


Biological Assessment of

# Sterling Fibers, Incorporated
# (formerly Cytec Industries)

Santa Rosa County

NPDES #FL002593

Sampled October 1996

April 1997

**Biology Section**
**Division of Administrative and Technical Services**

Comprehensive Quality Assurance Plan No. 870346G

# Department of Environmental Protection
## Results of Fifth Year Inspections

Discharger: Sterling Fibers, Inc. (Cytec Industries)
County: Santa Rosa
NPDES Number: FL0002593
State Permit Expiration Date: 24 August 1998

### Toxics Sampling Inspection (XSI)

Date Sampled: 7 October 1996

Results: No organic pollutants were found in the effluent. Effluent cyanide (0.037 µg/L or 0.47 lbs/day) complied with the Class III marine water quality standard (1.0 µg/L) and the permit limit (0.75 lbs/day maximum). Of the metals detected in the effluent, only copper (5 µg/L) and iron (323 µg/L) exceeded Class III water quality standards for marine waters. Because the facility has been granted a mixing zone for these parameters, these effluent concentrations do not represent violations.

### Compliance Biomonitoring Inspection (CBI)

Date Sampled: 7 October 1996

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

### Impact Bioassessment Inspection (IBI)

Date Sampled: 10 October 1996

Results: The macroinvertebrate data indicate that stressful conditions prevailed throughout Escambia Bay, with additional degradation (*e.g.*, biological integrity violations, decreases in taxa richness) observed at the test sites. The 32% decrease in the Shannon-Weaver diversity index between the reference site and test sites represented a violation of the biological integrity criterion (Rule 62-302.530(11) FAC). Phytoplankton was sparse throughout Escambia Bay, and there was no evidence that the facility was affecting the algal community.

### Water Quality Inspection (WQI)

Date Sampled: 10 October 1996

Results: While effluent fecal coliforms complied with water quality standards, effluent total coliforms (4,000 organisms/100 mL) exceeded the Class III standard of 2,400 organisms/100 mL (a violation of Rule 62-302.530(7)FAC). Receiving water fecal and total coliforms all complied with Class III water quality standards. Although the effluent levels of ammonia (8.8 mg/L), nitrate-nitrite (1.3 mg/L), and TKN (28 mg/L) were elevated, there did not appear to be nutrient enrichment in Escambia Bay attributable to the discharge. Effluent total nitrogen (374 lbs/day) and ortho-phosphate (10 lbs/day) complied with permit limits. With the exception of moderately elevated amounts of nitrate-nitrite at the reference site (0.097 mg/L) and test site 1 (0.15 mg/L), nutrients in the Escambia Bay sites were low or undetected. All sites had AGP values of 2.3 mg dry wt/L or less, which is considerably lower than the 10 mg dry wt/L "problem threshold" for marine waters. The effluent AGP was 395.3 mg dry wt/L.

## Introduction

Sterling Fibers, Incorporated, (previously "Cytec Industries" and "American Cyanamid"), is a synthetic fiber manufacturing facility located in Santa Rosa County, Florida (see map in Appendix). Wastewater from the chemical and dye manufacturing process (identified as "strong wastewater") is discharged through an underground injection well. Wastewater from the fiber process (identified as "weak wastewater") is treated separately in an aerated lagoon/stabilization pond (a biological treatment system). Wastewater from the sanitary waste system is treated biologically, settled, and chlorinated. The chlorinated sanitary wastewater enters the "weak wastewater" stream at the head of the lagoon treatment system. Wastewater from the lagoon is either discharged into the Class III Escambia Bay or to a spray irrigation field. The facility has a design flow of 1.53 MGD. Flow during this survey (1.53 MGD) was equal to the design flow.

Effluent permit limits are as follows: water temperature (95° F maximum), pH (6.0 to 8.5 SU, or not more than 1 SU below background if background is below 6 SU), BOD (125 lbs/day as a monthly average and 250 lbs/day maximum), TSS (250 lbs/day as a monthly average and 500 lbs/day maximum), cyanide (0.4 lbs/day as a monthly average and 0.75 lbs/day maximum), total nitrogen (450 lbs/day as a monthly average and 700 lbs/day maximum), ortho-phosphate (15 lbs/day as a monthly average and 30 lbs/day maximum).

A mixing zone, extending 125,600 $m^2$ into Escambia Bay, has been granted for cyanide, pH, iron, silver, and copper. Monthly Operating Report (MOR) data indicate four separate occasions of non-compliance with the permit limit for pH within the past year.

*Major characteristics of community structure of control and test sites.*

| Cytec Industries Inc. | Reference Site | Test Site 1 | Test Site 2 |
|---|---|---|---|
| **Macroinvertebrate Ponar** | | | |
| Number of Taxa | 20 | 8 | 11 |
| Shannon-Weaver Diversity | 2.19 | 1.49 | 1.5 |
| % Polychaeta | 70.4 | 92.2 | 85.9 |
| % Amphipoda | 22.4 | 0 | 0 |
| %Nemertea | 3.9 | 2.4 | 10 |
| % Oligochaeta | 0.2 | 4.8 | 1.2 |
| % Predator/Carnivores | 7.9 | 4.0 | 13.2 |
| % Above-Surface Deposit Feeders | 6.9 | 17.9 | 6.5 |
| % Below Surface Deposit Feeders | 55.0 | 60.0 | 72.4 |
| % Scavengers | 11.9 | 0 | 0 |
| % Suspension Feeders | 5.6 | 17.9 | 6.2 |
| % Browser-grazer | 11.9 | 0 | 0 |
| **Phytoplankton Algae** | | | |
| Number of Taxa | 4 | 7 | 5 |
| Shannon-Weaver Diversity | 1.77 | 1.51 | 1.77 |
| Chlorophyll a (µg/L) | 1.0 U | 1.12 U | 1.0 U |
| Algal Density (#/mL) | 189.0 | 683.8 | 452.0 |
| % Cryptophyceae | 33.3 | 55.9 | 45.5 |
| % Chlorophyceae | 22.2 | 2.9 | 13.6 |
| % Diatoms | 44.4 | 38.2 | 36.7 |
| **Algal Growth Potential (mg dry wt/l)** | 1.87 | 2.34 | 1.26 |

## Methods

The focus of this investigation was to determine the discharger's effects on Escambia Bay. A comparison of biological community health was made between a reference site (located in the northwestern portion of Escambia Bay near the mouth of the Escambia River) and two test sites (in the vicinity of the discharge). Test site 1 was located at the end of the discharge pipe and test site 2 was located approximately 1 mile south of the discharge, adjacent to Fisherman's Point. A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia* and *Cyprinella leedsi* as test organisms, were performed on an effluent sample (Weber 1991). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were per-

formed on effluent, reference, and test sites. Methods used for all chemical analyses are on file at the Tallahassee DEP Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected using three replicate petite Ponar grabs per site. Phytoplankton was sampled at reference and test sites via subsurface grabs. Chlorophyll *a* was also determined for periphyton communities (Ross 1990). Bacterial populations were analyzed for total and fecal coliforms following the methods of APHA (1989). Algal Growth Potential tests, using *Selenastrum capricornutum* for the freshwater effluent and *Dunaliella tertiolecta* for the remaining (higher salinity) sites, followed Miller *et al.* (1978) and EPA (1974). Sediment from reference and test sites was analyzed for grain size and percent organic matter (Ross 1990).

## Explanation of Measurements of Community Health

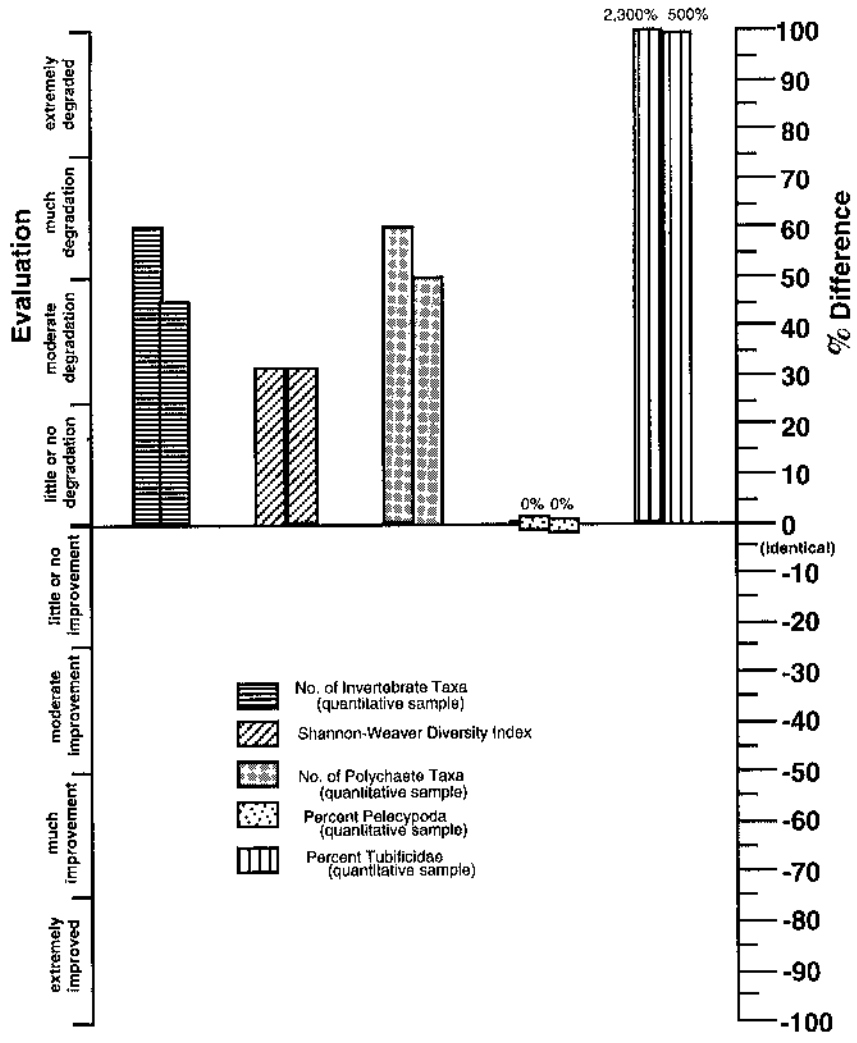
Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of a discharge. These are briefly discussed here.

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

Shannon-Weaver diversity: This index is specified in the Florida Administrative Code as a measure of biological integrity. Low diversity scores are undesirable. They represent conditions where only a few organisms are abundant, to the exclusion of other taxa. Excessive numerical dominance of a single type of organism (a high % contribution of the dominant taxon) is a related measure which is also associated with disturbance.

Numbers of pollution sensitive taxa: Some organisms become rare or absent as the intensity or duration of disturbance increases. For example, the Florida Index assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy. Species sensitivity data from other sources, such as Hulbert (1990), Hudson *et al.* (1990), Lenat (1993), Farrell (1992), Chang *et al.* (1992), and Whitmore (1989), are used as appropriate.

Community structure: Substantial shifts in proportions of major groups of organisms, compared to reference conditions, may indicate degradation. In marine systems, an increase in the % tubi-




***Effect of discharge on the benthic macroinvertebrate community.***

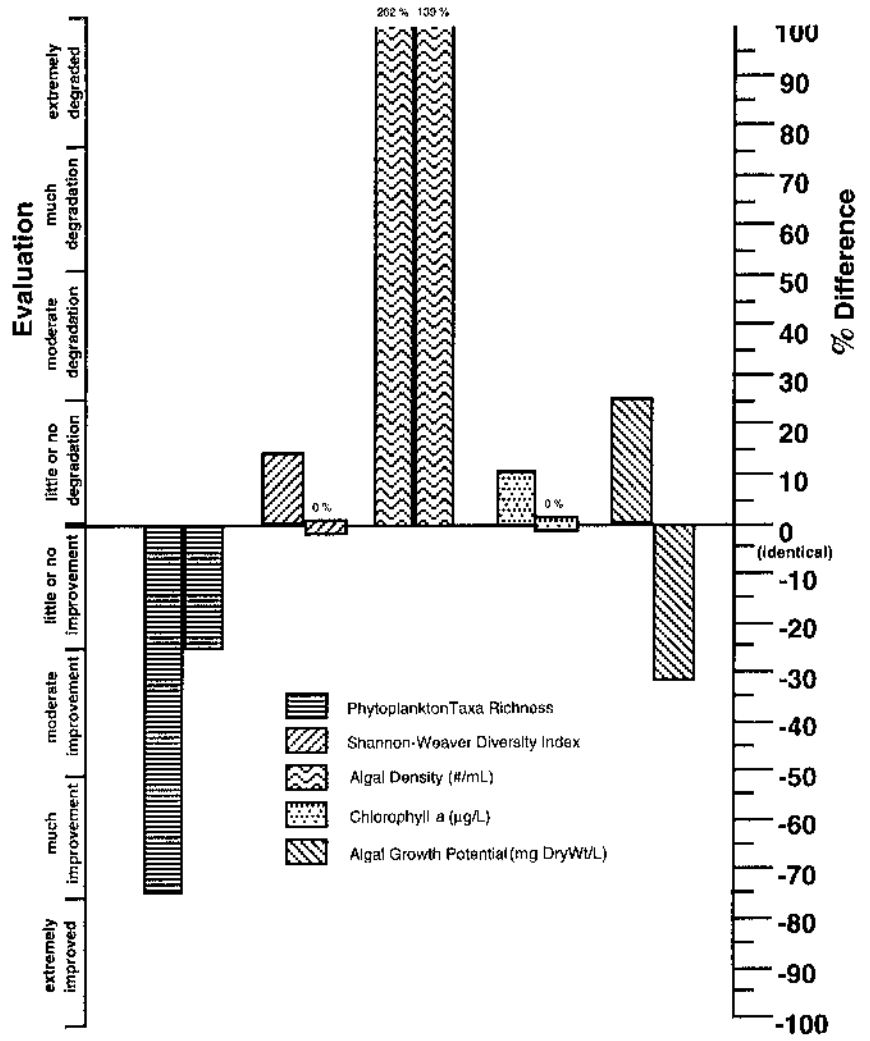
ficid oligochaetes, a decrease in the % pelecypods, and a decrease in the number of polychaete taxa are all considered indicators of disturbance (Engel *et al.* 1994).

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

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

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, the % filter-feeders, the number of polychaete taxa, and the % pelecypods are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving the % tubificids, algal density, chlorophyll *a*, and algal growth potential are measured as the test site minus reference site divided by the reference site.

The following personnel were involved in this investigation: Glen Butts (DEP Northwest District), Lyn Burton, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Kathleen Lurding, Elizabeth Miller, Urania Quintana, Lisa Tamburello, David Whiting, Vicki Whiting, and Greg Wynn (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Jan Mandrup-Poulsen, and Michael Tanski, as well as District representatives.




***Effect of discharge on the algal community.***

## Results and Discussion

Escambia Bay, an oligohaline estuary, is the receiving water for Sterling Fibers' discharge. Habitat quality at the reference site was "good" (with 61 points) while habitat at the test sites was considered "fair" (test site 1 = 41 points; test site 2 = 44 points). The relative lack of community types at the test sites was responsible for the lower habitat scores there.

The surface salinity at the reference site (9.4 ppt) was somewhat lower than either test site (test site 1 = 15.6 ppt and test site 2 = 13.9 ppt) which can be explained by the influence of the Escambia River at the reference site. The bottom salinity, however, was very similar at all three sites, ranging from 21.7 ppt to 21.8 ppt. The remaining physical/chemical measurements were also similar at all sites. The surface temperature ranged from

19.0° C to 20.4° C, while the surface pH ranged from 7.3 SU to 7.6 SU. Surface dissolved oxygen ranged from 7.5 mg/L to 7.6 mg/L while bottom measurements ranged from 5.2 mg/L to 5.7 mg/L at all sites. Sediment grain size was very similar among the three study sites, suggesting that any differences seen in the benthic communities would be due to factors other than grain size (Appendix).

The effluent sample was not toxic to the fish *Cyprinella leedsi*, or to the water flea, *Ceriodaphnia dubia*.

No organic pollutants were found in the effluent. Effluent cyanide (0.037 µg/L or 0.47 lbs/day) complied with the Class III marine water quality standard (1.0 µg/L) and the permit limit (0.75 lbs/day maximum).

Of the metals detected in the effluent, only copper (5 µg/L) and iron (323 µg/L) exceeded Class III water quality standards for marine waters. Because the facility has been granted mixing zones for these substances, these effluent concentrations do not represent a violation.

Effluent TSS (6 mg/L or 77 lbs/day) and $BOD_5$ (8.8 mg/L or 112 lbs/day) also complied with permit limits.

Although the effluent levels of ammonia (8.8 mg/L), nitrate-nitrite (1.3 mg/L), and TKN (28 mg/L) were elevated, there did not appear to be nutrient enrichment in Escambia Bay attributable to the discharge. Effluent total nitrogen (374 lbs/day) and ortho-phosphate (10 lbs/day) complied with permit limits. With the exception of moderately elevated amounts of nitrate-nitrite at the reference site (0.097 mg/L) and test site 1 (0.15 mg/L), nutrients in the Escambia Bay sites were low or undetected. These nitrate-nitrite values were higher than those found in 82% and 88% of other estuaries in Florida, respectively (see Table of Typical Water Quality Values in Appendix).

Algal growth potential (AGP) results also indicated that nutrient enrichment was not a problem in Escambia Bay. All receiving water sites had AGP's of 2.3 mg dry wt/L or less, which is considerably lower than the 10 mg dry wt/L "problem threshold" for marine waters. The effluent AGP was 395.3 mg dry wt/L.

While effluent fecal coliforms (480 organisms/100 mL) complied with water quality standards, effluent total coliforms (4,000 organisms/100 mL) exceeded the Class III standard of 2,400 organisms/100 mL (a violation of Rule 62-302.530(7)FAC). Receiving water fecal coliforms (ranging from 20 organisms/100 mL to 70 organisms/100 mL) and total coliforms (ranging from 150 organisms/100 mL to 260 organisms/100 mL) all complied with Class III water quality standards.

Quantitative measures of benthic macroinvertebrate community health suggested that even though the reference site was not pristine, additional biological impairment was observed at the test sites. The figure on p. 2 indicates the degree of difference between the reference and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean the test site was better than the reference.

Taxa richness decreased from 20 taxa at the reference site to 8 taxa at test site 1 and 11 taxa at test site 2. Although somewhat low at the background station, Shannon-Weaver diversity decreased from 2.2 at the reference site to 1.5 at both test sites. This 32% decrease in the Shannon-Weaver diversity index between the reference site and test sites represents a violation of the biological integrity criterion (Rule 62-302.530(11) FAC).

A total of 10 polychaete taxa were recovered from the reference site, while only 4 and 5 polychaete taxa were found at the test sites 1 and 2, respectively. The relative lack of polychaete taxa at test sites 1 and 2 is another indication of disturbance there. Another example of stress, observed at all stations, was the conspicuous lack of pelecypods.

A few pollution sensitive marine taxa, such as *Mysidopsis bahia* and *Corophium* sp., were found at the reference site. In contrast, no amphipods, isopods, or mysids were found at the test sites. All Escambia Bay stations were dominated by Capitellidae, which are considered pollution tolerant. Capitellidae accounted for 54.8%, 55.1%, and 71.2% of the total population at the reference site, test 1, and test site 2, respectively. In summary, the macroinvertebrate data indicate that stressful conditions prevailed throughout Escambia Bay, with additional degradation (*e.g.*, biological integrity violations) observed at the test sites.

The figure on p. 3 represents changes in the phytoplankton algal community. As was noted with the macroinvertebrates, larger differences (that is, higher percentages) correspond with greater degrees of degradation. Phytoplankton was sparse throughout Escambia Bay, and there was no evidence that the facility was having any effects on the algal community. Only 4 to 7 different types of taxa were recov-

ered at all sites, and algal density ranged from 189 organisms/mL to 684 organisms/mL. Chlorophyll *a* was undetected at all sites and phytoplankton Shannon-Weaver diversity ranged from 1.5 to 1.8. *Chroomonas* sp. and *Cyclotella* sp. were the two most common taxa throughout the bay.

## Conclusions

The effluent sample was not toxic to the fish *Cyprinella leedsi*, or to the water flea, *Ceriodaphnia dubia*.

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Phytoplankton was sparse throughout Escambia Bay, and there was no evidence that the facility was affecting the algal community.

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| Chemistry Summary Table for Sterling Fibers, Inc (Cytec). | Effluent | Reference Site | Test Site 1 | Test Site 2 |
|---|---|---|---|---|
| **Organic Constituents (ug/L)** | | | | |
| Cyanide (mg/L) | 0.037 Q | | | |
| **Metals (ug/L)** | | | | |
| Aluminum | 74 | | | |
| Arsenic | 20 U | | | |
| Cadmium | 0.05 U | | | |
| Copper | 5 I | | | |
| Chromium | 5 I | | | |
| Iron | 323 A | | | |
| Lead | 10 U | | | |
| Mercury | 0.1 U | | | |
| Nickel | 4 U | | | |
| Selenium | 30 U | | | |
| Silver | 0.07 I | | | |
| Zinc | 31 J | | | |
| **Nutrients (mg/L)** | | | | |
| Ortho-phosphate | 0.75 A | 0.004 U | 0.004 U | 0.005 I |
| Total phosphorus | 0.95 | 0.02 I | 0.019 I | 0.02 I |
| Ammonia | 8.8 A | 0.025 | 0.049 | 0.057 |
| Nitrate+Nitrite | 1.3 A | 0.097 A | 0.15 | 0.15 |
| TKN | 28 | 0.45 | 0.38 | 0.41 |
| **General Phys-Chem Parameters** | | | | |
| Habitat Assessment | | 61 | 41 | 44 |
| Surface Dissolved Oxygen (mg/L) | 5.9 | 7.5 | 7.5 | 7.6 |
| Bottom Dissolved Oxygen (mg/L) | | 5.6 | 5.2 | 5.7 |
| Surface pH (SU) | 7.0 | 7.4 | 7.3 | 7.6 |
| Surface Salinity (ppt) | 0.0 | 9.4 | 15.6 | 13.9 |
| Bottom Salinity (ppt) | | 21.7 | 21.8 | 21.7 |
| Surface Temperature (°C) | 19.6 | 20.4 | 20.1 | 19.0 |
| Total Suspended Solids (mg/L) | 6.0 | 13.0 | 27.0 | 10.0 |
| Biological Oxygen Demand, 5 day (mg/L) | 8.8 | 1.0 | 0.9 | 0.8 |
| Turbidity (NTU's) | 10 | 5 | 6 | 6 |
| Color (PCU's) | 80 | 40 | 50 | 50 |
| Hardness (mg CaCO3) | 8.89 | | | |
| Algal Growth Potential (mg dry wt/L) | 395.3 | 1.87 | 2.34 | 1.26 |
| **Toxicity** | | | | |
| Bioassay Fish-Dechlorinated | Not toxic | | | |
| Bioassay Invertebrate-Dechlorinated | Not toxic | | | |
| Bioassay Fish-Chlorinated | Not toxic | | | |
| Bioassay Invertebrate-Chlorinated | Not toxic | | | |
| **Microbiological Communities (org/100 mL)** | | | | |
| Fecal Coliform | 480 | 20 | 70 | 70 |
| Total Coliform | 4,000 | 150 | 260 | 200 |

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

I - Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit

J - Estimated value

Q - Sample held beyond normal holding time

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

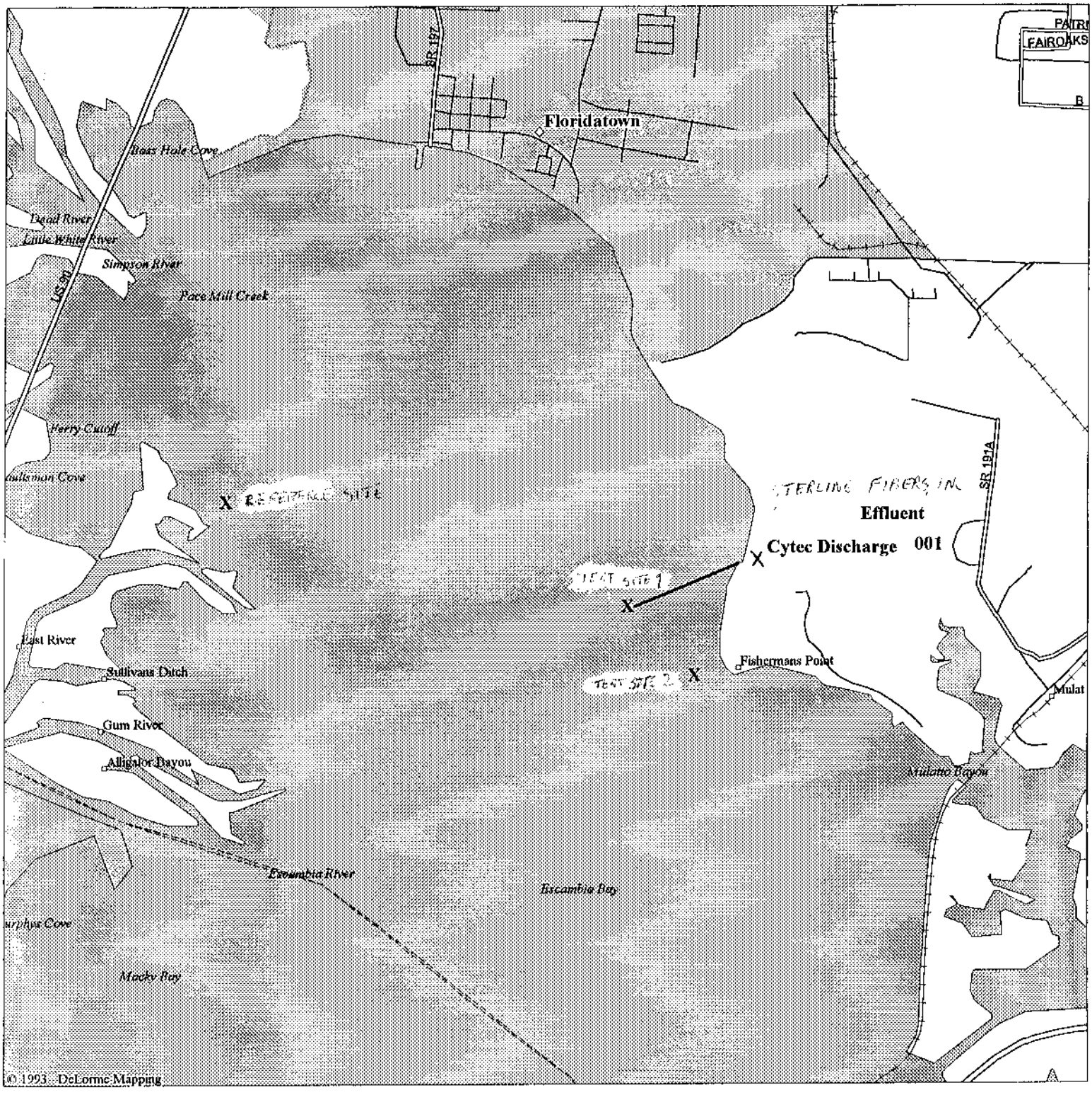
# Typical Values for Selected Parameters in Florida Waters

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

## Percentile Distribution

| Parameter | 5% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 95% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **STREAMS** (1617 stations) | | | | | | | | | | | |
| Phytoplankton Chlorophyll *a* | 0.22 | 0.52 | 0.94 | 1.60 | 3.02 | 4.63 | 6.72 | 9.87 | 14.68 | 27.35 | 48.70 |
| Periphyton Chlorophyll *a* | 0.31 | 0.43 | 0.77 | 1.04 | 2.16 | 2.94 | 6.45 | 10.51 | 17.00 | 39.51 | 60.85 |
| H-D Diversity | 0.84 | 2.12 | 2.48 | 2.74 | 2.88 | 3.09 | 3.25 | 3.40 | 3.52 | 3.76 | 3.90 |
| Qualitative Taxa Richness | 9.00 | 12.00 | 17.00 | 20.00 | 22.00 | 24.50 | 26.00 | 28.00 | 31.00 | 37.00 | 53.00 |
| H-D Taxa Richness | 6.00 | 6.50 | 9.00 | 11.50 | 13.00 | 15.00 | 17.00 | 21.50 | 26.00 | 29.00 | 32.00 |
| TKN | 0.30 | 0.39 | 0.56 | 0.73 | 0.87 | 1.00 | 1.11 | 1.26 | 1.49 | 1.93 | 2.80 |
| Ammonia | 0.02 | 0.02 | 0.04 | 0.05 | 0.06 | 0.08 | 0.11 | 0.14 | 0.20 | 0.34 | 0.60 |
| NO2-NO3 | 0.01 | 0.01 | 0.03 | 0.05 | 0.07 | 0.10 | 0.14 | 0.20 | 0.32 | 0.64 | 1.05 |
| Total Phosphorus | 0.02 | 0.03 | 0.05 | 0.06 | 0.10 | 0.13 | 0.18 | 0.25 | 0.39 | 0.74 | 1.51 |
| Ortho Phosphorus | 0.01 | 0.01 | 0.03 | 0.04 | 0.05 | 0.08 | 0.11 | 0.17 | 0.27 | 0.59 | 1.37 |
| Turbidity | 0.60 | 0.90 | 1.20 | 1.45 | 2.10 | 2.80 | 3.60 | 4.50 | 6.65 | 10.45 | 16.30 |
| **LAKES** (477 stations) | | | | | | | | | | | |
| Phytoplankton Chlorophyll *a* | 0.80 | 1.71 | 2.88 | 4.28 | 10.06 | 13.40 | 20.00 | 30.10 | 47.20 | 65.44 | 113.90 |
| Dredge Diversity | 0.71 | 0.97 | 1.43 | 1.74 | 1.98 | 2.12 | 2.21 | 2.59 | 2.85 | 3.15 | 3.17 |
| Dredge Taxa Richness | 3.00 | 5.00 | 6.50 | 7.00 | 9.00 | 10.00 | 11.00 | 13.00 | 15.00 | 17.00 | 21.00 |
| TKN | 0.36 | 0.49 | 0.67 | 0.83 | 1.08 | 1.26 | 1.40 | 1.51 | 1.68 | 2.11 | 3.46 |
| NH3+NH4 | 0.01 | 0.02 | 0.02 | 0.03 | 0.04 | 0.06 | 0.08 | 0.12 | 0.15 | 0.21 | 0.28 |
| NO2-NO3 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.02 | 0.04 | 0.05 | 0.10 | 0.14 | 0.23 |
| Total Phosphorus | 0.01 | 0.02 | 0.02 | 0.03 | 0.05 | 0.07 | 0.09 | 0.11 | 0.14 | 0.23 | 0.42 |
| Ortho-Phosphorus | 0.00 | 0.01 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.08 | 0.21 | 0.32 |
| Turbidity | 1.00 | 1.25 | 1.55 | 2.05 | 2.75 | 4.50 | 6.45 | 9.60 | 14.10 | 26.00 | 40.00 |
| **ESTUARIES** (690 stations) | | | | | | | | | | | |
| Phytoplankton Chlorophyll *a* | 2.14 | 3.28 | 4.49 | 5.13 | 6.00 | 6.93 | 7.94 | 9.60 | 12.40 | 17.60 | 22.20 |
| Dredge Diversity | 1.34 | 1.53 | 1.91 | 2.28 | 2.56 | 2.90 | 3.15 | 3.59 | 4.01 | 4.53 | 4.98 |
| Dredge Taxa Richness | 4.00 | 6.00 | 9.00 | 11.00 | 15.00 | 18.50 | 25.00 | 35.00 | 41.00 | 62.00 | 90.00 |
| TKN | 0.26 | 0.34 | 0.42 | 0.50 | 0.59 | 0.69 | 0.76 | 0.82 | 0.95 | 1.30 | 1.49 |
| NH3+NH4 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.08 | 0.09 | 0.13 | 0.22 | 0.28 |
| NO2-NO3 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.02 | 0.03 | 0.05 | 0.08 | 0.17 | 0.23 |
| Total Phosphorus | 0.01 | 0.02 | 0.06 | 0.07 | 0.10 | 0.11 | 0.14 | 0.17 | 0.23 | 0.43 | 0.59 |
| Ortho-Phosphorus | 0.01 | 0.02 | 0.03 | 0.04 | 0.04 | 0.05 | 0.07 | 0.09 | 0.12 | 0.21 | 0.44 |
| Turbidity | 3.50 | 4.00 | 4.50 | 5.05 | 5.40 | 5.60 | 6.30 | 6.80 | 8.00 | 11.40 | 11.75 |

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




Cytec, Inc
Mag 14.00
Fri Oct 04 07:57:56 1996

# FACILITY SUMMARY

Facility Name: Cytec Industries Date Summary Prepared: 10/03/96
State GMS # 1057P06136

| Location map: | County: | District: | Facility Type: |
|---|---|---|---|
| 1801 Cyanamid Road<br>Milton, Florida 32571 | Santa Rosa | NW | Industrial |

Wastewater Permit # FL0002593 issued May 1, 1995 and expires August 24, 1998.
(combines NPDES Permit FL0002591 and FDEP permit 1057P06136)

Function of facility:
A biological treatment facility for oxidation of weak wastewater from a synthetic fiber manufacturing facility.

Description of treatment process:
The process includes aerobic basins, discharging to an oxidation/polishing pond, chlorination chamber with final discharge to Escambia Bay and to an approved spray irrigation field.

Receiving waters: Escambia Bay Classification: III

Design Flow: n/a Mean Flow: 1.53 MGD (Aug. 1995 - July 1996) Flow during survey: 1.53 MGD (July 1996)

Discharge is: Continuous

If facility has a mixing zone, give details (size, parameters, etc.):
The facility has a mixing zone for cyanide, pH, iron, silver, and copper for which that surface area is 125,600 square meters.

List effluent limits (attach relevant paperwork):

| Parameter | Frequency | Limit |
|---|---|---|
| Flow | Continuous | n/a |
| Temperature | Continuous | 95°F (max.) |
| pH | Continuous | 6.0-8.5 s.u. unless background is <6.0. The pH shall not vary below background more than 1 unit. |
| BOD5 | Twice/week | 125 lbs/day (mo.avg.), 250 lbs/day (max.) |
| TSS | Twice/week | 250 lbs/day (mo.avg.), 500 lbs/day (max.) |
| Cyanide | Twice/week | 0.4 lbs/day (mo. avg.), 0.75 lbs/day (max.) |
| T. Nitrogen | Twice/week | 450 lbs/day (mo. avg.), 700 lbs/day (max.) |

Ortho Phosphate Twice/week 15 lbs/day (mo. avg.), 30 lbs/day (max.)

---

List permit violations (from MOR data or other source) and plant upsets within the past year:

07/31/96 pH = 8.7
03/26/96 pH = 4.0
12/13/95 pH = 8.8
08/31/95 pH = 8.8

---

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

The latest bioassay on file was performed in January 1996. The effluent was not toxic to the test organisms. There are no pending or existing enforcement actions against the permittee.

---

Discuss comparability of MOR results to past FDEP results and whether there are trends (improving, declining) in the data sets:

The MOR results appear to be accurate. However, no comparison can be made between FDEP and MOR results.

---

Additional information:

Staff contributing to this review (signature)

| | |
|---|---|
| | Biologist |
| | Inspector |
| | Engineer |
| Lisa Kelley | Other |
| | Other |

# STATE OF FLORIDA
## DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

| SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD | STORET STATION NUMBER: 33.02.0A13 | DATE (M/DY): 10-10-96 | TIME: 1040 | RECEIVING BODY OF WATER: ESCAMBIA BAY |
|---|---|---|---|---|

| REMARKS: | LOCATION: | FIELD ID/NAME: |
|---|---|---|
| REFERENCE SITE | AT ISLAND OFF RIVER DELTA | REFERENCE SITE |

RIPARIAN ZONE/INSTREAM FEATURES

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

| Forest | Field/Pasture | Agricultural | Residential | Commercial | Industrial | Other (Specify) |
|---|---|---|---|---|---|---|
| 95 | | | 5 | | | |

Local Watershed Erosion (check box): None [X] Moderate [ ] Heavy [ ]

Local Watershed NPS Pollution (check box): No evidence [X] Some potential sources [ ] Obvious sources [ ]

Point-Source Pollution (list location and describe): NONE IN IMMEDIATE AREA, APCI & CYTEC DISCHARGE ACROSS BAY ON THE EAST SHORE

| Estimated System Width (range, m): | Estimated System Depth (range, m): | yes |
|---|---|---|
| High Water Mark (m above bed): | Velocity (range, m/s): | Impounded [ ] Channelized [ ] |

Canopy Cover % : Open : [X] Lightly Shaded (11-45%): [ ] Moderately Shaded (46-80%): [ ] Heavily Shaded: [ ]

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Anaerobic: [ ] Other: [ ]

Sediment Oils: Absent: [X] Slight: [ ] Moderate: [ ] Profuse: [ ]

Sediment Deposits: Sludge: [ ] Paper Fiber: [ ] Mud: [X] Sand: [X] Shell: [ ] Other: [X] Plant debris

| Substrate Types | % coverage | # times sampled | method | Substrate Types | % coverage | # times sampled | method |
|---|---|---|---|---|---|---|---|
| Woody Debris (Snags) | | | | Riffles | | | |
| Leaf Packs | | | | Sand | 20 | | PONAR |
| Aquatic Vegetation | 20 | | PONAR | Mud/Muck/Silt | 60 | | PONAR |
| Rock or Shell Rubble | | | | Benthic leaf mats | | | |
| Undercut Banks/Roots | | | | Other: | | | |

WATER QUALITY

| | Depth (m): | Temp. (°C): | pH (SU): | D.O. (mg/l): | Cond. (µmho/cm): | | | Secchi (m): |
|---|---|---|---|---|---|---|---|---|
| Top | 1.0 ft | 20.39 | 7.40 | 7.50 | 14,520 | | | 1.4 |
| Mid-depth | 3.0 ft | 21.80 | 8.03 | 7.66 | 27,000 | | | |
| Bottom | 6.0 ft | 22.14 | 7.87 | 5.43 | 32,500 | | | |

System Type : Stream: [ ] (Sand Bottomed / Sand Bot w/ Spring / Swamp & Bog / Calcareous / Alluvial / Misc.) Lake: [ ] Wetland: [ ] Estuary: [X] Other: [ ]

Water Odors (check box): Normal: [X] Sewage: [ ] Petroleum: [ ] Chemical: [ ] Other: [ ]

Water Surface Oils (check box): None: [X] Sheen: [ ] Globs: [ ] Slick: [ ]

Clarity (check box): Clear: [ ] Slightly turbid: [X] Turbid: [ ] Opaque: [ ]

Color (check box): Tannic: [X] Green (algae): [ ] Clear: [ ] Other: [ ]

Weather Conditions: Clear

| Abundance: | Absent | Rare | Common | Abundant |
|---|---|---|---|---|
| Periphyton | [ ] | [ ] | [X] | [ ] |
| Fish | [ ] | [ ] | [X] | [ ] |
| Aquatic Macrophytes | [ ] | [ ] | [X] | [ ] |
| Iron/sulfur Bacteria | [X] | [ ] | [ ] | [ ] |

| SAMPLING TEAM: | SIGNATURE: | DATE: |
|---|---|---|
| G. BUTTS / L. DONELAN | Glenn Butts | |

# DEPARTMENT OF ENVIRONMENTAL REGULATION

## MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

| SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD | STORET STATION NUMBER: 33.02.0A13 | DATE (M/D/Y): 10-10-96 | RECEIVING BODY OF WATER: ESCAMBIA BAY |
|---|---|---|---|

| REMARKS: | LOCATION: | FIELD ID/NAME: |
|---|---|---|
| REFERENCE SITE | AT ISLAND OFF RIVER DELTA | REFERENCE SITE |

| Habitat Parameter / score | Excellent | Good | Fair | Poor |
|---|---|---|---|---|
| Littoral Alterations<br>9 | None—Unaltered shoreline.<br>**9-10 points** | Mostly natural shoreline, but with occasional riprap.<br>**6-8 points** | Shoreline consisting mostly of riprap and vertical seawalls.<br>**3-5 points** | Shoreline consisting almost entirely of vertical seawalls.<br>**0-2 points** |
| Community Types Observed<br>26 | At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek.<br>**38-50 points** | Two or three communities observed from those listed.<br>**26-37 points** | One community observed from those listed.<br>**13-25 points** | No communities observed from those listed.<br>**0-12 points** |
| Tidal Fluctuation<br>3 | >0.75 m.<br>**4-5 points** | 0.5 - 0.75 m.<br>**3 points** | 0.25 - 0.5 m.<br>**2 points** | <0.25 m.<br>**0-1 point** |
| Freshwater Discharges/ Alterations<br>9 | Only natural runoff..<br>**9-10 points** | Mostly natural runoff, but with a few, small stormwater sources.<br>**6-8 points** | Considerable stormwater discharge from local roads, parking lots, etc.<br>**3-5 points** | Extensive manmade discharges, especially from canals draining large tracts of land.<br>**0-2 points** |
| Flow and Wave Action<br>7 | Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures.<br>**9-10 points** | — | — | Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high.<br>**0-2 points** |
| Sediment Type<br>7 | Combination of sand, gravel, and shell.<br>**12-15 points** | Primarily sand, with small areas of mud.<br>**8-11 points** | Mixture of sand and mud, or well-aerated mud only.<br>**4-7 points** | Anaerobic mud.<br>**0-3 points** |

**TOTAL SCORE** 61

COMMENTS: Vallisneria americana beds along shoreline

| ANALYSIS DATE: | ANALYST: | SIGNATURE: |
|---|---|---|
| 10-10-96 | G. Butts | Glenn Butts |

# STATE OF FLORIDA
## DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

| SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD | STORET STATION NUMBER: 33.02.0A17 | DATE (M/D/Y): 10-10-96 | TIME: 0916 | RECEIVING BODY OF WATER: ESCAMBIA BAY |
|---|---|---|---|---|

| REMARKS: | LOCATION: AT CYTEC DISCHARGE, MIDDLE MARKER | FIELD/NAME: TEST SITE 1 |
|---|---|---|
| TEST SITE # 1 | | |

RIPARIAN ZONE/INSTREAM FEATURES

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

| Forest | Field/Pasture | Agricultural | Residential | Commercial | Industrial | Other (Specify) |
|---|---|---|---|---|---|---|
| | | | 40 | | 60 | |

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

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

Point-Source Pollution (list location and describe): CYTEC + APCI

| Estimated System Width (range, m): | Estimated System Depth (range, m): | yes |
|---|---|---|
| High Water Mark (m above bed): | Velocity (range, m/s): | Impounded ☐ Channelized ☐ |

Canopy Cover % : Open : ☒ Lightly Shaded (11-45%): ☐ Moderately Shaded (46-80%): ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☐ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☒ Other: ☐ SLIGHT

Sediment Oils: Absent: ☒ Slight: ☐ Moderate: ☐ Profuse: ☐

Sediment Deposits: Sludge: ☐ Paper Fiber: ☐ Mud: ☒ Sand: ☐ Shell: ☐ Other: ☐

| Substrate Types | % coverage | # times sampled | method | Substrate Types | % coverage | # times sampled | method |
|---|---|---|---|---|---|---|---|
| Woody Debris (Snags) | | | | Riffles | | | |
| Leaf Packs | | | | Sand | | | |
| Aquatic Vegetation | | | | Mud/Muck/Silt | 100 | | PONAR |
| Rock or Shell Rubble | | | | Benthic leaf mats | | | |
| Undercut Banks/Roots | | | | Other: | | | |

WATER QUALITY

| | Depth (m): | Temp. (°C): | pH (SU): | D.O. (mg/l): | Cond. (µmho/cm): | | | Secchi (m): |
|---|---|---|---|---|---|---|---|---|
| Top | 1.0 ft | 20.13 | 7.27 | 7.50 | 23,000 | | | 1.1 |
| Mid-depth | 3.0 ft | 21.87 | 7.95 | 7.44 | 29,700 | | | |
| Bottom | 6 ft | 21.63 | 7.8 | 5.24 | 32,800 | | | |

System Type : Stream: ☐ (Sand Bottomed ☐ Swamp & Bog ☐ Alluvial ☐ Sand Bot w/ Spring ☐ Calcareous ☐ Misc. ☐) 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: CLEAR

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

| SAMPLING TEAM: | SIGNATURE: | DATE: |
|---|---|---|
| G. BUTTS / L. DONELAN | Glenn Butts | |

# DEPARTMENT OF ENVIRONMENTAL REGULATION

## MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

| SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD | STORET STATION NUMBER: 33.02.0A17 | DATE (M/D/Y): 10-10-96 | RECEIVING BODY OF WATER: ESCAMBIA BAY |
|---|---|---|---|

| REMARKS: | LOCATION: AT CYTEC DISCHARGE, MIDDLE MARKER | FIELD ID/NAME: TEST SITE 1 |
|---|---|---|
| TEST SITE #1 | | |

| Habitat Parameter / score | Excellent | Good | Fair | Poor |
|---|---|---|---|---|
| Littoral Alterations: 6 | None—Unaltered shoreline. **9-10 points** | Mostly natural shoreline, but with occasional riprap. **6-8 points** | Shoreline consisting mostly of riprap and vertical seawalls. **3-5 points** | Shoreline consisting almost entirely of vertical seawalls. **0-2 points** |
| Community Types Observed: 15 | At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. **38-50 points** | Two or three communities observed from those listed. **26-37 points** | One community observed from those listed. **13-25 points** | No communities observed from those listed. **0-12 points** |
| Tidal Fluctuation: 3 | >0.75 m. **4-5 points** | 0.5 - 0.75 m. **3 points** | 0.25 - 0.5 m. **2 points** | <0.25 m. **0-1 point** |
| Freshwater Discharges/ Alterations: 6 | Only natural runoff.. **9-10 points** | Mostly natural runoff, but with a few, small stormwater sources. **6-8 points** | Considerable stormwater discharge from local roads, parking lots, etc. **3-5 points** | Extensive manmade discharges, especially from canals draining large tracts of land. **0-2 points** |
| Flow and Wave Action: 7 | Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points** | — | — | Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. **0-2 points** |
| Sediment Type: 4 | Combination of sand, gravel, and shell. **12-15 points** | Primarily sand, with small areas of mud. **8-11 points** | Mixture of sand and mud, or well-aerated mud only. **4-7 points** | Anaerobic mud. **0-3 points** |

**TOTAL SCORE** 41

COMMENTS:

| ANALYSIS DATE: | ANALYST: | SIGNATURE: |
|---|---|---|
| 10-10-96 | G. BUTTS | Glenn Butts |

# STATE OF FLORIDA
## DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

| SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD | STORET STATION NUMBER: 33.02.0001 | DATE (M/D/Y): 10-10-96 | TIME: 0956 | RECEIVING BODY OF WATER: ESCAMBIA BAY |
|---|---|---|---|---|

| REMARKS: | LOCATION: | FIELD ID/NAME: |
|---|---|---|
| TEST SITE # 2 | OFF FISHERMAN'S POINT | TEST SITE 2 |

RIPARIAN ZONE/INSTREAM FEATURES

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

| Forest | Field/Pasture | Agricultural | Residential | Commercial | Industrial | Other (Specify) |
|---|---|---|---|---|---|---|
| | | | 60 | 20 | 20 | |

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

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

Point-Source Pollution (list location and describe): CYTEC + AIR PRODUCTS (APCI)

| Estimated System Width (range, m): | Estimated System Depth (range, m): | yes |
|---|---|---|
| High Water Mark (m above bed): | Velocity (range, m/s): | Impounded ☐ Channelized ☐ |

Canopy Cover % : Open : ☒ Lightly Shaded (11-45%): ☐ Moderately Shaded (46-80%): ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☒ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☒ Other: ☐ SLIGHT

Sediment Oils: Absent: ☒ Slight: ☐ Moderate: ☐ Profuse: ☐

Sediment Deposits: Sludge: ☐ Paper Fiber: ☐ Mud: ☒ Sand: ☒ Shell: ☒ Other: ☐

| Substrate Types | % coverage | # times sampled | method | Substrate Types | % coverage | # times sampled | method |
|---|---|---|---|---|---|---|---|
| Woody Debris (Snags) | | | | Riffles | | | |
| Leaf Packs | | | | Sand | 20 | | FINAR |
| Aquatic Vegetation | | | | Mud/Muck/Silt | 60 | | PINAS |
| Rock or Shell Rubble | 20 | | PINAS | Benthic leaf mats | | | |
| Undercut Banks/Roots | | | | Other: | | | |

WATER QUALITY

| | Depth (m): | Temp. (°C): | pH (SU): | D.O. (mg/l): | Cond. (µmho/cm): | | | Secchi (m): |
|---|---|---|---|---|---|---|---|---|
| Top | 1.0 Ft | 18.98 | 7.59 | 7.58 | 20,800 | | | 1.4 |
| Mid-depth | 3.0 Ft | 21.86 | 7.98 | 7.37 | 29,300 | | | |
| Bottom | 7.0 Ft | 21.64 | 7.79 | 5.71 | 32,400 | | | |

System Type : Stream: ☐ (Sand Bottomed, Sand Bot w/ Spring, Swamp & Bog, Calcareous, Alluvial, Misc.) 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: CLEAR

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

| SAMPLING TEAM: | SIGNATURE: | DATE: |
|---|---|---|
| G. BUTTS / L. DONELAN | Glenn Butts | |

# DEPARTMENT OF ENVIRONMENTAL REGULATION

## MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

| SUBMITTING AGENCY CODE: 8010 / SUBMITTING AGENCY NAME: FDEP NWD | STORET STATION NUMBER: 33.02.0001 | DATE (M/D/Y): 10-10-96 | RECEIVING BODY OF WATER: ESCAMBIA BAY |
|---|---|---|---|

| REMARKS: | LOCATION: OFF FISHERMAN'S POINT | FIELD ID/NAME: TEST SITE 2 |
|---|---|---|
| TEST SITE # 2 | | |

| Habitat Parameter / score | Excellent | Good | Fair | Poor |
|---|---|---|---|---|
| Littoral Alterations: 7 | None—Unaltered shoreline. **9-10 points** | Mostly natural shoreline, but with occasional riprap. **6-8 points** | Shoreline consisting mostly of riprap and vertical seawalls. **3-5 points** | Shoreline consisting almost entirely of vertical seawalls. **0-2 points** |
| Community Types Observed: 15 | At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. **38-50 points** | Two or three communities observed from those listed. **26-37 points** | One community observed from those listed. **13-25 points** | No communities observed from those listed. **0-12 points** |
| Tidal Fluctuation: 3 | >0.75 m. **4-5 points** | 0.5 - 0.75 m. **3 points** | 0.25 - 0.5 m. **2 points** | <0.25 m. **0-1 point** |
| Freshwater Discharges/ Alterations: 8 | Only natural runoff.. **9-10 points** | Mostly natural runoff, but with a few, small stormwater sources. **6-8 points** | Considerable stormwater discharge from local roads, parking lots, etc. **3-5 points** | Extensive manmade discharges, especially from canals draining large tracts of land. **0-2 points** |
| Flow and Wave Action: 7 | Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points** | — | — | Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. **0-2 points** |
| Sediment Type: 4 | Combination of sand, gravel, and shell. **12-15 points** | Primarily sand, with small areas of mud. **8-11 points** | Mixture of sand and mud, or well-aerated mud only. **4-7 points** | Anaerobic mud. **0-3 points** |

**TOTAL SCORE** 44

COMMENTS: PROBABLE DEPOSITION AREA FOR BOTH APCI + CYTEC DISCHARGES AND STORMWATER INPUT FROM IMMEDIATE AREA AND DOWN BAY

| ANALYSIS DATE: | ANALYST: G. BUTTS | SIGNATURE: Glenn Butts |
|---|---|---|

# FDEP Biology Section — Acute Bioassay Bench Sheet

**Sample Source:** CyTec Industries
**County:** Santa Rosa
**Contact / District:** Glenn Butts / Northwest
**NPDES Permit #:** FL0002593
**LIMS Sample #:** 155092 **LIMS Job #:** 96-Oct-06-09
sample log 10-14-96
**Test Type:** Screening | Definitive
Static | Static Renewal | Flow-through
**Test Number:** 2 of 2
**Remarks:** dech = dechlorinated
A C1- sample shall indicate 0.01 mg/L TRC when the solubility of 0.05 mg/L SO2 in Reconstituted Water is exceeded.

**Sample Collection:** Date 10-07-96 Time 1230
**Test Beginning:** Date 10-08-96 Time 1450
**Test Ending:** Date 10-10-96 Time 1450
**Organism Batch #:** 76 **Diluent Batch #:** well #3
**Organism Age:** 11 days
***Test Organism:*** Cyprinella leedsi

**Instrument Calibrations:**

| | pH | Temperature °C | D.O. mg/L | Conductivity µmhos/cm |
|---|---|---|---|---|
| meter # | 7851 | 90H018262 | 90H018262 | G9005749 |
| 0 hr | 7.0 @ 7.0<br>9.0 @ 9.0 | 22.9 @ 23.0 | 8.5 @ 23.0 °C | 1083 @ 1013<br>1380 @ 1409 @ 23.5 |
| 24 hr | 7.0 @ 7.0<br>9.0 @ 9.0 | 23.4 @ 23.5 | 8.5 @ 23.3 °C | 1086 @ 1013<br>1386 @ 1409 @ 24.0 |
| 48 hr | 7.0 @ 7.0<br>9.0 @ 9.0 | 22.7 @ 22.6 | 8.4 @ 23.4 °C | 1079 @ 1013<br>1374 @ 1409 @ 23.5 |

A. wrong chamber code mf 10-8-96

| Conc. | Chamber # | Number Live 0 hr | Number Live 24 h | Number Live 48 h | pH 0 hr | pH 24 h | pH 48 h | Temperature (°C) 0 hr | Temperature (°C) 24 h | Temperature (°C) 48 h | D.O. (mg/L) 0 hr | D.O. (mg/L) 24 h | D.O. (mg/L) 48 h | UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm)) 0 hr | UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm)) 24 h | UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm)) 48 h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Control A | ~~A9~~ A13 | 5 | 5 | 4 10 | 7.8 | 8.2 | 8.5 | 24.3 | 22.7 | 23.2 | 7.7 | 8.0 | 8.0 | 250 | 245 | 240 |
| Control B | ~~A2~~ A14 | 5 | 5 | 5 | 7.8 | 8.3 | 8.5 | 24.3 | 23.3 | 23.1 | 7.7 | 8.0 | 8.0 | 250 | 245 | 245 |
| Control C | ~~A3~~ A15 | 5 | 5 | 5 | 7.8 | 8.3 | 8.5 | 24.3 | 23.4 | 23.0 | 7.7 | 8.1 | 8.0 | 250 | 245 | 245 |
| Control D | ~~A4~~ A16 | 5 | 5 | 5 | 7.8 | 8.3 | 8.5 | 24.3 | 23.3 | 23.2 | 7.7 | 8.4 | 8.1 | 250 | 245 | 245 |
| 100% A | ~~A5~~ A17 | 5 | 5 | 3 10 | 7.3 | 8.0 | 8.1 | 24.0 | 23.7 | 23.3 | 6.9 | 7.7 | 7.5 | 480 | 480 | 475 |
| 100% B | ~~A6~~ A18 | 5 | 5 | 5 | 7.3 | 7.8 | 8.1 | 24.0 | 23.6 | 23.1 | 6.9 | 7.5 | 7.6 | 480 | 480 | 475 |
| 100% C | ~~A7~~ A19 | 5 | 5 | 5 | 7.3 | 7.5 | 7.9 | 24.0 | 23.5 | 23.1 | 7.0 | 7.7 | 7.6 | 480 | 480 | 475 |
| 100% D | ~~A8~~ A20 | 5 | 5 | 5 | 7.3 | 7.2 | 7.9 | 24.0 | 23.6 | 23.3 | 7.1 | 7.5 | 7.7 | 480 | 480 | 475 |
| 100% dech A | A21 | 5 | 5 | 5 | 7.4 | 7.8 | 8.0 | 24.2 | 23.5 | 23.4 | 7.1 | 7.6 | 7.7 | 480 | 480 | 475 |
| 100% dech B | A22 | 5 | 5 | 5 | 7.4 | 7.8 | 8.0 | 24.2 | 23.7 | 23.3 | 7.1 | 7.8 | 7.8 | 480 | 480 | 475 |
| 100% dech C | A23 | 5 | 5 | 5 | 7.4 | 7.8 | 7.9 | 24.2 | 23.6 | 23.3 | 7.8 | 7.9 | 7.7 | 480 | 480 | 475 |
| 100% dech D | A24 | 5 | 5 | 5 | 7.4 | 7.8 | 8.0 | 24.2 | 23.8 | 23.4 | 7.8 | 7.7 | 7.8 | 480 | 480 | 475 |
| Measured/Loaded by: | | MF | MF | DW | MF | DN | DN | MF | DN | DN | MF | DN | DN | MF | DN | |
| Recorded by: | | DN | ND | DW | JS | ND | JS | JS | ND | JS | JS | ND | JS | JS | ND | |

Investigators' Signatures
Marshall Faircloth
John Sharpe
Ted Lloyd
Dwayne Martyniuk
Chris Hall
Tim

| Water Quality Parameters | Salt Water / Well Water | 20% Min Water | Sample | Method | Measured |
|---|---|---|---|---|---|
| Field Total Residual Cl2 (mg/L): | | | NOT MEASURED | | |
| Lab Total Residual Cl2 (mg/L): | < .03 | < .03 | 0.04 | DR-100 | JS |
| Alkalinity (mg/L as $CaCO_3$): | 125 | 75 | 55 | Hach | ND |
| Hardness (mg/L as $CaCO_3$): | 130 | 85 | 10 | Hach | ND |
| Total ammonia (mg/L as N): | < .03 | < .03 | 2.75 | ORION | |

Ammonia Ammonia 5861 Ammonia Control ( ) ppt Sample

# FDEP Biology Section — Acute Bio

Sample Source: Cytec Industries
County: Santa Rosa
Contact / District: Glenn Butts / ~~Northeast~~ Northwest
NPDES Permit #: FL0002593
LIMS Sample #: 155092 LIMS Job #: 96-Oct-08-09
sample log 10-14-96
Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Test Number: 1 of 2

Sample Collection: Date 10-07-96 Time 1030
Test Beginning: Date 10-08-96 Time 1440
Test Ending: Date 10-10-96 Time 1440
Organism Batch #: 44 Diluent Batch #: 25
Organism Age: 24 hrs
Test Organism: Ceriodaphnia dubia

Instrument Calibrations: pH / Temperature °C / D.O. mg/L / conductivity µmhos/cm
meter # 7851 / 90H018262 / 90H018262 / G9005749

0 hr 7.0 @ 7.0, 9.0 @ 9.0 — 22.9 @ 23.0 — 8.5 @ 23.0 °C — 108.3 @ 101.3 — 1380 @ 1409 @ 23.5 °C
24 hr 7.0 @ 7.0, 9.0 @ 9.0 — 23.4 @ 23.5 — 8.5 @ 23.3 °C — 108.6 @ 101.3 — 1386 @ 1409 @ 24.0 °C
48 hr 7.0 @ 7.0, 9.0 @ 9.0 — 22.7 @ 22.6 — 8.4 @ 23.4 °C — 107.9 @ 101.3 — 1374 @ 1409 @ 32.2 °C

Remarks: deCl⁻ sample still indicated 0.4 mg/L TRC even after the addition of 0.05 mL of @0.25N Sodium Thiosulfate/L.

☆ Laboratory personnel failed to take 48-hr parameters. DW

| Conc. | Chamber # | Number Live 0 hr | 24 h | 48 h | pH 0 hr | 24 h | 48 h | Temperature (°C) 0 hr | 24 h | 48 h | D.O. (mg/L) 0 hr | 24 h | 48 h | UNCORRECTED Cond. (mmhos/cm) / Cond. (µmhos/cm) 0 hr | 24 h | 48 h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Control A | A | 5 | 5 | 5 | 8.2 | | | 23.7 | | | 7.9 | | | 265 | | |
| Control B | B | 5 | 5 | 5 | | | | | | | | | | | | |
| Control C | C | 5 | 5 | 5 | | | | | | | | | | | | |
| Control D | D | 5 | 5 | 5 | | | | | | | | | | | | |
| 100% A | A | 5 | 5 | 5 | 7.5 | | | 23.6 | | | 7.4 | | | 465 | | |
| 100% B | B | 5 | 5 | 5 | | | | | | | | | | | | |
| 100% C | C | 5 | 5 | 5 | | | | | | | | | | | | |
| 100% D | D | 5 | 5 | 5 | | | | | | | | | | | | |
| 100% A | A | 5 | 5 | 5 | 7.6 | | | 23.9 | | | 7.7 | | | 465 | | |
| 100% B | B | 5 | 5 | 5 | | | | | | | | | | | | |
| 100% C | C | 5 | 5 | 5 | | | | | | | | | | | | |
| 100% D | D | 5 | 5 | 5 | | | | | | | | | | | | |
| Measured/Loaded by: | | MF | MF | DW | MF | | | MF | | | MF | | | MF | | |
| Recorded by: | | MF | ND | DW | JS | | | JS | | | JS | | | JS | | |

Dilution 170 µ

dechlorinated

Investigators' Signatures
Dennis Nicholson
Marshall Faircloth
Julie Sharpe

| Water Quality Parameters | Salt Water / Well Water | 20% Min Water | Sample | Method | Measured by |
|---|---|---|---|---|---|
| Field Total Residual Cl2 (mg/L): | | | NOT | measured | |
| Lab Total Residual Cl2 (mg/L): | <0.03 | <0.03 | 0.04 | DR-100 | JS by MF |
| Alkalinity (mg/L as $CaCO_3$): | 125 | 75 | 55 | Hach | ND |
| Hardness (mg/L as $CaCO_3$): | 130 | 85 | 120* | Hach | ND |
| Total ammonia (mg/L as N): | <0.017 | <0.017 | 2.75 | ORION | DN |

* W10-15 XX

Ammonia Meter #98136 Ammonia Meter Slope: -58.1 Ammonia Blank: <0.017 Control ○ ppt Sample ○ ppt

reviewer

form updated 4/01/96

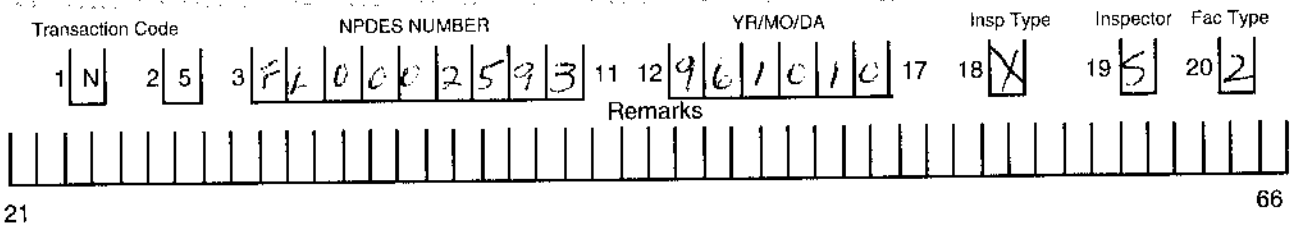
Benthic macroinvertebrate taxa list for Sterling Fibers, Inc. (Cytec Industries), collected via Ponar grabs in Escambia Bay, on 10 October, 1996. Densities, in number/$m^2$, represent the mean of three replicates.

| | Reference Site | Test Site 1 | Test Site 2 |
|---|---|---|---|
| **Amphipoda** | | | |
| *Corophium* sp. | 1 | - | - |
| *Grandidierella bonnieroides* | 120 | - | - |
| **Anthozoa** | - | - | 2 |
| **Cumacea** | | | |
| *Almyracuma* sp. | 2 | - | - |
| **Decapoda** | - | - | 1 |
| **Diptera** | | | |
| *Coelotanypus* sp. | - | 1 | - |
| **Gastropoda** | | | |
| *Neritina reclivata* | 4 | - | - |
| Pyramidellidae | - | 1 | - |
| *Pyramidella* sp. | 1 | - | 1 |
| **Isopoda** | | | |
| *Cyathura polita* | 2 | - | - |
| *Edotea montosa* | 6 | - | - |
| **Mysidacea** | | | |
| *Mysidopsis bahia* | 2 | - | - |
| **Nemertea** | 14 | 2 | 10 |
| *Rhynchocoela* sp. | 7 | 7 | 7 |
| *Eteone* sp. | - | - | 2 |
| *Nereis* sp. | 2 | - | - |
| *Nereis riisei* | 6 | - | - |
| *Laeonereis culveri* | 10 | - | 1 |
| Goniadidae | 1 | 1 | - |
| **Oligochaeta** | 1 | 4 | 2 |
| Tubificidae | - | 14 | - |
| **Platyhelminthes** | - | - | 1 |
| **Polychaeta** | | | |
| *Neanthes succinea* | 3 | - | - |
| Pilargidae | 3 | 3 | - |
| *Glycinde solitaria* | 7 | 1 | 1 |
| Spionidae | - | 1 | - |
| *Boccardia* sp. | 4 | - | - |
| *Boccardia hamata* | 4 | - | - |
| *Paraprionospio pinnata* | 1 | - | - |
| *Streblospio benedicti* | 41 | 132 | 21 |
| Capitellidae | 296 | 205 | 121 |
| *Hobsonia florida* | 2 | - | - |

Phytoplankton taxa list and densities (#/mL) for Sterling Fibers, Inc. (Cytec Industries collected via subsurface grabs in Escambia Bay, on 10 October, 1996.

| | Reference Site | Test Site 1 | Test Site 2 |
|---|---|---|---|
| **Bacillariophyceae** | | | |
| *Cyclotella* sp. | 7 | 24 | 16 |
| *Rhizosolenia* sp. | - | 1 | - |
| *Nitzschia* sp. | 1 | 1 | - |
| **Chlorophyceae** | | | |
| *Chlorella* sp. | 4 | 2 | 4 |
| *Scenedesmus* sp. | - | - | 2 |
| **Cryptophyceae** | | | |
| *Tetraselmis* sp. | - | 1 | - |
| *Chroomonas* sp. | 6 | 38 | 20 |
| **Cyanophyceae** | | | |
| *Oscillatoria* sp. | - | 1 | - |
| **Dinophyceae** | | | |
| *Peridinium* sp. | - | - | 2 |

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




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

