


Bioassays of

# Sterling Fibers
# (formerly American Cyanamid Company)

Pace, Santa Rosa County, Florida

NPDES #FL0002593

Sampled 11/13/01

June 2002

**Biology Section**

**Division of Resource Assessment & Management**

Comprehensive Quality Assurance Plan #870346G

Bioassays of

# Sterling Fibers
# (formerly American Cyanamid Company)

Pace, Santa Rosa County, Florida

NPDES #FL0002593

**Biology Section**
**Bureau of Laboratories**
**June 2002**

## Introduction

Sterling Fiber, Incorporated (formerly American Cyanamid Company), 5005 Sterling Way, Santa Rosa County, Pace, Florida, NPDES #FL0002593, tests performed on 14 to 16 November 2001.

The Santa Rosa Plant for Sterling Fibers has been in operation since 1958. The facility produces acrylic fibers from acrylonitrile and vinyl acetate using a solvent, sodium thiocyanate, and water. The effluent produced from the chemical and dye process is identified as "strong wastewater". The "strong wastewater" is disposed through an underground injection well. Wastewater from the fiber process is identified as "weak wastewater" and is discharged to a biological-lagoon treatment system. From the treatment system, effluent is primarily discharged to a spray irrigation system, or effluent can be discharged, under special circumstances, into the Class III marine waters of Escambia Bay. The property contains a "strong wastewater" treatment plant, a "weak wastewater" treatment plant, three lagoons (part of the "weak wastewater" treatment), two unlined landfills, and two active spray fields. Wetlands and four streams compose the lower portion of the property. The four streams are Harrison Branch, Judges Branch, North Fork Judges Branch, and St. Regis Branch.

The FDEP Tallahassee office of Hazardous Waste Regulation requested that the FDEP Northwest District biologist perform a biological reconnaissance on the four streams at the Sterling Fibers facility. The biological reconnaissance was prompted as part of the Resource Conservation and Recovery Act/ Hazardous and Solid Waste Amendments facility investigative process. The biological reconnaissance revealed that three of the streams at the site were "impaired", and one was "suspect". The Department initiated surface water sampling on November 11, 2001, to investigate further the source of impairment (facility information and documentation was provided by Kathy Gaynor, Bureau of Solid and Hazardous Waste, FDEP, Tallahassee. The primary document was *Revised RCRA Facilities Investigation Report*, prepared for Sterling Fibers, Inc., by CH2M Hill, Volumes 1 through 4; November 2000).

The toxicity tests discussed in this report were performed in accordance with methods described by Weber, 1993, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, 4th Edition, EPA/600/4-90/027F.

## Results and Discussion

The FDEP Biology Section performed eight 48-hour static acute screening toxicity bioassays on four samples. A sample was collected from each of the four streams: Harrison Branch, Judges Branch, Northfork Judges Branch, and St. Regis Branch, which are located on this facility's property. The test species used for these bioassays were the waterflea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*. Because the samples had a pH below six standard units (SU) (minimal limit for the test organisms), aliquots of each sample were pH adjusted to approximately seven SU and tested along side the 100 % unadjusted sample. The unadjusted samples showed some mortality in both species, which was expected because of low pH. The test results of the pH-adjusted aliquots did not indicate toxicity in the samples collected from Harrison Branch, Judges Branch, or North Fork Judges Branch to either test species within 48 hours. The St. Regis Branch pH-adjusted sample showed toxicity to both test species, producing 100% mortality and 50% mortality respectively, in the *C. dubia* and *C. leedsi* tests within 48 hours (Tables 1, 2, 3, and 4). The cause of toxicity was undetermined and warrants further investigation.

Total residual chlorine and total ammonia were not detected in the bioassay samples in the laboratory. Further chemical analyses were performed on the samples, and several metals were identified in each of the four samples (Tables 5, 6, 7, and 8).

## Conclusion

The pH-adjusted aliquots from the samples collected from Harrison Branch, Judges Branch, or North Fork Judges Branch did not show toxicity to either test species within 48 hours. The pH-adjusted samples collected from St. Regis Branch indicated toxicity causing 50 percent mortality in the *C. leedsi* test and 100% mortality in the *C. dubia* test within 48 hours. The cause of toxicity was not determined. The cause of the mortality in the unadjusted samples was attributed to the intolerance of the test organisms to low pH, except in the sample from St. Regis Branch in which the cause of toxicity was attributed to both low pH and undetermined constituents in the sample. Further investigation into the source of toxicity in St. Regis Branch is warranted.

**Table 1.**

Rosa County, Pace, Florida, NPDES #FL0002593, tests performed on 14 to 16 November 2001.

**Harrison Branch**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Facility: | **Sterling Fiber** | | **NPDES #** | **FL0002593** | Facility Type: | **Chemical** | **Analysts:** Della Parker-Hanson |
| Location: | 5005 Sterling Way | | Contact/District: | Glenn Butts/ Haz Waste Reg | | **Plant** | Joshua Ayres |
| County: | Santa Rosa | | Test type: | static acute screen | | | Marshall Faircloth |
| Sample Collection Date: | 11/13/01 | Time: 0845 | # tests: | 2 | Receiving Water: | Escambia Bay | Eva Pastora |
| Test Beginning Date: | 11/14/01 | Time: 1630 | Chlorination Type: | nonchlorinated | | | |
| Test Ending Date: | 11/16/01 | Time: 1450 | | | | **Page 1 of 1** | **Reviewer:** David Whiting |

Organism: ***Ceriodaphnia dubia*** Life stage: <24 hours

| | 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 | 8.2 | - | 8.1 | 23.9 | - | 24.1 | 7.8 | - | 7.0 | 155 | 185 |
| Control B | 0/20 | 5 | 5 | 5 | - | - | 8.2 | - | - | 24.1 | - | - | 7.1 | - | 195 |
| Control C | 0/20 | 5 | 5 | 5 | - | - | 8.2 | - | - | 24.0 | - | - | 7.2 | - | 200 |
| Control D | 0/20 | 5 | 5 | 5 | - | - | 8.2 | - | - | 24.0 | - | - | 7.2 | - | 200 |
| pH 100% A | 20/0 | 5 | 5 | 5 | 7.4 | - | 8.1 | 23.8 | - | 24.1 | 6.5 | - | 7.2 | 410 | 445 |
| pH 100% B | 20/0 | 5 | 5 | 5 | - | - | 8.1 | - | - | 24.0 | - | - | 7.2 | - | 450 |
| pH 100% C | 20/0 | 5 | 5 | 5 | - | - | 8.1 | - | - | 23.9 | - | - | 7.2 | - | 450 |
| pH 100% D | 20/0 | 5 | 5 | 5 | - | - | 8.1 | - | - | 23.8 | - | - | 7.2 | - | 485 |
| 100% A | 20/0 | 5 | 5 | 5 | 6.0 | - | 7.6 | 23.7 | - | 23.9 | 7.1 | - | 7.2 | 335 | 420 |
| 100% B | 20/0 | 5 | 5 | 5 | - | - | 7.6 | - | - | 23.9 | - | - | 7.1 | - | 405 |
| 100% C | 20/0 | 5 | 5 | 5 | - | - | 7.6 | - | - | 23.8 | - | - | 7.1 | - | 390 |
| 100% D | 20/0 | 5 | 5 | 5 | - | - | 7.5 | - | - | 23.8 | - | - | 7.2 | - | 410 |

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24.0-25.0 °C.
Incubator #2 temperature range for the test period was 25.5-26.5°C.

Organism: ***Cyprinella leedsi*** Life stage: 11 days

| | Sample/Diluent | SURVIVAL # Alive | | | pH | | | Temperature[C] | | | 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 | 0/500 | 5 | 5 | 5 | 8.0 | 8.3 | 8.5 | 24.3 | 23.6 | 23.7 | 7.7 | 8.2 | 7.1 | 250 | 285 |
| Control B | 0/500 | 5 | 5 | 5 | 8.0 | 8.3 | 8.5 | 24.1 | 23.6 | 23.7 | 7.7 | 8.3 | 7.1 | 255 | 290 |
| Control C | 0/500 | 5 | 5 | 5 | 8.0 | 8.3 | 8.5 | 24.1 | 23.6 | 23.8 | 7.7 | 8.1 | 7.1 | 260 | 295 |
| Cotnrol D | 0/500 | 5 | 5 | 5 | 8.0 | 8.3 | 8.5 | 24.0 | 23.4 | 23.8 | 7.7 | 8.3 | 7.1 | 260 | 320 |
| pH 100% A | 500/0 | 5 | 5 | 5 | 7.3 | 7.7 | 7.8 | 24.0 | 23.4 | 23.8 | 6.3 | 8.0 | 6.9 | 420 | 440 |
| pH 100% B | 500/0 | 5 | 5 | 5 | 7.3 | 7.7 | 7.8 | 24.2 | 23.9 | 23.8 | 6.3 | 8.1 | 7.1 | 425 | 455 |
| pH 100% C | 500/0 | 5 | 5 | 5 | 7.3 | 7.7 | 7.8 | 24.2 | 23.9 | 23.9 | 6.2 | 8.1 | 7.1 | 425 | 460 |
| pH 100% D | 500/0 | 5 | 5 | 5 | 7.3 | 7.7 | 7.8 | 24.2 | 23.7 | 24.0 | 6.3 | 8.0 | 6.9 | 430 | 455 |
| 100% A | 500/0 | 5 | 5 | 5 | 5.9 | 7.0 | 7.3 | 24.2 | 23.5 | 23.9 | 6.1 | 8.2 | 7.0 | 365 | 380 |
| 100% B | 500/0 | 5 | 5 | 5 | 5.9 | 7.0 | 7.3 | 24.2 | 23.9 | 24.0 | 6.1 | 8.2 | 7.0 | 360 | 400 |
| 100 % C | 500/0 | [B] | [B] | [B] | 5.9 | - | - | 24.1 | - | - | 5.9 | - | - | 360 | - |
| 100% D | 500/0 | [B] | [B] | [B] | 5.9 | - | - | 24.0 | - | - | 6.0 | - | - | 360 | - |

[B] Insuffient organism available to load all four replicates of the 100% sample.

[C] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24.0-25.0°C.
Incubator #3 temperature range for the test period was 25.0-25.5°C.

| **Data Transcription Verification** | |
|---|---|
| date: | 4/9/02 |
| by: | Joshua Ayres |
| | Gary Hardie |

| **LIMS** | |
|---|---|
| Job number: | TLH-2001-11-14-41 |
| Sample number: | 561413 |

| **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 |
| Control water (water flea): | <0.017 | <0.017 |
| 100% Sample: | <0.017 | <0.017 |

| **Alk & Hardness** | Alkalinity (mg/L) | Hardness (mg/L) |
|---|---|---|
| Control water (fish): | 145 | 130 |
| Control water (water flea): | 80 | 78 |
| 100% Sample: | 21 | 16 |

**Table 2.**

Rosa County, Pace, Florida, NPDES #FL0002593, tests performed on 14 to 16 November 2001.

**Judges Branch**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Facility: | **Sterling Fiber** | | **NPDES #** | **FL0002593** | Facility Type: | **Chemical** | **Analysts:** Della Parker-Hanson |
| Location: | 5005 Sterling Way | | Contact/District: | Glenn Butts/ Haz Waste Reg | | **Plant** | Joshua Ayres |
| County: | Santa Rosa | | Test type: | static acute screen | | | Marshall Faircloth |
| Sample Collection Date: | 11/13/01 | Time: 0845 | # tests: | 2 | Receiving Water: | Escambia Bay | Eva Pastora |
| Test Beginning Date: | 11/14/01 | Time: 1630 | Chlorination Type: | nonchlorinated | | | |
| Test Ending Date: | 11/16/01 | Time: 1450 | | | | **Page 1 of 1** | **Reviewer:** David Whiting |

Organism: ***Ceriodaphnia dubia*** Life stage: <24 hours

| | 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 | 8.3 | - | 8.2 | 23.7 | - | 24.3 | 7.9 | - | 7.0 | 150 | 195 |
| Control B | 0/20 | 5 | 5 | 5 | - | - | 8.2 | - | - | 24.2 | - | - | 7.2 | - | 190 |
| Control C | 0/20 | 5 | 5 | 5 | - | - | 8.3 | - | - | 24.1 | - | - | 7.1 | - | 210 |
| Control D | 0/20 | 5 | 5 | 5 | - | - | 8.3 | - | - | 23.9 | - | - | 7.1 | - | 225 |
| pH 100% A | 20/0 | 5 | 5 | 5 | 7.2 | - | 7.8 | 23.7 | - | 24.1 | 7.8 | - | 6.9 | 240 | 300 |
| pH 100% B | 20/0 | 5 | 5 | 5 | - | - | 7.8 | - | - | 24.1 | - | - | 6.9 | - | 285 |
| pH 100% C | 20/0 | 5 | 5 | 5 | - | - | 7.8 | - | - | 23.9 | - | - | 7.0 | - | 290 |
| pH 100% D | 20/0 | 5 | 5 | 5 | - | - | 7.8 | - | - | 23.9 | - | - | 7.1 | - | 300 |
| 100% A | 20/0 | 5 | 0 | 0 | 4.5 | 4.5 | - | 23.9 | 24.3 | - | 7.4 | 7.9 | - | 235 | 230 [B] |
| 100% B | 20/0 | 5 | 0 | 0 | - | 4.5 | - | - | 24.4 | - | - | 8.0 | - | - | 260 [B] |
| 100% C | 20/0 | 5 | 0 | 0 | - | 4.5 | - | - | 24.2 | - | - | 8.1 | - | - | 260 [B] |
| 100% D | 20/0 | 5 | 0 | 0 | - | 4.5 | - | - | 24.0 | - | - | 8.1 | - | - | 255 [B] |

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24.0-25.0 °C.
Incubator #2 temperature range for the test period was 25.5-26.5°C.

[B] Measurement taken at 24 hours

Organism: ***Cyprinella leedsi*** Life stage: 11 days

| | Sample/Diluent | SURVIVAL # Alive | | | pH | | | TemperatureD | | | 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 | 0/500 | 5 | 5 | 5 | 8.0 | 8.4 | 8.5 | 24.4 | 23.7 | 23.7 | 7.8 | 7.7 | 7.0 | 245 | 310 |
| Control B | 0/500 | 5 | 5 | 5 | 8.0 | 8.4 | 8.5 | 24.2 | 23.9 | 23.9 | 7.7 | 7.8 | 7.2 | 255 | 290 |
| Control C | 0/500 | 5 | 5 | 5 | 8.0 | 8.3 | 8.5 | 24.1 | 24.0 | 23.8 | 7.8 | 7.7 | 7.1 | 260 | 290 |
| Cotnrol D | 0/500 | 5 | 5 | 5 | 8.0 | 8.3 | 8.5 | 24.0 | 24.1 | 23.7 | 7.8 | 7.6 | 7.2 | 260 | 280 |
| pH 100% A | 500/0 | 5 | 5 | 5 | 7.3 | 7.5 | 7.6 | 24.2 | 23.7 | 23.7 | 7.7 | 7.8 | 7.3 | 250 | 280 |
| pH 100% B | 500/0 | 5 | 5 | 5 | 7.3 | 7.5 | 7.6 | 24.2 | 23.8 | 23.6 | 7.7 | 7.8 | 7.3 | 250 | 285 |
| pH 100% C | 500/0 | 5 | 5 | 5 | 7.3 | 7.5 | 7.6 | 24.1 | 24.0 | 23.7 | 7.7 | 7.5 | 7.3 | 250 | 275 |
| pH 100% D | 500/0 | 5 | 5 | 5 | 7.1 | 7.5 | 7.6 | 24.2 | 24.2 | 23.7 | 7.6 | 7.5 | 7.2 | 250 | 285 |
| 100% A | 500/0 | 5 | 0 | 0 | 4.4 | 4.6 | - | 24.2 | 23.7 | - | 7.7 | 7.7 | - | 240 | 265 [E] |
| 100% B | 500/0 | 5 | 0 | 0 | 4.4 | 4.6 | - | 24.2 | 24.1 | - | 7.7 | 7.6 | - | 240 | 260 [E] |
| 100 % C | 500/0 | [C] | [C] | [C] | 4.4 | - | - | 24.2 | - | - | 7.7 | - | - | 240 | - |
| 100% D | 500/0 | [C] | [C] | [C] | 4.4 | - | - | 24.2 | - | - | 7.7 | - | - | 240 | - |

[C] Insuffient organism available to load all four replicates of the 100% sample.

[D] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24.0-25.0°C.
Incubator #3 temperature range for the test period was 25.0-25.5°C.

[E] Measurement taken at 24 hours.

| **Data Transcription Verification** | |
|---|---|
| date: | 4/9/02 |
| by: | Joshua Ayres |
| | Gary Hardie |

| **LIMS** | |
|---|---|
| Job number: | TLH-2001-11-14-41 |
| Sample number: | 561414 |

| **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 |
| Control water (water flea): | <0.017 | <0.017 |
| 100% Sample: | <0.017 | <0.017 |

| **Alk & Hardness** | Alkalinity (mg/L) | Hardness (mg/L) |
|---|---|---|
| Control water (fish): | 145 | 130 |
| Control water (water flea): | 80 | 78 |
| 100% Sample: | 9 | 7 |

**Table 3.**

Rosa County, Pace, Florida, NPDES #FL0002593, tests performed on 14 to 16 November 2001.

**North Fork Judges Branch**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Facility: | **Sterling Fiber** | | **NPDES #** | **FL0002593** | Facility Type: | **Chemical** | **Analysts:** Della Parker-Hanson |
| Location: | 5005 Sterling Way | | Contact/District: | Glenn Butts/ Haz Waste Reg | | **Plant** | Joshua Ayres |
| County: | Santa Rosa | | Test type: | static acute screen | | | Marshall Faircloth |
| Sample Collection Date: | 11/13/01 | Time: 0845 | # tests: | 2 | Receiving Water: | Escambia Bay | Eva Pastora |
| Test Beginning Date: | 11/14/01 | Time: 1630 | Chlorination Type: | nonchlorinated | | | |
| Test Ending Date: | 11/16/01 | Time: 1450 | | | | **Page 1 of 1** | **Reviewer:** David Whiting |

Organism: ***Ceriodaphnia dubia*** Life stage: <24 hours

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **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 | 8.2 | - | 8.1 | 23.9 | - | 24.0 | 7.9 | - | 7.2 | 150 | 205 |
| Control B | 0/20 | 5 | 5 | 5 | - | - | 8.3 | - | - | 23.9 | - | - | 7.2 | - | 205 |
| Control C | 0/20 | 5 | 5 | 5 | - | - | 8.3 | - | - | 23.9 | - | - | 7.3 | - | 200 |
| Control D | 0/20 | 5 | 5 | 5 | - | - | 8.3 | - | - | 23.8 | - | - | 7.3 | - | 210 |
| pH 100% A | 20/0 | 5 | 5 | 5 | 7.7 | - | 7.7 | 24.1 | - | 24.0 | 7.4 | - | 7.1 | 305 | 345 |
| pH 100% B | 20/0 | 5 | 5 | 5 | - | - | 7.7 | - | - | 23.9 | - | - | 7.1 | - | 340 |
| pH 100% C | 20/0 | 5 | 5 | 5 | - | - | 7.7 | - | - | 23.9 | - | - | 7.1 | - | 380 |
| pH 100% D | 20/0 | 5 | 5 | 5 | - | - | 7.7 | - | - | 23.9 | - | - | 7.1 | - | 380 |
| 100% A | 20/0 | 5 | 2 | 2 | 5.7 | - | 7.1 | 24.8 | - | 24.0 | 7.8 | - | 7.1 | 295 | 355 |
| 100% B | 20/0 | 5 | 5 | 5 | - | - | 7.1 | - | - | 24.0 | - | - | 7.1 | - | 325 |
| 100% C | 20/0 | 5 | 2 | 2 | - | - | 7.1 | - | - | 24.0 | - | - | 7.2 | - | 345 |
| 100% D | 20/0 | 5 | 4 | 4 | - | - | 7.1 | - | - | 24.1 | - | - | 7.2 | - | 365 |

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24.0-25.0 °C.
Incubator #2 temperature range for the test period was 25.5-26.5°C.

Organism: ***Cyprinella leedsi*** Life stage: 11 days

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Sample/Diluent** | **SURVIVAL # Alive** | | | pH | | | Temperature[C] | | | 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 | 0/500 | 5 | 5 | 5 | 8.0 | 8.3 | 8.5 | 24.2 | 23.4 | 23.7 | 7.8 | 8.5 | 7.1 | 245 | 295 |
| Control B | 0/500 | 5 | 5 | 5 | 8.0 | 8.3 | 8.5 | 24.1 | 24.5 | 23.9 | 7.7 | 8.0 | 7.2 | 255 | 295 |
| Control C | 0/500 | 5 | 5 | 5 | 8.0 | 8.3 | 8.5 | 24.1 | 24.3 | 23.8 | 7.8 | 7.9 | 7.2 | 260 | 290 |
| Cotnrol D | 0/500 | 5 | 5 | 5 | 8.0 | 8.3 | 8.5 | 24.0 | 23.7 | 23.8 | 7.7 | 8.0 | 7.3 | 260 | 290 |
| pH 100% A | 500/0 | 5 | 5 | 5 | 7.5 | 7.6 | 7.8 | 24.2 | 23.8 | 23.7 | 7.2 | 8.0 | 7.2 | 315 | 350 |
| pH 100% B | 500/0 | 5 | 5 | 5 | 7.5 | 7.6 | 7.8 | 24.1 | 24.0 | 23.8 | 7.1 | 8.0 | 7.3 | 315 | 360 |
| pH 100% C | 500/0 | 5 | 5 | 5 | 7.5 | 7.6 | 7.8 | 24.1 | 24.0 | 23.9 | 7.0 | 8.0 | 7.2 | 320 | 380 |
| pH 100% D | 500/0 | 5 | 5 | 5 | 7.5 | 7.6 | 7.8 | 24.1 | 23.7 | 24.0 | 7.0 | 8.0 | 7.2 | 320 | 380 |
| 100% A | 500/0 | 5 | 5 | 5 | 5.6 | 6.6 | 7.0 | 24.2 | 24.8 | 23.9 | 7.0 | 7.9 | 7.2 | 301 | 350 |
| 100% B | 500/0 | 5 | 4 | 4 | 5.6 | 6.6 | 7.0 | 24.3 | 23.6 | 23.8 | 6.9 | 7.9 | 7.2 | 295 | 345 |
| 100 % C | 500/0 | [B] | [B] | [B] | 5.6 | - | - | 24.3 | - | - | 6.9 | - | - | 295 | - |
| 100% D | 500/0 | [B] | [B] | [B] | 5.6 | - | - | 24.2 | - | - | 6.9 | - | - | 295 | - |

[B] Insuffient organism available to load all four replicates of the 100% sample.

[C] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24.0-25.0°C.
Incubator #3 temperature range for the test period was 25.0-25.5°C.

| **Data Transcription Verification** | |
|---|---|
| date: | 4/9/02 |
| by: | Gary Hardie |
| | Joshua Ayres |

| **LIMS** | |
|---|---|
| Job number: | TLH-2001-11-14-41 |
| Sample number: | 561416 |

| **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 |
| Control water (water flea): | <0.017 | <0.017 |
| 100% Sample: | <0.017 | <0.017 |

| **Alk & Hardness** | Alkalinity (mg/L) | Hardness (mg/L) |
|---|---|---|
| Control water (fish): | 145 | 130 |
| Control water (water flea): | 80 | 78 |
| 100% Sample: | 12 | 12 |

**Table 4.** Data recorded during the 48-hour acute screening bioassays of a sample of effluent from Sterling Fibers (formerly American Cyanamid Company), 5005 Sterling Way, Santa Rosa County, Pace, Florida, NPDES #FL0002593, tests performed on 14 to 16 November 2001.

**St. Regis Branch**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Facility: | **Sterling Fiber** | | **NPDES #** | **FL0002593** | Facility Type: | **Chemical Plant** | **Analysts:** Della Parker-Hanson |
| Location: | 5005 Sterling Way | | Contact/District: | Glenn Butts/ Haz Waste Reg | | | Joshua Ayres |
| County: | Santa Rosa | | Test type: | static acute screen | | | Marshall Faircloth |
| Sample Collection Date: | 11/13/01 | Time: 0945 | # tests: | 2 | Receiving Water: | Escambia Bay | Eva Pastora |
| Test Beginning Date: | 11/14/01 | Time: 1530 | Chlorination Type: | nonchlorinated | | | |
| Test Ending Date: | 11/16/01 | Time: 1510 | | | **Page 1 of 1** | | **Reviewer:** David Whiting |

Organism: ***Ceriodaphnia dubia*** Life stage: <24 hours

| | 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 | - | 8.2 | 23.8 | - | 23.9 | 7.8 | - | 7.3 | 155 | 195 |
| Control B | 0/20 | 5 | 5 | 5 | - | - | 8.2 | - | - | 23.9 | - | - | 7.2 | - | 190 |
| Control C | 0/20 | 5 | 5 | 5 | - | - | 8.2 | - | - | 23.9 | - | - | 7.2 | - | 205 |
| Control D | 0/20 | 5 | 5 | 5 | - | - | 8.3 | - | - | 24.0 | - | - | 7.3 | - | 205 |
| pH 100% A | 20/0 | 5 | 1 | 0 | 7.2 | - | 7.5 | 24.0 | - | 24.1 | 7.4 | - | 7.1 | 285 | 310 |
| pH 100% B | 20/0 | 5 | 0 | 0 | - | 7.2 | - | - | 24.1 | - | - | 8.1 | - | - | 290[B] |
| pH 100% C | 20/0 | 5 | 1 | 0 | - | - | 7.5 | - | - | 24.1 | - | - | 7.0 | - | 340 |
| pH 100% D | 20/0 | 5 | 0 | 0 | - | 7.2 | - | - | 24.0 | - | - | 8.1 | - | - | 320[B] |
| 100% A | 20/0 | 5 | 0 | 0 | 5.1 | 5.1 | - | 24.3 | 24.1 | - | 6.8 | 8.2 | - | 255 | 260[B] |
| 100% B | 20/0 | 5 | 0 | 0 | - | 5.0 | - | - | 24.4 | - | - | 8.2 | - | - | 260[B] |
| 100% C | 20/0 | 5 | 0 | 0 | - | 5.0 | - | - | 24.3 | - | - | 8.0 | - | - | 240[B] |
| 100% D | 20/0 | 5 | 0 | 0 | - | 4.9 | - | - | 24.5 | - | - | 8.0 | - | - | 230[B] |

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24.0-25.0 °C.
Incubator #2 temperature range for the test period was 25.5-26.5°C.

[B] Measurement taken at 24 hours.

Organism: ***Cyprinella leedsi*** Life stage: 11 days

| | Sample/Diluent | SURVIVAL # Alive | | | pH | | | Temperature[D] | | | 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 | 0/500 | 5 | 5 | 5 | 8.0 | 8.3 | 8.5 | 24.2 | 23.7 | 23.6 | 7.7 | 8.2 | 7.1 | 240 | 290 |
| Control B | 0/500 | 5 | 5 | 5 | 8.0 | 8.3 | 8.5 | 24.2 | 24.0 | 23.7 | 7.7 | 8.4 | 7.2 | 260 | 285 |
| Control C | 0/500 | 5 | 5 | 5 | 8.0 | 8.4 | 8.5 | 24.1 | 24.0 | 23.7 | 7.7 | 8.4 | 7.1 | 260 | 285 |
| Cotnrol D | 0/500 | 5 | 5 | 5 | 8.0 | 8.4 | 8.5 | 24.2 | 23.9 | 23.8 | 7.7 | 8.4 | 7.1 | 260 | 305 |
| pH 100% A | 500/0 | 5 | 4 | 4 | 7.1 | 7.2 | 7.4 | 24.5 | 23.4 | 23.7 | 7.4 | 8.3 | 7.1 | 295 | 335 |
| pH 100% B | 500/0 | 5 | 2 | 2 | 7.1 | 7.2 | 7.4 | 24.7 | 23.7 | 23.7 | 7.4 | 8.3 | 7.0 | 295 | 325 |
| pH 100% C | 500/0 | 5 | 3 | 3 | 7.1 | 7.2 | 7.4 | 24.6 | 23.7 | 23.7 | 7.2 | 8.0 | 6.8 | 295 | 315 |
| pH 100% D | 500/0 | 5 | 1 | 1 | 7.1 | 7.2 | 7.4 | 24.6 | 24.4 | 23.7 | 7.3 | 8.0 | 6.8 | 295 | 325 |
| 100% A | 500/0 | 5 | 2 | 0 | 5.0 | 5.1 | 5.2 | 25.1 | 23.9 | 24.0 | 7.2 | 8.0 | 6.9 | 275 | 295 |
| 100% B | 500/0 | 5 | 0 | 0 | 5.0 | 5.1 | - | 25.0 | 23.5 | - | 7.1 | 8.0 | - | 275 | 285 [E] |
| 100 % C | 500/0 | [C] | [C] | [C] | 5.0 | - | - | 24.8 | - | - | 7.1 | - | - | 270 | - |
| 100% D | 500/0 | [C] | [C] | [C] | 5.0 | - | - | 24.7 | - | - | 7.2 | - | - | 270 | - |

[C] Insuffient organism available to load all four replicates of the 100% sample.

[D] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24.0-25.0°C.
Incubator #3 temperature range for the test period was 25.0-25.5°C.

[E] Measurement taken at 24 hours.

| **Data Transcription Verification** | |
|---|---|
| date: | 4/9/02 |
| by: | Joshua Ayres<br>Gary Hardie |

| **LIMS** | |
|---|---|
| Job number: | TLH-2001-11-14-41 |
| Sample number: | 561414 |

| **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 |
| Control water (water flea): | <0.017 | <0.017 |
| 100% Sample: | <0.017 | <0.017 |

| **Alk & Hardness** | Alkalinity (mg/L) | Hardness (mg/L) |
|---|---|---|
| Control water (fish): | 145 | 130 |
| Control water (water flea): | 80 | 78 |
| 100% Sample: | 11 | 44 |

**Table 5. Results of chemical analyses on the effluent from Harrison Branch from Sterling Fibers, Inc. sampled on November 13, 2001.**

### Metals

| | | | |
|---|---|---|---|
| Aluminum | 1550 | µg/L | A |
| Barium | 41.6 | µg/L | A |
| Beryllium | 0.2 | µg/L | I |
| Calcium | 3.1 | mg/L | A |
| Cobalt | 2.7 | µg/L | I |
| Iron | 763 | µg/L | A |
| Magnesium | 1.6 | mg/L | A |
| Manganese | 778 | µg/L | A |
| Nickel | 2.9 | µg/L | I |
| Potassium | 1.1 | mg/L | A |
| Sodium | 61.3 | mg/L | A |
| Zinc | 6.4 | µg/L | I |

### Pesticides and Herbicides

None detected

### Base, Neutral, & Acid Extractable Organics

None detected

[A] The value reported is the mean of two or more determinations.
[I] The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

**Table 6. Results of chemical analyses on the effluent from Judges Branch from Sterling Fibers, Inc. sampled on November 13, 2001.**

### Metals

| | | |
|---|---|---|
| Aluminum | 310 | µg/L |
| Barium | 19.5 | µg/L |
| Calcium | 0.82 | mg/L |
| Iron | 240 | µg/L |
| Magnesium | 0.75 | mg/L |
| Manganese | 17.8 | µg/L |
| Potassium | 0.3 | mg/L |
| Sodium | 41.1 | mg/L |

### Pesticides and Herbicides

None detected

### Base, Neutral, & Acid Extractable Organics

None detected

**Table 7. Results of chemical analyses on the effluent from North Fork Judges Branch from Sterling Fibers, Inc. sampled on November 13, 2001.**

### Metals

| | | | |
|---|---|---|---|
| Aluminum | 290 | µg/L | [I] |
| Barium | 47 | µg/L | |
| Beryllium | 0.075 | µg/L | [I] |
| Calcium | 2.71 | mg/L | |
| Iron | 117 | µg/L | |
| Magnesium | 1.2 | mg/L | |
| Manganese | 255 | µg/L | |
| Nickel | 1.7 | µg/L | [I] |
| Potassium | 0.71 | mg/L | |
| Sodium | 51.6 | mg/L | |
| Zinc | 10.5 | µg/L | |

### Pesticides and Herbicides

None detected

### Base, Neutral, & Acid Extractable Organics

None detected

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

**Table 8. Results of chemical analyses on the effluent from St. Regis Branch from Sterling Fibers, Inc. sampled on November 13, 2001.**

## Metals

| | | | |
|---|---|---|---|
| Aluminum | 1880 | µg/L | |
| Barium | 13.3 | µg/L | |
| Calcium | 0.56 | mg/L | [I] |
| Chromium | 4.4 | µg/L | [I] |
| Iron | 1530 | µg/L | |
| Magnesium | 0.42 | mg/L | |
| Manganese | 36.4 | µg/L | |
| Potassium | 0.29 | mg/L | |
| Sodium | 51.3 | mg/L | |
| Vanadium | 4.9 | µg/L | [I] |
| Zinc | 4.6 | µg/L | [I] |

## Pesticides and Herbicides

None detected

## Base, Neutral, & Acid Extractable Organics

None detected

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