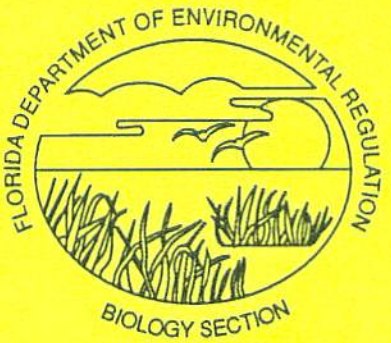



Bioassays of

# Dynaflow Sewage Treatment Plant

Clearwater, Pinellas County, Florida

NPDES #FL0034789

Sampled 3/19/90

June 15, 1990

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

Bioassays of

# Dynaflow Sewage Treatment Plant

Clearwater, Pinellas County, Florida

NPDES #FL0034789

**Biology Section**
**Bureau of Laboratories**
**June 15, 1990**

## Introduction

Dynaflow STP, Clearwater, Pinellas County, Florida, NPDES #FL0034789, on 20 to 22 March, 1990.

This facility, located at 3210 U.S. 19 North, is privately owned. It treats sewage and wastewater from residential homes, office complexes, and restaurants in an area of northern Pinellas County. The facility has a design capacity of 1.0 MGD and has an average flow of 0.7 MGD. Treatment includes extended aeration, final filters, and final chlorination. The recovered water is discharged to Curlew Creek.

The toxicity tests discussed in this report were performed in accordance with methods described by Peltier and Weber, 1985, *Methods for Measuring the Acute Toxicity of Effluents to Aquatic Organisms*, 3rd Edition, and by the FDER Biology Section, 1985, *Quality Assurance Manual for Performing Acute Toxicity Tests*, 2nd Edition.

## Results and Discussion

The sample of discharge from the Dynaflow facility was toxic to the bioassay test organisms, the fish, *Notropis leedsi* and the water flea, *Ceriodaphnia dubia*, producing $LC_{50}$'s of < 100%. The sample also adversely affected the Microtox® assay test organism, *Photobacterium phosphoreum*, producing an $EC_{50}$ of 10%. Bioassay tests were also performed on a portion of the sample that was dechlorinated using the sodium thiosulfate method. Tests using the dechlorinated sample indicated that the sample was not toxic to *N. leedsi*, but was toxic to *C. dubia*, producing an $LC_{50}$ of 85%. The dechlorinated sample also affected the Microtox® assay organism, *P. phosphoreum*, producing an $EC_{50}$ of 105%.

The tests using *C. dubia* were invalidated due to excessive control mortality. Due to the control mortality, the *C. dubia* test results cannot be used for enforcement and are presented for information only. However, since the cause of this control mortality is known to be contamination of the control water at its source, the toxicity of the 100% sample indicates that the dechlorinated sample is indeed toxic.

We attribute the toxicity in the chlorinated tests to the total residual chlorine (2.3 mg/l Hach) concentration and to an unknown toxicant(s) in the sample. The cause of toxicity in the dechlorinated sample tests was not determined. The concentrations of total and unionized ammonia in the sample were 2.3 mg/l and 0.15 mg/l, respectively. No further chemical analyses were performed on the sample.

## Conclusion

The sample of discharge from the Dynaflow STP facility was toxic on 19 March, 1990. The toxicity in the sample was attributed to the total residual chlorine concentration and an unknown toxicant(s).

**Table 1. Concentration Series and Volumes Used for These Static Bioassays.**

*Ceriodaphnia dubia* (water flea)

| Concentration | Dilution Water | Sample | Total Volume |
|---|---|---|---|
| Control | 15.0 ml | 0.0 ml | 15 ml |
| 10.0% | 13.5 ml | 1.5 ml | 15 ml |
| 30.0% | 10.5 ml | 4.5 ml | 15 ml |
| 50.0% | 7.5 ml | 7.5 ml | 15 ml |
| 70.0% | 4.5 ml | 10.5 ml | 15 ml |
| 85.0% | 2.25 ml | 12.75 ml | 15 ml |
| 100.0% | 0.0 ml | 15.0 ml | 15 ml |

*Notropis leedsi* (bannerfin shiner)

| Concentration | Dilution Water | Sample | Total Volume |
|---|---|---|---|
| Control | 500 ml | 0 ml | 500 ml |
| 10.0% | 450 ml | 50 ml | 500 ml |
| 30.0% | 350 ml | 150 ml | 500 ml |
| 50.0% | 250 ml | 250 ml | 500 ml |
| 70.0% | 150 ml | 350 ml | 500 ml |
| 85.0% | 75 ml | 425 ml | 500 ml |
| 100.0% | 0 ml | 500 ml | 500 ml |

Table 2. Data recorded during the static screening bioassay of a sample of discharge from the Dynaflow STP, Clearwater, Pinellas County, Florida, NPDES #FL0034789, on 20 to 22 March, 1990.

| | | | | | |
|---|---|---|---|---|---|
| Facility: | Dynaflow Sewage Treatment Plant | | NPDES # | FL0034789 | Facility Type: sewage treatment |
| Location: | 3210 US 19 North, Clearwater | | Contact/District: | D. Demmi / SW | |
| County: | Pinellas | | Test type: | static screen | |
| Sample Collection Date: | 3/19/90 | Time: 1045 | # tests: | 2 | Receiving Water: Curlew Creek |
| Test Beginning Date: | 3/20/90 | Time: 1030 | Chlorination Type: | chlorinated | |
| Test Ending Date: | 3/22/90 | Time: 1030 | | | Page 1 of 1 |

| Total Residual Cl2 | mg/l | Method |
|---|---|---|
| Field: | 1.5 | Hach |
| Lab: | 2.3 | Hach |
| Lab: | 3.5 | Iodometric |

| Ammonia | Total (mg/l) | Unionized (mg/l) |
|---|---|---|
| Control Water (fish): | 0.00 | 0.00 |
| Cond. Control Water (daphnids): | 0.17 | 0.01 |
| 100% Sample: | 2.30 | 0.15 |

| Alk & Hardness | Alkalinity (mg/l) | Hardness (mg/l) |
|---|---|---|
| Control Water (fish): | 126 | 120 |
| Cond. Control Water (daphnids): | 77 | 75 |
| 100% Sample: | 205 | 191 |

| Salinity (ppt) | |
|---|---|
| Control Water: | 0 |
| 100% Sample: | 0 |

Organism: *Ceriodaphnia dubia* Life stage: neonate
LC50: <100%

| | SURVIVAL | | | Dissolved Oxygen | | | pH | | | Temperature | | | Conductivity | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concentrations | # at 0 hr | Live at 24 hr | Live at 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 | 5 | 4* | - | 8.4 | 9.0 | - | 8.2 | 8.2 | - | 21.2 | 19.9 | - | - | - |
| Control | 5 | 4 | - | 8.4 | 9.0 | - | 8.2 | 8.2 | - | - | - | - | - | - |
| Control | 5 | 3 | - | 8.4 | 9.0 | - | 8.2 | 8.2 | - | - | - | - | - | - |
| Control | 5 | 3 | - | 8.4 | 9.0 | - | 8.2 | 8.2 | - | - | - | - | 160 | 160 |
| 100% | 5 | 0 | - | 8.1 | 9.0 | - | 7.9 | 8.6 | - | 21.4 | 20.0 | - | - | - |
| 100% | 5 | 0 | - | 8.1 | 9.0 | - | 7.9 | 8.6 | - | - | - | - | - | - |
| 100% | 5 | 0 | - | 8.1 | 9.0 | - | 7.9 | 8.6 | - | - | - | - | - | - |
| 100% | 5 | 0 | - | 8.1 | 9.0 | - | 7.9 | 8.6 | - | - | - | - | 820 | 755 |

* test invalidated due to excessive control mortality

Organism: *Notropis leedsi* Age: 16 days
LC50: <100%

| | SURVIVAL | | | Dissolved Oxygen | | | pH | | | Temperature | | | Conductivity | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concentrations | # at 0 hr | Live at 24 hr | Live at 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 | 5 | 5 | - | 8.0 | 8.9 | - | 7.9 | 8.3 | - | 21.1 | 19.0 | - | - | - |
| Control | 5 | 5 | - | 8.0 | 8.9 | - | 7.9 | 8.3 | - | - | - | - | 82230 | 225 |
| 100% | 5 | 0 | - | 8.0 | 9.2 | - | 7.7 | 8.3 | - | 22.7 | 18.5 | - | - | - |
| 100% | 5 | 0 | - | 8.0 | 9.2 | - | 7.7 | 8.3 | - | - | - | - | 875 | 825 |

Table 3. Data recorded during the static definitive bioassay of a dechlorinated sample of discharge from the Dynaflow STP, Clearwater, Pinellas County, Florida, NPDES #FL0034789, on 20 to 22 March, 1990.

| | | | | | |
|---|---|---|---|---|---|
| Facility: | **Dynaflow SewageTreatment Plant** | | **NPDES #** | **FL0034789** | **Facility Type: sewage treatment** |
| Location: | 3210 US 19 North, Clearwater | | Contact/District: | D. Demmi / SW | |
| County: | Pinellas | | Test type: | static definitive | |
| Sample Collection Date: | 3/19/90 | Time: 1045 | # tests: | 2 | Receiving Water: Curlew Creek |
| Test Beginning Date: | 3/20/90 | Time: 1030 | Chlorination Type: | **dechlorinated** | |
| Test Ending Date: | 3/22/90 | Time: 1030 | Dechlor Method: | lab, sodium thiosulfate | **Page 1 of 2** |

Organism: ***Ceriodaphnia dubia*** Life stage: neonate
LC50: 85% Binomial: - Moving Average: - Probit: -

| | SURVIVAL | | | Dissolved Oxygen | | | pH | | | Temperature | | | Conductivity | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concentrations | # at 0 hr | Live at 24 hr | Live at 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 | 5 | 2* | 2 | 8.4 | - | - | 8.2 | - | - | 20.8 | - | - | - | - |
| Control | 5 | 5 | 3 | 8.4 | - | - | 8.2 | - | - | - | - | - | - | - |
| Control | 5 | 5 | 3 | 8.5 | - | - | 8.2 | - | - | - | - | - | - | - |
| Control | 5 | 4 | 3 | 8.5 | - | - | 8.2 | - | - | - | - | - | 160 | - |
| 10% | 5 | 5 | 5 | 8.4 | - | - | 8.2 | - | - | 20.7 | - | - | - | - |
| 10% | 5 | 5 | 5 | 8.4 | - | - | 8.2 | - | - | - | - | - | - | - |
| 10% | 5 | 5 | 5 | 8.4 | - | - | 8.2 | - | - | - | - | - | - | - |
| 10% | 5 | 5 | 5 | 8.4 | - | - | 8.2 | - | - | - | - | - | 230 | - |
| 30% | 5 | 5 | 5 | 8.4 | - | - | 8.2 | - | - | 20.8 | - | - | - | - |
| 30% | 5 | 5 | 5 | 8.4 | - | - | 8.2 | - | - | - | - | - | - | - |
| 30% | 5 | 5 | 5 | 8.4 | - | - | 8.2 | - | - | - | - | - | - | - |
| 30% | 5 | 5 | 4 | 8.4 | - | - | 8.2 | - | - | - | - | - | 360 | - |
| 50% | 5 | 5 | 5 | 8.4 | - | - | 8.1 | - | - | 20.9 | - | - | - | - |
| 50% | 5 | 5 | 5 | 8.4 | - | - | 8.1 | - | - | - | - | - | - | - |
| 50% | 5 | 5 | 5 | 8.4 | - | - | 8.2 | - | - | - | - | - | - | - |
| 50% | 5 | 5 | 5 | 8.4 | - | - | 8.2 | - | - | - | - | - | 500 | - |
| 70% | 5 | 5 | 5 | 8.2 | - | - | 8.2 | - | - | 20.9 | - | - | - | - |
| 70% | 5 | 5 | 5 | 8.3 | - | - | 8.2 | - | - | - | - | - | - | - |
| 70% | 5 | 5 | 5 | 8.3 | - | - | 8.2 | - | - | - | - | - | - | - |
| 70% | 5 | 5 | 5 | 8.3 | - | - | 8.2 | - | - | - | - | - | 630 | - |
| 85% | 5 | 5 | 1 | 8.2 | - | - | 8.1 | - | - | 21.2 | - | - | - | - |
| 85% | 5 | 5 | 2 | 8.2 | - | - | 8.1 | - | - | - | - | - | - | - |
| 85% | 5 | 5 | 3 | 8.2 | - | - | 8.1 | - | - | - | - | - | - | - |
| 85% | 5 | 5 | 4 | 8.2 | - | - | 8.1 | - | - | - | - | - | 730 | - |
| 100% | 5 | 5 | 0 | 8.2 | - | - | 8.1 | - | - | 21.5 | - | - | - | - |
| 100% | 5 | 3 | 0 | 8.2 | - | - | 8.1 | - | - | - | - | - | - | - |
| 100% | 5 | 5 | 0 | 8.2 | - | - | 8.1 | - | - | - | - | - | - | - |
| 100% | 5 | 5 | 0 | 8.2 | - | - | 8.1 | - | - | - | - | - | 835 | - |

* test invalidated due to excessive control mortality

| Total Residual Cl2 | mg/l | Method |
|---|---|---|
| Field: | 1.5 | Hach |
| Lab: | 2.3 | Hach |
| Lab: | 3.5 | Iodometric |

| Ammonia | Total (mg/l) | Unionized (mg/l) |
|---|---|---|
| Control Water (fish): | 0.00 | 0.00 |
| Cond. Control Water (daphnids): | 0.17 | 0.01 |
| 100% Sample: | 2.30 | 0.15 |

| Alk & Hardness | Alkalinity (mg/l) | Hardness (mg/l) |
|---|---|---|
| Control Water (fish): | 126 | 120 |
| Cond. Control Water (daphnids): | 77 | 75 |
| 100% Sample: | 205 | 191 |

| Salinity (ppt) | |
|---|---|
| Control Water: | 0 |
| 100% Sample: | 0 |

Table 3. Continued.

| | | | | | |
|---|---|---|---|---|---|
| Facility: | Dynaflow SewageTreatment Plant | | NPDES # | FL0034789 | Facility Type: sewage treatment |
| Location: | 3210 US 19 North, Clearwater | | Contact/District: | D. Demmi / SW | |
| County: | Pinellas | | Test type: | static definitive | |
| Sample Collection Date: | 3/19/90 | Time: 1045 | # tests: | 2 | Receiving Water: Curlew Creek |
| Test Beginning Date: | 3/20/90 | Time: 1030 | Chlorination Type: | dechlorinated | |
| Test Ending Date: | 3/22/90 | Time: 1030 | Dechlor Method: | lab, sodium thiosulfate | Page 2 of 2 |

Organism: ***Notropis leedsi*** Age: 16 days days

LC50: - Binomial: - Moving Average: - Probit: -

| Concentrations | SURVIVAL # at 0 hr | Live at 24 hr | Live at 48 hr | Dissolved Oxygen 0 hour | 24 hour | 48 hour | pH 0 hour | 24 hour | 48 hour | Temperature 0 hour | 24 hour | 48 hour | Conductivity 0 hour | 48 hour |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Control | 5 | 5 | 5 | 8.0 | 9.0 | 10.8 | 7.9 | 8.2 | 8.4 | 21.0 | 18.3 | 18.8 | - | - |
| Control | 5 | 5 | 5 | 8.0 | 9.1 | 10.8 | 7.9 | 8.2 | 8.4 | - | - | - | 230 | 230 |
| 10% | 5 | 5 | 5 | 8.1 | 9.0 | 10.4 | 7.9 | 8.3 | 8.3 | 21.0 | 18.2 | 18.7 | - | - |
| 10% | 5 | 5 | 5 | 8.0 | 9.0 | 10.4 | 7.9 | 8.3 | 8.3 | - | - | - | 290 | 295 |
| 30% | 5 | 5 | 5 | 7.9 | 9.0 | 10.4 | 7.9 | 8.3 | 8.4 | 21.2 | 18.2 | 18.6 | - | - |
| 30% | 5 | 5 | 5 | 8.0 | 9.0 | 10.4 | 7.9 | 8.3 | 8.4 | - | - | - | 425 | 425 |
| 50% | 5 | 5 | 5 | 8.1 | 8.9 | 10.0 | 7.9 | 8.3 | 8.4 | 21.5 | 18.1 | 18.4 | - | - |
| 50% | 5 | 5 | 5 | 8.1 | 9.0 | 10.0 | 7.9 | 8.3 | 8.4 | - | - | - | 555 | 550 |
| 70% | 5 | 5 | 5 | 8.2 | 8.9 | 9.8 | 7.9 | 8.3 | 8.4 | 21.9 | 18.0 | 18.4 | - | - |
| 70% | 5 | 5 | 5 | 8.2 | 8.9 | 9.8 | 7.9 | 8.3 | 8.4 | - | - | - | 690 | 675 |
| 85% | 5 | 5 | 5 | 8.2 | 8.8 | 9.5 | 7.9 | 8.3 | 8.4 | 22.1 | 18.1 | 18.5 | - | - |
| 85% | 5 | 5 | 5 | 8.2 | 8.8 | 9.6 | 7.9 | 8.3 | 8.4 | - | - | - | 790 | 770 |
| 100% | 5 | 5 | 5 | 8.1 | 8.7 | 9.8 | 7.9 | 8.3 | 8.4 | 22.4 | 18.7 | 18.9 | - | - |
| 100% | 5 | 5 | 5 | 8.1 | 8.7 | 9.8 | 7.9 | 8.3 | 8.4 | - | - | - | 885 | 870 |

| Total Residual Cl2 | mg/l | Method |
|---|---|---|
| Field: | 1.5 | Hach |
| Lab: | 2.3 | Hach |
| Lab: | 3.5 | Iodometric |

| Ammonia | Total (mg/l) | Unionized (mg/l) |
|---|---|---|
| Control Water (fish): | 0.00 | 0.00 |
| Cond. Control Water (daphnids): | 0.17 | 0.01 |
| 100% Sample: | 2.30 | 0.15 |

| Alk & Hardness | Alkalinity (mg/l) | Hardness (mg/l) |
|---|---|---|
| Control Water (fish): | 126 | 120 |
| Cond. Control Water (daphnids): | 77 | 75 |
| 100% Sample: | 205 | 191 |

| Salinity (ppt) | |
|---|---|
| Control Water: | 0 |
| 100% Sample: | 0 |

Table 4. Microtox test results, Dynaflow STP, Pinellas County, NPDES #FL0034789, on 20 March, 1990.

| % Sample | Final Reclaimed Water | | | |
|---|---|---|---|---|
| | Chlorinated | | Dechlorinated | |
| | 5-min | 15-min | 5-min | 15-min |
| 0 | 85 | 46 | 89 | 50 |
| 0 | 82 | 43 | 93 | 45 |
| 0 | 99 | 47 | 92 | 44 |
| 12.38 | 28 | 17 | 91 | 50 |
| 12.38 | 29 | 21 | 91 | 45 |
| 12.38 | 27 | 16 | 91 | 47 |
| 24.75 | 7 | 2 | 84 | 41 |
| 24.75 | 12 | 4 | 80 | 39 |
| 24.75 | 13 | 4 | 89 | 44 |
| 49.5 | 4 | 1 | 60 | 26 |
| 49.5 | 4 | 1 | 87 | 38 |
| 49.5 | 4 | 0 | 72 | 30 |
| 99 | 2 | 0 | 77 | 29 |
| 99 | 1 | 0 | 70 | 28 |
| 99 | 2 | 0 | 64 | 25 |

$EC_{50}$ Chlorinated (15 minute, 15 °C) = 10.38% sample
$EC_{50}$ Dechlorinated (15 minute, 15 °C) = 105.64% sample

$EC_{50}$ (15 minute, 15 °C) is calculated using the Data Reduction Computer Program developed by Microbics Corporation for the Sharp Model EL-5100 calculator (*Microbics Systems Operating Manual*, 1982, Microbics Corporation, Carlsbad, CA).

**Table 5. $LC_{50}$ Data for Bioassay of Dynaflow STP, Clearwater, Pinellas County, Florida, NPDES # Fl0034789.**

| Organism | Method of Data Analysis | 48 Hour $LC_{50}$ (95% Confidence Intervals) |
|---|---|---|
| **Chlorinated discharge** | | |
| *Ceriodaphnia dubia* | none | <100% [a] |
| *Notropis leedsi* | none | <100% [a] |
| **Dechlorinated discharge** | | |
| *Ceriodaphnia dubia* | Binomial | 85% (75%, 100%) |
| | Probit | [b] |
| | Moving Average | [b] |

a The $LC_{50}$ is < 100% since all the organisms died in the lowest test concentration ([100%]).

b Due to an insufficient number of dead organisms, or to the irregular distribution of mortality, an $LC_{50}$ value cannot be calculated using this method of statistical analysis..

County: Pinellas (SW)
Region: Dennis David

# MICROTOX™ Data Reduction Sheet

3/19/94

SOURCE: Dyna Flow STP

GRAPH CALC EC 50 ( 15 MIN, 17 °C) = 105.64 %SAMPLE mg/L

SAMPLE DATA: Dechlorinated

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.):

DATE ASSAYED: 3/21/90 TIME: 9:45 AM

VISUAL COLOR: CORRECTION REQUIRED: YES NO

VISUAL TURBIDITY: SEPARATION REQUIRED: YES NO

INITIAL pH: pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH: MOAS (DRY NaCl) OTHER

PRIMARY DILUTION OF SAMPLE:

OPERATOR: [signature] REAGENT VIAL LOT NO. M- NLN

REMARKS:

**MICROTOX™ TEST**

| SAMPLE CUVETTE | % SAMPLE | READINGS 5 MIN | READINGS 15 MIN | Γ5 | Γ15 | NOTES |
|---|---|---|---|---|---|---|
| A1 | 0 | 84 | 50 | X | X | |
| B1 | | 93 | 45 | | | |
| C1 | | 92 | 44 | | | |
| A2 | 12.38 | 91 | 50 | | -.07 | |
| B2 | | 91 | 45 | | | |
| C2 | | 91 | 47 | | | |
| A3 | 24.75 | 84 | 41 | | .12 | |
| B3 | | 80 | 39 | | | |
| C3 | | 89 | 44 | | | |
| A4 | 49.5 | 60 | 26 | | .48 | |
| B4 | | 87 | 38 | | | |
| C4 | | 72 | 30 | | | |
| A5 | 99 | 77 | 29 | | .70 | |
| B5 | | 70 | 28 | | | |
| C5 | | 64 | 25 | | | |
| $EC_{50}$ (15 MIN, 17 °C) | | | | | 105.64 | |

REVIEWED BY: [signature]
DATE: 4/12/90

Aug 94 D County Pinellas SW
Region David Denecini

# MICROTOX™ Data Reduction Sheet

SOURCE: Dyna Flow STP

GRAPH CALC EC 50 ( 15 MIN, 15 °C) = 10.38 %SAMPLE mg/L

SAMPLE DATA: Chlorinated

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.):

DATE ASSAYED: 3/20/90 TIME: 9:45 AM

VISUAL COLOR: CORRECTION REQUIRED: YES NO

VISUAL TURBIDITY: SEPARATION REQUIRED: YES NO

INITIAL pH: pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH: MOAS (DRY NaCl) OTHER

PRIMARY DILUTION OF SAMPLE:

OPERATOR: MG Cenizos REAGENT VIAL LOT NO. M- NLN

REMARKS:

MICROTOX™ TEST

| SAMPLE CUVETTE | % SAMPLE | READINGS 5 MIN | READINGS 15 MIN | Γ5 | Γ15 | NOTES |
|---|---|---|---|---|---|---|
| A1 | 0 | 85 | 46 | X | X | |
| B1 | | 82 | 43 | | | |
| C1 | | 94 | 47 | | | |
| A2 | 12.38 | 28 | 17 | | 1.52 | |
| B2 | | 29 | 21 | | | |
| C2 | | 27 | 16 | | | |
| A3 | 24.75 | 07 | 02 | | 12.60 | |
| B3 | | 12 | 04 | | | |
| C3 | | 13 | 04 | | | |
| A4 | 49.5 | 04 | 01 | | 67.00 | |
| B4 | | 04 | 01 | | | |
| C4 | | 04 | 00 | | | |
| A5 | 99 | 02 | 00 | | 0 | |
| B5 | | 81 | 00 | | | |
| C5 | | 82 | 00 | | | |
| $EC_{50}$ ( MIN, °C) | | | | | 10.38 | |

REVIEWED BY:
DATE: 6/12/90

# DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: DYNAFLOW STP
Address/City: _____
County: _____
Contact/District: _____
NPDES Permit #: _____ Outfall #: _____

Sample Collection: Date 3/19/90 Time 10:48
Test Beginning: Date 3/20/90 Time 1030
Test Ending: Date 3/21/90 Time 1035
Test Organism: N. Lata
Life Stage/Age: 16 days

Test Number: 4 of 4 Test Type (Screening) | Definitive
(Static) | Static Renewal | Flow-through

Remarks: Chlor

Instrument Calibrations:

| | pH | DO | Cond | Temp |
|---|---|---|---|---|
| 0 hr | | | | |
| 24 hr | | | | |
| 48 hr | | | | |

| | | Number Live | | | DO (mg/l) | | | pH | | | Temp. (°C) | | | Cond. (µmhos/cm) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conc. | Chamber # | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 |
| Control | 12 | 5 | 5 | | 8.0 | 8.9 | | 7.9 | 8.3 | | 21.1 | 19.0 | | | | |
| " | 3 | 5 | 5 | | 8.0 | 8.9 | | 7.9 | 8.3 | | | | | 280 | 275 | |
| 100% | 113 | 5 | 0 | | 8.0 | 9.2 | | 7.7 | 8.3 | | 22.7 | 18.5 | | | | |
| " | 76 | 5 | 0 | | 8.0 | 9.2 | | 7.7 | 8.3 | | | | | 875 | 925 | |
| Measured by: | | MF | MF | | SW | MF | | SW | MF | | SW | MF | | SW | MF | |
| Recorded by: | | MF | MF | | MF | SW | | MF | SW | | MF | SW | | MF | SW | |

Investigators' Signatures

Steven D Wolf
Marshall Faircloth

Reviewer

Water-quality Parameters

| | Well Water | Cond. Water | Sample | Method | Measured by |
|---|---|---|---|---|---|
| Field Tot. Resid. Cl2: | | | | | |
| Lab Tot. Resid. Cl2: | | | | | |
| Alkalinity: | | | | | |
| Hardness: | | | | | |
| Total Ammonia: | | | | | |

# DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: DYNAFLOW STP
Address/City: _____
County: _____
Contact/District: _____
NPDES Permit #: _____ Outfall #: _____

Sample Collection: Date 3/19/90 Time 10:48
Test Beginning: Date 3/20/90 Time 10 30
Test Ending: Date 3/21/90 Time 1030
Test Organism: Ceriodaphnia dubia
Life Stage/Age: < 24 hrs

Test Number: 3 of 4 Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through

Remarks: Chlor

Instrument Calibrations:

| | pH | DO | Cond | Temp |
|---|---|---|---|---|
| 0 hr | | | | |
| 24 hr | | | | |
| 48 hr | | | | |

| Conc. | Chamber # | Number Live 0 | 24 | 48 | DO (mg/l) 0 | 24 | 48 | pH 0 | 24 | 48 | Temp. (°C) 0 | 24 | 48 | Cond. (µmhos/cm) 0 | 24 | 48 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CONTROL | | 5 | 5 4 | | 8.4 | 9.0 | | 8.2 | 8.2 | | 21.2 | 19.9 | | 160 | | |
| " | | 5 | 5 4 | | 8.4 | 9.0 | | 8.2 | 8.2 | | | | | | | |
| " | | 5 | 5 3 | | 8.4 | 9.0 | | 8.2 | 8.2 | | | | | | | |
| " | | 5 | 5 3 | | 8.4 | 9.0 | | 8.2 | 8.2 | | | | | 160 | 160 | |
| 100% | | 5 | 0 | | 8.1 | 9.0 | | 7.9 | 8.6 | | 21.4 | 20.0 | | | | |
| " | | 5 | 0 | | 8.1 | 9.0 | | 7.9 | 8.6 | | | | | | | |
| " | | 5 | 0 | | 8.1 | 9.0 | | 7.9 | 8.6 | | | | | | | |
| " | | 5 | 0 | | 8.1 | 9.0 | | 7.9 | 8.6 | | | | | 820 | 755 | |
| Measured by: | | MF | MF | | SW | MF | | SW | MF | | SW | MF | | SW | MF | |
| Recorded by: | | MF | MF | | MF | SW | | MF | SW | | MF | SW | | MF | SW | |

Investigators' Signatures

Steven H Wolfe

Marshall Faircloth

Reviewer

Water-quality Parameters

| | Well Water | Cond. Water | Sample | Method | Measured by |
|---|---|---|---|---|---|
| Field Tot. Resid. Cl2: | | | | | |
| Lab Tot. Resid. Cl2: | | | | | |
| Alkalinity: | | | | | |
| Hardness: | | | | | |
| Total Ammonia: | | | | | |

# DER Biology Section — Acute-bioassay Bench Sheet

**Sample Source:** DYNAFLOW STP
**Address/City:**
**County:**
**Contact/District:**
**NPDES Permit #:** **Outfall #:**

**Sample Collection:** Date 3/19/90 Time 10:45
**Test Beginning:** Date 3/20/90 Time 1030
**Test Ending:** Date 3/22/90 Time 1120
**Test Organism:** Notropis leedsi
**Life Stage/Age:** 16 days

**Test Number:** 2 of 4 **Test Type:** Screening (Definitive) (Static) Static Renewal | Flow-through

**Remarks:** Dechlor

**Instrument Calibrations:**

| | pH | DO | Cond | Temp |
|---|---|---|---|---|
| 0 hr | | | | |
| 24 hr | | | | |
| 48 hr | | | | |

| | | Number Live | | | DO (mg/l) | | | pH | | | Temp. (°C) | | | Cond. (µmhos/cm) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conc. | Chamber # | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 |
| Control | 14 | 5 | 5 | 5 | 8.0 | 9.0 | 10.8 | 7.9 | 8.2 | 8.4 | 21.0 | 19.3 | 18.3 | | | |
| " | 10 | 5 | 5 | 5 | 8.0 | 9.1 | 10.8 | 7.9 | 8.2 | 8.4 | | | | 230 | | 230 |
| 10% | 190 | 5 | 5 | 5 | 8.1 | 9.0 | 10.4 | 7.9 | 8.3 | 8.3 | 21.0 | 19.2 | 18.7 | | | |
| " | 19 | 5 | 5 | 5 | 8.0 | 9.0 | 10.4 | 7.9 | 8.3 | 8.3 | | | | 290 | | 295 |
| 30% | 50 | 5 | 5 | 5 | 7.9 | 9.0 | 10.4 | 7.9 | 8.3 | 8.4 | 21.2 | 19.2 | 18.6 | | | |
| " | 119 | 5 | 5 | 5 | 8.0 | 9.0 | 10.4 | 7.9 | 8.3 | 8.4 | | | | 425 | | 425 |
| 50% | 13 | 5 | 5 | 5 | 8.1 | 8.9 | 10.0 | 7.9 | 8.3 | 8.4 | 21.5 | 19.1 | 18.4 | | | |
| " | 94 | 5 | 5 | 5 | 8.1 | 9.0 | 10.0 | 7.9 | 8.3 | 8.4 | | | | 555 | | 550 |
| 70% | 63 | 5 | 5 | 5 | 8.2 | 8.9 | 9.3 | 7.9 | 8.3 | 8.4 | 21.9 | 19.0 | 18.1 | | | |
| " | 41 | 5 | 5 | 5 | 8.2 | 8.9 | 9.3 | 7.9 | 8.3 | 8.4 | | | | 690 | | 675 |
| 85% | 39 | 5 | 5 | 5 | 8.2 | 8.9 | 9.5 | 7.9 | 8.3 | 8.4 | 22.1 | 19.1 | 18.5 | | | |
| " | 271 | 5 | 5 | 5 | 8.2 | 8.9 | 9.6 | 7.9 | 8.3 | 8.4 | | | | 790 | | 770 |
| 100% | 87 | 5 | 5 | 5 | 8.1 | 8.7 | 9.3 | 7.9 | 8.3 | 8.4 | 22.4 | 19.7 | 18.9 | | | |
| " | 43 | 5 | 5 | 5 | 8.1 | 8.7 | 9.3 | 7.9 | 8.3 | 8.4 | | | | 885 | | 870 |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Measured by: | | MF | MF | MF | SW | MF | SW | SW | MF | SW | SW | MF | SW | SW | | SW |
| Recorded by: | | MF | MF | MF | MF | SW | MF | MF | SW | MF | MF | SW | MF | MF | | MF |

**Investigators' Signatures**

Steven W Wolfe

Marshall Faircloth

Reviewer

**Water-quality Parameters**

| | Well Water | Cond: Water | Sample | Method | Measured by |
|---|---|---|---|---|---|
| Field Tot. Resid. Cl2: | | | | | |
| Lab Tot. Resid. Cl2: | | | | | |
| Alkalinity: | | | | | |
| Hardness: | | | | | |
| Total Ammonia: | | | | | |

# DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: DYNAFLOW STP
Address/City: near DORADO BLVD.,
County: PINELLAS
Contact/District: DAVID DEMMI
NPDES Permit #: FL0034789 Outfall #: 001

Sample Collection: Date 3/19/90 Time 10:48
Test Beginning: Date 3/20/90 Time 1030
Test Ending: Date 3/21/90 Time 1030
Test Organism: Ceriodaphnia dubia
Life Stage/Age: < 20 hrs

Test Number: 1 of 4 Test Type: Screening (Definitive)
(Static) | Static Renewal | Flow-through

Remarks: Dechlor

* = Immobilized
** = Immobilized

Instrument Calibrations:

| | pH | DO | Cond | Temp |
|---|---|---|---|---|
| 0 hr | 7.0, 7.0, 7.0 | 8.3 @ 22°C | 1354 @ 23°C / 1536 | 21.8 @ 22.9 |
| 24 hr | 7.0, 7.0, 7.0 | 8.2 @ 23°C | 1355 @ 24.1°C | 1384 @ 22.4 @ 22.1 |
| 48 hr | 7.0, 7.0, 7.0 | 8.7 @ 23°C | 1353 @ 23.0°C | 224 @ 22.7°C |

| Conc. | Chamber # | Number Live 0 | 24 | 48 | DO (mg/l) 0 | 24 | 48 | pH 0 | 24 | 48 | Temp. (°C) 0 | 24 | 48 | Cond. (µmhos/cm) 0 | 24 | 48 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CONTROL | | 5 | 2 | 2 | 8.4 | | | 8.2 | | | 20.8 | | | | | |
| " | | 5 | 5 | 3 | 8.4 | | | 8.2 | | | | | | | | |
| " | | 5 | 5 | 3 | 8.5 | | | 8.2 | | | | | | | | |
| " | | 5 | 4 | 3 | 8.5 | | | 8.2 | | | | | | 160 | | |
| 10% | | 5 | 5 | 5 | 8.4 | | | 8.2 | | | 20.7 | | | | | |
| " | | 5 | 5 | 5 | 8.4 | | | 8.2 | | | | | | | | |
| " | | 5 | 5 | 5 | 8.4 | | | 8.2 | | | | | | | | |
| " | | 5 | 5 | 5 | 8.4 | | | 8.2 | | | | | | 230 | | |
| 30% | | 5 | 5 | 5 | 8.4 | | | 8.2 | | | 20.8 | | | | | |
| " | | 5 | 5 | 5 | 8.4 | | | 8.2 | | | | | | | | |
| " | | 5 | 5 | 5 | 8.4 | | | 8.2 | | | | | | | | |
| " | | 5 | 5 | 4 | 8.4 | | | 8.2 | | | | | | 360 | | |
| 50% | | 5 | 5 | 5 | 8.4 | | | 8.1 | | | 21.9 | | | | | |
| " | | 5 | 5 | 5 | 8.4 | | | 8.1 | | | | | | | | |
| " | | 5 | 5 | 5 | 8.4 | | | 8.2 | | | | | | | | |
| " | | 5 | 5 | 5 | 8.4 | | | 8.2 | | | | | | 500 | | |
| 70% | | 5 | 5 | 5 | 8.2 | | | 8.2 | | | 20.9 | | | | | |
| " | | 5 | 5 | 5 | 8.3 | | | 8.2 | | | | | | | | |
| " | | 5 | 5 | 5 | 8.3 | | | 8.2 | | | | | | | | |
| " | | 5 | 5 | 5 | 8.3 | | | 8.2 | | | | | | 630 | | |
| 85% | | 5 | 5 | 1 | 8.2 | | | 8.1 | | | 21.2 | | | | | |
| " | | 5 | 5 | 2 | 8.2 | | | 8.1 | | | | | | | | |
| " | | 5 | 5 | 3 | 8.2 | | | 8.1 | | | | | | | | |
| " | | 5 | 5 | 4 | 8.2 | | | 8.1 | | | | | | 730 | | |
| 100% | | 5 | 5 | 0 | 8.2 | | | 8.1 | | | 21.5 | | | | | |
| " | | 5 | 3 | 0 | 8.2 | | | 8.1 | | | | | | | | |
| " | | 5 | 5* | 0 | 8.2 | | | 8.1 | | | | | | | | |
| " | | 5 | 5** | 0 | 8.2 | | | 8.1 | | | | | | 835 | | |
| Measured by: | | MF | MF | MF | SW | | | SW | | | SW | | | SW | | |
| Recorded by: | | MF | MF | MF | MF | | | MF | | | MF | | | MF | | |

Investigators' Signatures

Steven H Wolfe

Marshall Fairlett

Reviewer

Water-quality Parameters

| | Well Water | Cond. Water | Sample | Method | Measured by |
|---|---|---|---|---|---|
| Field Tot. Resid. Cl2: | | | 1.5 | HACH | D. DOMANI |
| Lab Tot. Resid. Cl2: | | | 23/345 | HACH/EDD | JMF |
| Alkalinity: | 126 | 77 | 205 | Hach | SHW |
| Hardness: | 120 | 75 | 191 | Hach | SHW |
| Total Ammonia: | 0.00 | 0.17 | 2.30 | [illegible] | SHW |

slope = -58.9