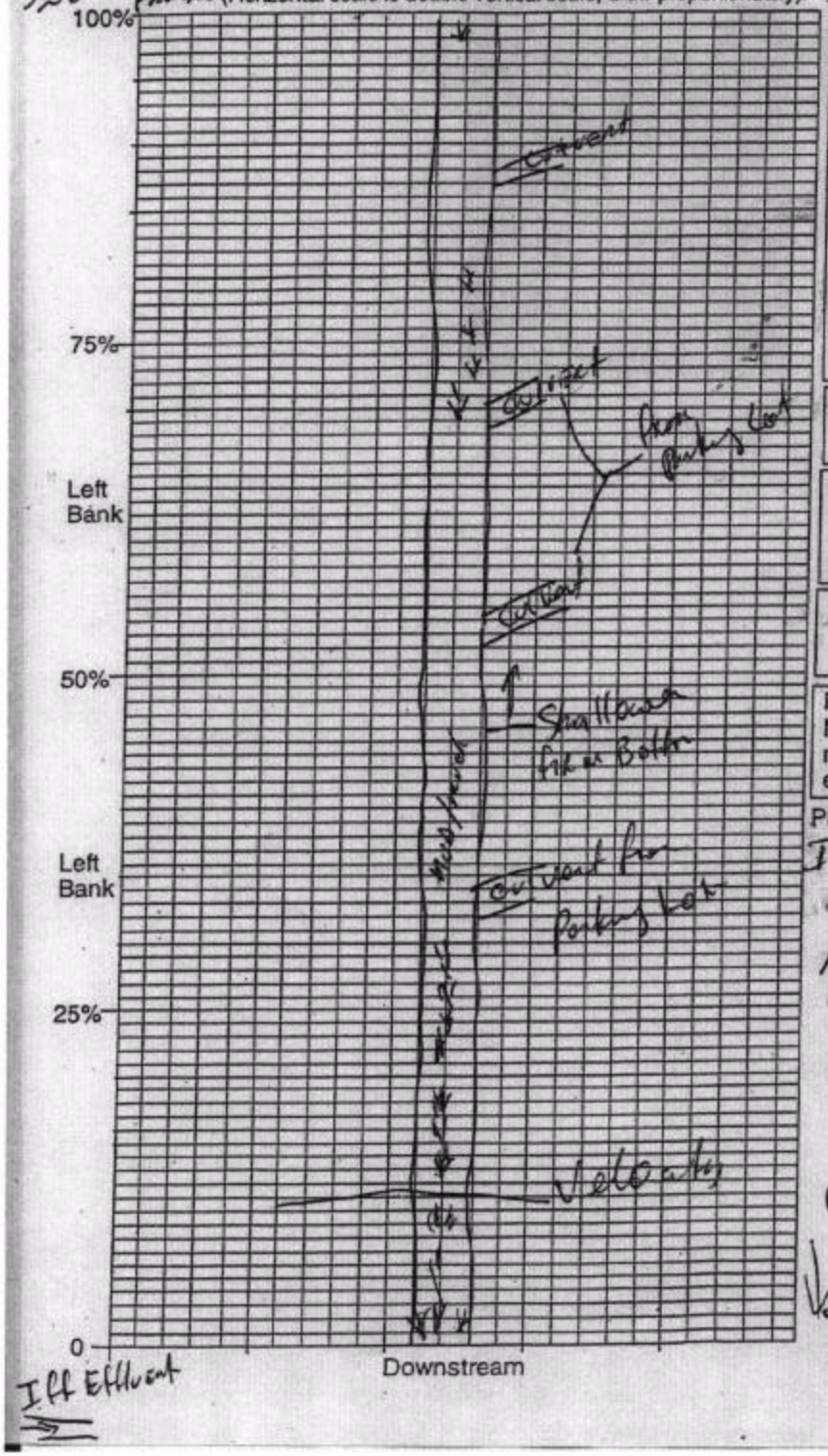
TOTAL SCORE 56

ANALYSIS DATE:	ANALYST:	SIGNATURE:
2/3/03	O'CONNOR	

Control Site
12th St Ditch
≈250 meters upstream

Site Map / Habitat Sketch

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



Field ID: Control Site

Substrates: Code key, draw proportionate habitat abundance.

- Snags
- XX Roots/undercut banks
- OO Leaf Packs (or mats)
- VV 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:
IFF POD 250M ABOVE
12th St Ditch
Control site is above
area where Iff effluent
enters 12th St Ditch
30 21 02.0
81 44 45.5 @ 0'
2-3 m wide
0.5 m/s Aquatic Veg
Concentrated in
center of Ditch
Turbid

FDEP-SOP-001/01: Form FD 9000-3 (June 1, 2001)

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME:	RECEIVING BODY OF WATER:
		2/3/03	1215	

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Duval	IFF 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):
					50	50	

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

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

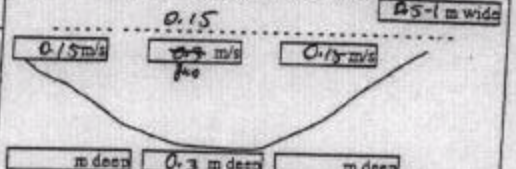
Width of riparian vegetation (m) On least buffered side: 1

List & map dominant Vegetation on back

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

Artificially Impounded ☐ yes

Typical Width (m) Depth (m)/Velocity (m/sec) Transect 45-1 m wide



High Water Mark: 0.3 (m above present water level) + 0.3 (present depth in m) = 0.6 (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 moderate Other: ____ slight (severe)

Substrate Type	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	2	5	DiPnet	Sand	62	5	DiPnet
Leaf Packs of Mats	.			Mud/Muck/Silt			
Aquatic Vegetation	35	5	DiPnet	Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots	1	5	DiPnet	*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (umho/cm) Or Salinity (ppt):			Secchi (m):
Top								
Mid-depth	0.05	31.48	8.29	4.44	812			0.1
Bottom								

System Type: Stream: (1st) 2nd order ☐ 5th – 6th order ☐ 3rd 4th 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:

Clear cool 70° F

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

SAMPLING TEAM: Wright O'Connor

SIGNATURE: Patrick O'Connor DATE: 2/3/03

FDEP-SOP-001/01: Form FD 9000-5 (June 1, 2001)

STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		2/5/03	Little Sugar Creek

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Duval	IFF TEST	

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity 13	Four or more productive habitats present (snags, tree roots/undercut banks, aquatic vegetation, leaf packs (partially decayed), rock). 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Substrate Availability 18	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 13	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec. Or spate occurring: > 1 m/sec 5 4 3 2 1
Habitat Smothering 13 Primary Score 57	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of the habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, as severe problem, pools absent 5 4 3 2 1
Secondary Habitat Components Artificial Channelization 3	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	Many have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability Right Bank 4 Left Bank 4	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank 1 Left Bank 2	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12m 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 2 Left Bank 2 Secondary Score 20	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 ozone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of streambank surfaces are vegetated and/or poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 3 2 1

TOTAL SCORE 97

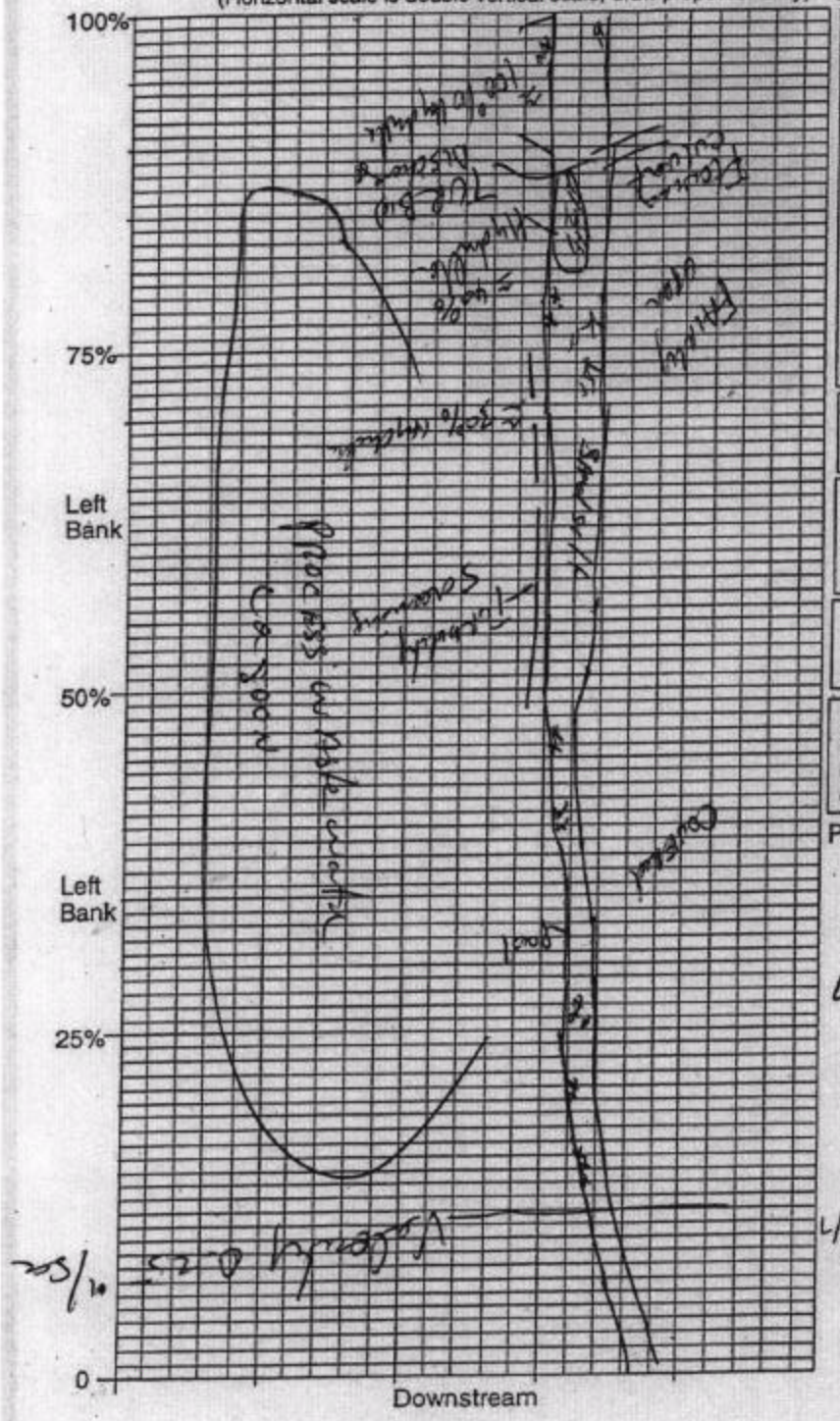
ANALYSIS DATE:	ANALYST:	SIGNATURE:
2/3/03	OlConnor	

TEST

IFF POD No Ditch Above POD
100% of Flow in Ditch is Effluent

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 abundance.

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

Velocity:
Note where velocity measures were taken.

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

100-90 100% Hydrilla
80-50 fairly uniform dept
Ludwigia peruviana
Bidens
Eastern Bacopa

Flowing Culvert from RR ROW

L/L @ POD 30 20 56.5
81 44 54.3

Appendix 9a

Taxa list and density (number/cm^2) for periphyton collected from glass microscope slides incubated for 28 days upstream and downstream of the IFF Chemical Holdings discharge, 2/3/03.

	Control Site	Test Site
Bacillariophyta		
Achnanthes exigua	-	20,378
Achnanthes lanceolata	1,021	-
Amphora sp.	9,187	-
Cocconeis sp.	1,021	-
Cocconeis placentula	1,021	2,911
Cyclotella sp.	2,042	-
Cymbellaceae	1,021	-
Diploneis sp.	-	2,911
Eunotia sp.	27,560	163,022
Fragilaria delicatissima	3,062	-
Fragilariaceae	82,681	8,733
Gomphonema sp.	15,311	26,200
Gomphonema acuminatum	2,042	-
Gomphonema affine	1,021	2,911
Gomphonema gracile	2,042	14,556
Gomphonema parvulum	7,145	8,733
Gomphonema truncatum	12,249	-
Melosira sp.	13,270	-
Navicula sp.	3,062	87,333
Navicula cryptocephala	-	2,911
Navicula rostellata	-	186,310
Naviculaceae	2,042	-
Nitzschia sp.	5,104	40,755
Nitzschia amphibia	-	17,467
Nitzschia frustulum	-	17,467
Nitzschia palea	-	2,911
Pinnularia sp.	12,249	5,822
Rhopalodia gibba	1,021	-
Synedra ulna	13,270	-
Tryblionella sp.	1,021	2,911
Chlorophycota		
Chlamydomonas sp.	1,021	-
Chlorella sp.	12,249	-
Chlorococcum sp.	2,042	-
Cosmarium sp.	2,042	5,822
Oedogonium sp.	34,705	-
Oocystis sp.	1,021	5,822
Pediastrum duplex	1,021	-
Staurastrum triundulatum floridense	1,021	-
Stigeoclonium sp.	4,083	-
Ulothrix sp.	4,083	-
Chrysophyta		
Dinobryon sertularia	2,042	-
Cyanophycota		
Anabaena sp.	1,021	128,088
Aphanocapsa sp.	1,021	-
Chroococcus minutus	-	5,822
Cyanobium parvum	-	14,556
Cyanobium plancticum	-	2,911
Gloeocapsa sp.	3,062	-
Lyngbya sp.	9,187	32,022
Lyngbya martensiana	-	2,911
Microcystis sp.	-	5,822
Oscillatoria sp.	9,187	32,022
Oscillatoria subbrevis	-	11,644
Oscillatoria tenuis	-	23,289
Schizothrix calcicola	1,021	-

Appendix 9b

Taxa list and number of individuals counted for periphyton collected from glass microscope slides incubated for 28 days upstream and downstream of the IFF Chemical Holdings discharge, 2/3/03.

	Control Site	Test Site
Bacillariophyta		
Achnanthes exigua	-	7
Achnanthes lanceolata	1	-
Amphora sp.	9	-
Cocconeis sp.	1	-
Cocconeis placentula	1	1
Cyclotella sp.	2	-
Cymbellaceae	1	-
Diploneis sp.	-	1
Eunotia sp.	27	56
Fragilaria delicatissima	3	-
Fragilariaceae	81	3
Gomphonema sp.	15	9
Gomphonema acuminatum	2	-
Gomphonema affine	1	1
Gomphonema gracile	2	5
Gomphonema parvulum	7	3
Gomphonema truncatum	12	-
Melosira sp.	13	-
Navicula sp.	3	30
Navicula cryptocephala	-	1
Navicula rostellata	-	64
Naviculaceae	2	-
Nitzschia sp.	5	14
Nitzschia amphibia	-	6
Nitzschia frustulum	-	6
Nitzschia palea	-	1
Pinnularia sp.	12	2
Rhopalodia gibba	1	-
Synedra ulna	13	-
Tryblionella sp.	1	1
Chlorophycota		
Chlamydomonas sp.	1	-
Chlorella sp.	12	-
Chlorococcum sp.	2	-
Cosmarium sp.	2	2
Oedogonium sp.	34	-
Oocystis sp.	1	2
Pediastrum duplex	1	-
Staurastrum triundulatum floridense	1	-
Stigeoclonium sp.	4	-
Ulothrix sp.	4	-
Chrysophyta		
Dinobryon sertularia	2	-
Cyanophycota		
Anabaena sp.	1	44
Aphanocapsa sp.	1	-
Chroococcus minutus	-	2
Cyanobium parvum	-	5
Cyanobium plancticum	-	1
Gloeocapsa sp.	3	-
Lyngbya sp.	9	11
Lyngbya martensiana	-	1
Microcystis sp.	-	2
Oscillatoria sp.	9	11
Oscillatoria subbrevis	-	4
Oscillatoria tenuis	-	8
Schizothrix calcicola	1	-

Appendix 10a

Benthic macroinvertebrates collected from Hester-Dendy artificial substrates incubated upstream and downstream of the IFF Chemical Holdings facility for 28 days (2/3/03). Taxa collected and density (average number of individuals/m^2) rounded to the nearest individual (n = 3 samples). See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site	Test Site
Annelida		
Oligochaeta		
Allonais pectinata	3	-
Bratislavia unidentata	-	3
Chaetogaster sp.	11	-
Enchytraeidae	-	3
Nais communis complex	53	-
Arthropoda		
Arachnida		
Hygrobates sp.	-	93
Oribatei sp.	-	19
Crustacea		
Hyalella azteca	5	-
Insecta		
Diptera		
Ceratopogonidae	3	-
Cricotopus bicinctus	56	13
Dicrotendipes sp.	3	-
Kiefferulus sp.	-	3
Nanocladius sp.	3	-
Polypedilum flavum	8	8
Polypedilum illinoense grp.	3	5
Polypedilum scalaenum grp.	-	3
Rheotanytarsus exiguus grp.	3	3
Rheotanytarsus pellucidus	3	-
Thienemannimyia grp.	-	13
Ephemeroptera		
Caenis sp.	11	-
Odonata		
Argia fumipennis	-	3
Libellulidae	3	-
Trichoptera		
Cheumatopsyche sp.	-	3
Cnidaria		
Hydrozoa		
Hydra sp.	5	-
Mollusca		
Gastropoda		
Ancylidae	-	6
Micromenetus dilatatus	7	-
Micromenetus dilatatus avus	4	-
Physella sp.	-	21

Appendix 10b

Benthic macroinvertebrates collected from Hester-Dendy artificial substrates incubated upstream and downstream of the IFF Chemical Holdings facility for 28 days (2/3/03). Taxa collected and total number of individuals counted (n = 3 samples).

	Control Site	Test Site
Annelida		
Oligochaeta		
Allonais pectinata	1	-
Bratislavia unidentata	-	1
Chaetogaster sp.	4	-
Enchytraeidae	-	1
Nais communis complex	20	-
Arthropoda		
Arachnida		
Hygrobates sp.	-	35
Oribatei sp.	-	7
Crustacea		
Hyalella azteca	2	-
Insecta		
Diptera		
Ceratopogonidae	1	-
Chironomidae	-	4
Cricotopus bicinctus	21	5
Dicrotendipes sp.	1	-
Kiefferulus sp.	-	1
Nanocladius sp.	1	-
Polypedilum flavum	3	3
Polypedilum illinoense grp.	1	2
Polypedilum scalaenum grp.	-	1
Rheotanytarsus exiguus grp.	1	1
Rheotanytarsus pellucidus	1	-
Thienemannimyia grp.	-	1
Ephemeroptera		
Caenis sp.	4	-
Odonata		
Libellulidae	1	-
Argia fumipennis	-	1
Trichoptera		
Cheumatopsyche sp.	-	1
Cnidaria		
Hydrozoa		
Hydra sp.	2	-
Mollusca		
Gastropoda		
Ancylidae	-	2
Micromenetus dilatatus	2	-
Micromenetus dilatatus avus	1	-
Physella sp.	-	7
Undetermined Gastropoda	1	1

Appendix 11a

Qualitative benthic macroinvertebrate collections (n = 20 discrete dipnet sweeps) upstream and downstream of the IFF Chemical Holdings facility (2/3/03). Taxa list and number of individuals counted (collapsed). See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

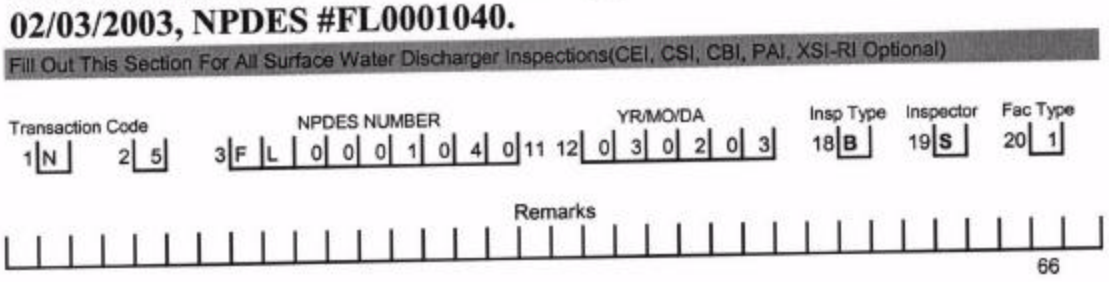
	Control Site	Test Site
Annelida		
Oligochaeta		
Allonais pectinata	-	46
Aulodrilus pigueti	10	9
Bratislavia unidentata	-	2
Dero digitata complex	1	-
Eclipidrilus sp.	1	-
Enchytraeidae	1	1
Haber speciosus	10	-
Limnodrilus sp.	-	17
Limnodrilus hoffmeisteri	33	-
Nais communis complex	29	-
Pristina aequiseta	-	25
Pristina leidyi	-	2
Arthropoda		
Arachnida		
Hygrobates sp.	-	3
Oribatei sp.	-	1
Insecta		
Diptera		
Ceratopogonidae	1	-
Cricotopus bicinctus	42	-
Polypedilum illinoense grp.	2	-
Ephemeroptera		
Caenis sp.	14	-
Trichoptera		
Cheumatopsyche sp.	-	1
Zygoptera		
Argia sp.	-	1
Mollusca		
Bivalvia		
Sphaeriidae	3	-
Gastropoda		
Ancylidae	2	1
Physella sp.	-	1
Nemertea		
Prostoma sp.	1	1

Appendix 11b

Qualitative benthic macroinvertebrate collections (n = 20 discrete dipnet sweeps) upstream and downstream of the IFF Chemical Holdings facility (2/3/03). Taxa list and number of individuals counted.

	Control Site	Test Site
Annelida		
Oligochaeta		
Allonais pectinata	-	46
Aulodrilus pigueti	10	9
Bratislavia unidentata	-	2
Dero digitata complex	1	-
Eclipidrilus sp.	1	-
Enchytraeidae	1	1
Haber speciosus	10	-
Limnodrilus sp.	-	17
Limnodrilus hoffmeisteri	33	-
Nais communis complex	29	-
Pristina aequiseta	-	25
Pristina leidyi	-	2
Arthropoda		
Arachnida		
Hygrobates sp.	-	3
Oribatei sp.	-	1
Insecta		
Diptera		
Ceratopogonidae	1	-
Chironomidae	5	-
Cricotopus bicinctus	38	-
Polypedilum illinoense grp.	1	-
Ephemeroptera		
Caenis sp.	14	-
Trichoptera		
Cheumatopsyche sp.	-	1
Zygoptera		
Argia sp.	-	1
Mollusca		
Bivalvia		
Sphaeriidae	1	-
Undetermined Bivalvia	2	-
Gastropoda		
Ancylidae	2	1
Physella sp.	-	1
Nemertea		
Prostoma sp.	1	1

The Bioassay of IFF Chemical Holdings, Inc. effluent sampled on 02/03/2003, NPDES #FL0001040.



The Priority Pollutants Analysis for Bioassay of IFF Chemical Holdings, Inc. effluent sampled on 02/03/2003, NPDES #FL0001040.

