


Bioassays of

# Motel 8 Wastewater Treatment Plant

Lake City, Columbia County, Florida

NPDES #FL0038971

Sampled 11/12/91

January 3, 1991

**Biology Section**
**Division of Technical Services**

Bioassays of

# Motel 8 Wastewater Treatment Plant

Lake City, Columbia County, Florida

NPDES #FL0038971

**Biology Section**
**Bureau of Laboratories**
**January 3, 1991**

## Introduction

Motel 8 Wastewater Treatment Plant, Lake City, Columbia County, Florida, NPDES #FL0038971, on 13 to 15 November, 1991.

This facility is located on State Road 47 at the I-75 interchange in Lake City. It has an average flow of about 2,000 gpd. Treatment consists of extended aeration and chlorination, then dechlorination of effluent for discharge to Clay Hole Creek.

The toxicity tests discussed in this report were performed in accordance with methods described by Weber, 1991, *Methods for Measuring the Acute Toxicity of Effluents to Aquatic Organisms*, 4th Edition.

## Results and Discussion

The FDER Biology Section performed static acute screening toxicity bioassays on a sample of effluent from this facility. The bioassay organisms used for these tests were the water flea, *Ceriodaphnia dubia*, and the fish, *Notropis leedsi*. The test results indicated that the effluent was toxic to both test organisms. The fish showed 100% mortality at 24 hours and the *C. dubia* showed 60% mortality at 48 hours in the 100% effluent test concentration ($LC_{50} < 100\%$ for each test).

Total residual chlorine was not detected in the sample. Total and unionized ammonia concentrations were 2.28 mg/L and 0.08 mg/L (Hach), respectively. The EPA document, *Quality Criteria for Water, 1986,* reports unionized ammonia to be acutely toxic to freshwater organisms at concentrations (uncorrected for pH) of 0.08 mg/L for fish and 0.53 mg/L for invertebrates.

Further chemical analyses were not performed on the sample.

## Conclusion

The sample of effluent from this facility was toxic to *C. dubia* and *N. leedsi* on 12 November, 1991. The cause of toxicity may be attributed to the concentration of unionized ammonia in the sample.

**Table 1. Concentration Series and Volumes Used for the Static Acute Screening Bioassays of the Motel 8 WWTP on 13 to 15 November, 1991.**

*Ceriodaphnia dubia* (water flea)

| Concentration | Dilution Water | Sample | Total Volume |
|---|---|---|---|
| Control | 20 mL | 0 mL | 20 mL |
| 100 % | 0 mL | 20 mL | 20 mL |

*Notropis leedsi* (bannerfin shiner)

| Concentration | Dilution Water | Sample | Total Volume |
|---|---|---|---|
| Control | 500 mL | 0 mL | 500 mL |
| 100 % | 0 mL | 500 mL | 500 mL |

**Table 2. $LC_{50}$ Data for the Bioassay of Motel 8 WWTP effluent on November 12, 1991.**

| Organism | Method of Data Analysis | 48 Hour $LC_{50}$ (95% Confidence Intervals) |
|---|---|---|
| *Ceriodaphnia dubia* | not calculated | < 100% [a] |
| *Notropis leedsi* | not calculated | < 100% [b] |

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

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

Table 3. Data recorded during the acute screening bioassay of a sample of effluent from the Motel 8 WWTP, Lake City, Columbia County, Florida, NPDES# FL0038971, on 13 to 15 November, 1991.

| | | | | | |
|---|---|---|---|---|---|
| Facility: | Motel 8 WWTP | | NPDES # | FL0038971 | Facility Type: WWTP |
| Location: | SR 47 & I-75, Lake City | | Contact/District: | Scott Bulgrin / NE | |
| County: | Columbia | | Test type: | static acute screen | |
| Sample Collection Date: | 11/12/91 | Time: 1050 | # tests: | 2 | Receiving Water: Clay Hole Creek |
| Test Beginning Date: | 11/13/91 | Time: 1330 | Chlorination Type: | chlorinated | |
| Test Ending Date: | 11/15/91 | Time: 1330 | | | Page 1 of 1 |

| Total Residual Cl2 | mg/l | Method |
|---|---|---|
| Field: | < 0.01 | Hach |
| Lab: | 0.0 | Hach |

| Ammonia | Total (mg/l) | Unionized (mg/l) |
|---|---|---|
| Control Water (fish): | 0.00 | 0.00 |
| Cond. Control Water (daphnids): | 0.48 | 0.04 |
| 100% Sample: | 2.28 | 0.08 |

| Alk & Hardness | Alkalinity (mg/l) | Hardness (mg/l) |
|---|---|---|
| Control Water (fish): | 130 | 160 |
| Cond. Control Water (daphnids): | 80 | 110 |
| 100% Sample: | 200 | 240 |

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

Organism: *Ceriodaphnia dubia* Life stage: neonate
LC50: < 100% Binomial: - Moving Average: - Probit: -

| | SURVIVAL | | | pH | | | Temperature | | | Dissolved Oxygen | | | 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 | 5 | 8.6 | - | 8.2 | 22.0 | - | 24.0 | 9.2 | - | 8.6 | 161 | 194 |
| Control | 5 | 5 | 5 | - | - | 8.2 | - | - | - | - | - | 8.6 | - | - |
| Control | 5 | 5 | 5 | - | - | 8.2 | - | - | - | - | - | 8.6 | - | - |
| Control | 5 | 5 | 5 | - | - | 8.2 | - | - | - | - | - | 8.6 | - | - |
| 100% | 5 | 4 | 1 | 7.8 | - | 8.6 | 22.4 | - | 24.0 | 9.5 | - | 8.5 | 773 | 806 |
| 100% | 5 | 5 | 4 | - | - | 8.6 | - | - | - | - | - | 8.5 | - | - |
| 100% | 5 | 5 | 1 | - | - | 8.6 | - | - | - | - | - | 8.5 | - | - |
| 100% | 5 | 3 | 2 | - | - | 8.6 | - | - | - | - | - | 8.5 | - | - |

Organism: *Notropis leedsi* * Age: 12 days
LC50: < 100% Binomial: - Moving Average: - Probit: -

| | SURVIVAL | | | pH | | | Temperature | | | Dissolved Oxygen | | | 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 | 24 hour |
| Control | 5 | 5 | * | 7.9 | 8.2 | - | 22.0 | 22.1 | - | 8.6 | 8.7 | - | - | - |
| Control | 5 | 5 | * | 7.9 | 8.2 | - | - | - | - | 8.7 | 8.7 | - | 234 | 276 |
| 100% | 5 | 0 | * | 7.6 | 8.0 | - | 23.9 | 22.0 | - | 10.0 | 7.0 | - | - | - |
| 100% | 5 | 0 | * | 7.6 | 8.0 | - | - | - | - | 10.0 | 7.1 | - | 844 | 809 |

* test terminated at 24 hours.

# DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: MOTEL 8 WWTP
Address/City:
County: COLUMBIA
Contact/District: SCOTT BULGRIN / NE
NPDES Permit #: FL0038971 Outfall #: 001

Sample Collection: Date 11-12-91 Time 1050
Test Beginning: Date 11-13-91 Time 1330
Test Ending: Date 11/15/91 Time 1330
Test Organism: C. dubia
Life Stage/Age: < 24 hours

Test Number: 1 of 2 Test Type: (Screening) | Definitive
(Static) Static Renewal | Flow-through

Remarks: SAMPLED AFTER DECHLORINATION
LIMS 25618 91-NOV-18-09

Instrument Calibrations:

| | pH | DO | Temp | Cond |
|---|---|---|---|---|
| 0 hr | 7, 909 | 8.7@230 | 23.4@23H | 1357@23.3 |
| 24 hr | 7, 909 | 8.6@235 | 23.2@23.2 | 1357@23.3 |
| 48 hr | 7, 905 | 8.5@24.0 | 23.5@24.0 | 1356@24.0 |

| Conc. | Chamber # | Number Live 0 | 24 | 48 | pH 0 | 24 | 48 | Temp. (°C) 0 | 24 | 48 | DO (mg/L) 0 | 24 | 48 | Cond. (µmhos/cm) 0 | 24 | 48 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| control | A | 5 | 5 | 5 | 8.6 | | 8.2 | 22.0 | | 24.0 | 9.2 | | 8.6 | 161 | | 194 |
| control | B | 5 | 5 | 5 | | | 8.2 | | | | | | 8.6 | | | |
| control | C | 5 | 5 | 5 | | | 8.2 | | | | | | 8.6 | | | |
| control | D | 5 | 5 | 5 | | | 8.2 | | | | | | 8.6 | | | |
| 100% | A | 5 | 4 | 1 | 7.8 | | 8.6 | 22.4 | | 24.0 | 9.5 | | 8.5 | 723 | | 806 |
| 100% | B | 5 | 5 | 4 | | | 8.6 | | | | | | 8.5 | | | |
| 100% | C | 5 | 5 | 1 | | | 8.6 | | | | | | 8.5 | | | |
| 100% | D | 5 | 3 | 2 | | | 8.10 | | | | | | 8.5 | | | |
| Measured/Loaded by: | | KP | AF | AJ | AJ | | MF | AJ | | MF | AJ | | MF | AJ | | MF |
| Recorded by: | | AJ | AF | AJ | KP | | AJ | KP | | AJ | KP | | AJ | KP | | AJ |

25618 91-NOV-13-09-01
BIOLOGY Matrix: W-EFFLUENT
Date Collected: 12-NOV-1991 10:50:00
Field ID:
BSY-SN-CLD BSY-SN-FSH

Investigators' Signatures

Kym Pearce
Alison Fowler
Andrea Summerall
Marshall Faircloth
Reviewer

Water-quality Parameters

| | Well Water | Cond. Water | Sample | Method | Measured by |
|---|---|---|---|---|---|
| Field Tot. Resid. Cl2: | | | <.01 | Hach | SB |
| Lab Tot. Resid. Cl2: | | 0.0 | 0.0 | hach | AF |
| Alkalinity: | | 80 | 200 | hach | AH |
| Hardness: | | 110 | 240 | hach | AH |
| Total Ammonia: | | .48 | 2.29 | hach | AF |

Ammonia Meter Slope: _____
Ammonia Blank: _____
Salinity Sample: _____ ppt

# DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: MOTEL 8 WWTP
Address/City: _____
County: COLUMBIA
Contact/District: SCOTT BULGRIN
NPDES Permit #: FL0038971 Outfall #: _____

Sample Collection: Date 11-12-91 Time 1050
Test Beginning: Date 11-13-91 Time 1340
Test Ending: Date 11/14/91 Time 1330
Test Organism: NOTROPIS LEEDSI
Life Stage/Age: 12 days

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

Remarks: SAMPLED AFTER DECHLORINATION
test terminated at 24 hours

Instrument Calibrations:

| | pH | DO | Temp | Cond |
|---|---|---|---|---|
| 0 hr | 7@7.9@9 | 8.7@23.0 | 23.4@23.4 | 1359@23.5 |
| 24 hr | 7@7.9@7 | 8.6@23.5 | 23@23.2 | 1359@23.3 |
| 48 hr | | | | |

| | | Number Live | | | pH | | | Temp. (°C) | | | DO (mg/L) | | | Cond. (µmhos/cm) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conc. | Chamber # | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 | 0 | 24 | 48 |
| control | 76 | 5 | 5 | | 7.9 | 8.2 | | 22.0 | 22.1 | | 8.6 | 8.7 | | | | |
| control | 39 | 5 | 5 | | 7.9 | 8.2 | | | | | 8.7 | 8.7 | | 234 | 276 | |
| 100% | 67 | 5 | 0 | | 7.6 | 8.0 | | 23.9 | 22.0 | | 10.0 | 7.0 | | | | |
| 100% | 88 | 5 | 0 | | 7.6 | 8.0 | | | | | 10.0 | 7.1 | | 844 | 809 | |
| Measured/Loaded by: | | AJ | AJ | | AJ | AJ | | AJ | AJ | | AJ | AJ | | AJ | AJ | |
| Recorded by: | | AJ | AJ | | KP | AH | | KP | AH | | KP | AH | | KP | AH | |

Investigators' Signatures
Kim Pearce
Alson Jordan
Andrea Summerlot

Reviewer

Water-quality Parameters

| | Well Water | Cond. Water | Sample | Method | Measured by |
|---|---|---|---|---|---|
| Field Tot. Resid. Cl2: | | | | | |
| Lab Tot. Resid. Cl2: | 0.0 | | 0.0 | hach | AJ |
| Alkalinity: | 130 | | 200 | hach | AH |
| Hardness: | 160 | | 240 | hach | AH |
| Total Ammonia: | 0.0 | | 2.28 | hach | AJ |

Ammonia Meter Slope: _____ Ammonia Blank: _____ Salinity Sample: _____ ppt

**The Bioassay of Motel 8 WWTP effluent sampled on 12 November, 1991, NPDES# FL0038971.**

