


# Lowry Park Zoo

Hillsborough County

NPDES #FL0186651

Sampled June 21, 2005

September 2005

**Biology Section**
**Bureau of Laboratories**
**Division of Resource Assessment and Management**

Quality Manual No. 870346G
NELAC Certification No. E31780

Lowry Park Zoo, 7530 North Boulevard, Tampa, Hillsborough County, Florida, NPDES # FL0186651. Effluent samples for this facility were collected on June 21, 2005.

## Introduction

Lowry Park Zoo is a zoological garden. This facility does not have a design flow; it has a rainfall dependent intermittent discharge. At most, the facility discharges only a couple of days per month. The mean flow from June 2004 through May 2005 was 100,800 gallons per month. The flow during the sampling event was 225 gallons per minute. The facility generates wastewater from maintenance activities associated with the zoo operation. This wastewater and storm water run-off is routed to Lake Sharon. Wastewater and storm water is pumped from the north side of Lake Sharon at a rate of 350 gallons per minute into a 2,000 gallon holding tank. Effluent from the holding tank is passed through two 42-inch epoxy coated sand filters then pumped through an ultraviolet disinfection system. Disinfected effluent is then used to irrigate restricted public access areas of the park. These areas consist of animal exhibits and the planters around these exhibits. Filter backwash discharges to a sanitary sewer. Chlorine, although not used in the wastewater treatment process, is used in some of the maintenance activities, therefore residual chlorine is sometimes detected in the effluent. In the event that wastewater and storm water collected in Lake Sharon exceed the irrigation needs of the park and the holding capacity of the lake, the facility is authorized to discharge untreated water from Lake Sharon through outfall D-001 to the Class III freshwaters of Hamilton Creek thence to the Hillsborough River. The D-001 discharge point is located at latitude 28º 00' 42.5" N and longitude 82º 28' 14.9" W.

The facility has no Administrative or Consent Orders. No previous bioassessments have been performed at this facility. During the past year, the facility has had violations for total residual chlorine, dissolved oxygen, fecal coliforms, and unionized ammonia (facility information provided by Lori Pillsbury of FDEP Southwest District).

## Methods

Samples were collected from the D-001 NPDES sampling point by Lori Pillsbury and Nahir Cornwell (FDEP Southwest District) following DEP-SOP-001/01 FS 2400 Wastewater Sampling. All DEP SOP's are available on the web at: http://www.floridadep.org/labs/qa/sops.htm.

The acute definitive toxicity tests and algal growth potential test were performed following internal DEP SOP's TA07_01, TA07_02, and TA08_01 through TA08_07. All internal DEP SOP's are available on the web at: http://www.floridadep.org/labs/cgi-bin/sop/biosop.asp.

## Toxicity Test Results

Tests were performed June 22 - 26, 2005.

| | |
|---|---|
| *Ceriodaphnia dubia* 96-hr acute definitive bioassay – | $LC_{50}$ > 100%, 0% mortality in 100% sample at 96 hours |
| *Cyprinella leedsi* 96-hr acute definitive bioassay – | $LC_{50}$ > 100%, 0% mortality in 100% sample at 96 hours |

The bioassay sample was not acutely toxic to the test organisms.

See Appendix 1 for bioassay bench sheets.

## Algal Growth Potential

The effluent Algal Growth Potential (AGP) was 23.7 mg dry wt/L of the unicellular green alga, *Pseudokirchneriella subcapitata*, formerly known as *Selenastrum capricornutum*. Raschke and

Shultz (1987) found that AGP values above 5.0 mg dry weight/L represent a “problem” threshold for fresh receiving waters, implying nutrient enrichment. The analytical chemistry suggests that the effluent is nitrogen-limited. The predicted AGP based on the inorganic nitrogen concentration was 33.4 (±20%) (Miller et al. 1978).

See Table 1 for AGP results.

## Chemistry Results

The total residual chlorine (TRC) concentration (0.3 mg/L) measured in the effluent sample in the field exceeded the Class III freshwater surface water criterion of ≤ 0.01 mg/L (62-302.530(19), F.A.C.). TRC and total ammonia were not detected in the bioassay sample in the laboratory. The total ammonia concentration in the sample collected and preserved for chemical analysis was 0.028 mg/L. Based on the pH, salinity, and temperature of the effluent as collected, the calculated unionized ammonia concentration was < 0.02 mg/L.

Aluminum and iron were detected in the effluent at levels that comply with Class III freshwater quality criteria. Copper, lead, selenium, and zinc were detected between the laboratory minimum detection limits (MDL) and practical quantitation limits (PQL).

See Table 2 for results of analytes detected in the effluent, and corresponding limits.

See Appendix 2 for a complete list of chemical analyses performed.

## Conclusion

The effluent sample collected from the D-001 NPDES sampling point for this facility on June 21, 2005, was not acutely toxic to either test species during the 96-hour acute definitive bioassays. The effluent AGP result exceeded the "problem” threshold for fresh receiving waters. The effluent total residual chlorine (TRC) concentration exceeded the Class III freshwater surface water quality criterion.

## Literature Cited

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

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

*Table 1. Measured and predicted algal growth potential (AGP; mg dry wt/L) of* Pseudokirchneriella subcapitata *for total soluble nitrogen (TSIN) and total nitrogen (TN) limitation, and ratios of nitrogen to phosphorus for the sample collected from Lowry Park Zoo on June 21, 2005.*

| Location | AGP (measured) | Predicted AGP (TSIN) ± 20% | Predicted AGP (TN) ± 20% | Inorganic N:P ratio | Total N:P ratio |
|---|---|---|---|---|---|
| Effluent Samples | 23.7 | 33.36 ± 6.672 | 77.9 ± 15.58 | 4.62 | 7.59 |

*Table 2. Effluent limits, Class III Freshwater Criteria, and chemical and microbiological data for the samples collected from Lowry Park Zoo on June 21, 2005*

| **Lowry Park Zoo NPDES# FL0186651** | Class III Freshwater Stds | Effluent Limits | Effluent Samples |
|---|---|---|---|
| **Metals (µg/L unless otherwise noted)** | | | |
| Aluminum | - | - | 102 |
| Arsenic | ≤ 50 | - | 4 U |
| Cadmium | ≤ 2.1 b | - | 0.05 U |
| Calcium (mg/L) | - | - | 73.9 |
| Chromium-III | ≤ 165.1 b | - | 2 U |
| Copper | ≤ 18.4 b | - | 1.8 I |
| Iron | ≤ 1,000 | - | 76 |
| Lead | ≤ 8.7 b | - | 0.28 I |
| Magnesium (mg/L) | - | - | 8.9 |
| Nickel | ≤ 102.1 b | - | 2 U |
| Selenium | ≤ 5 | - | 1.5 I |
| Silver | ≤ 0.07 | - | 0.025 U |
| Zinc | ≤ 234.8 b | - | 7.5 I |
| **Nutrients (mg/L)** | | | |
| Ortho-phosphate | - | - | 0.19 |
| Total Phosphorus | - | ≤ 1 ma | 0.27 |
| Ammonia | - | Report | 0.028 |
| Unionized Ammonia | ≤ 0.02 | ≤ 0.02 s | < 0.02 c |
| Nitrate+Nitrite | - | - | 0.85 |
| Total Kjeldahl Nitrogen | - | - | 1.2 |
| Organic Nitrogen | - | - | 1.17 c |
| Total Nitrogen | - | ≤ 5 ma | 2.05 c |
| **General Physical and Chemical Parameters** | | | |
| Dissolved Oxygen (mg/L) | ≥ 5 | ≥ 5 s | 5.7 |
| pH (S.U.) | 6.0-8.5 s | 6.0-8.5 s | 7.5 |
| Conductivity (umhos/cm) | ≤ 1,275 | ≤ 1,275 | 920 |
| Temperature (C) | - | Report | 28.3 |
| CBOD (mg/L) | - | - | 0.77 I |
| Flow (gallons/month) | - | Report | 108,000 a |
| Hardness (mg/L) | - | - | 221.2 c |
| Total Residual Chlorine (mg/L) | ≤ 0.01 | ≤ 0.01 s | 0.3 |
| Turbidity (NTU) | ≤ 29 t | ≤ 29 t | 3.5 |
| TSS (mg/L) | - | - | 4 U |
| **Microbiology (# counts/100ml)** | | | |
| Fecal Coliforms-Membrane Filter | ≤ 400 | ≤ 800 s | 1K * |
| Total Coliforms | ≤ 1,000 | ≤ 2,400 s | 1K * |

Value exceeds the Class III Fresh Water Quality Criteria (62-302, F.A.C.) and/or Effluent Limits

a - Annual average

b - Value is calculated based on hardness

c - calculated value

ma - monthly average

s - Single sample

t - Shall not exceed 29 NTUs above background

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

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

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

* - Data provided by FL DEP SW District chemistry lab

# FDEP Biology Section - Acute Definitive Bioassay Bench Sheets

Facility: ~~Lowery~~ Park Zoo (Lowry)

Address: 7530 North Boulevard

City: Tampa County: Hillsborough

Contact/District: Lori Pillsbury / Southwest District

NPDES Permit #: FL 0186651

LIMS Job #: TLH-2005-06-22-33 LIMS Sample #: 844082

Sample Collection: Date: 6-21-05 Time: 1030

Hold Time Start: Date: 6-21-05 Time: 1030

Comments:
Because district only sent two jugs of sample, C.leedsi test volume was reduced from 500 mL to 400 mL.

Lims Data Entry: 6-29-05 MF

Data Entry Verification: 6-27-05 SP

Instructions (for below): Circle appropriate wording. If yes is circled complete blanks.

SOP#07_01/_02

**Test Type:** Definitive

Static / (Static Renewal) / Flow-through

**Test Duration:** 48 (96) Hours.

Light Intensity : 50 - 100 ft. candles.

Photoperiod : 16 hours light 8 hours dark.

Initial sample handling:

**Test 1 validation:**

Control survival ≥90%: (Yes) No

Temperature Range ≤3°C: (Yes) No

**Test 2 validation:**

Control survival ≥90%: (Yes) No

Temperature Range ≤3°C: (Yes) No

PH adjustment : yes (no) Initial pH NaOH N HCl N Drops mL Final pH

Aeration : yes (no) Initial DO: mg/L Final DO: mg/L Duration: minutes Rate: ~ bubbles/min

Salinity adjusted (Test 1): yes (no) Initial Salinity: Final Salinity: Salts Hypersaline brine

Salinity adjusted (Test 2): yes (no) Initial Salinity: Final Salinity: Salts Hypersaline brine

Dechlorination: yes (no) mL of 0.025N Sodium Thiosulfate per liter of sample. Final TRC

Temperature Range °C

Incubator # 2 Range 25.0 - 26.3

Room B246: 23.6 - 24.6

Waterbath: N/A

**Sample Validation:**

Temperature: Shipped ≤6°C (Yes) No Hand Delivered: Cooling (received °C < collected °C) Yes No

Holding Time: ≤36 Hours (Yes) No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Investigators' Signatures

Sarah Pinkney

Deanna Nichelson

Marshall Faircloth

James Daniels

Nicole Wellendorf

REVIEWER

| Water Quality Parameters | 20% DMW | Well Water | Salt Water ASW NSW Test 1 | Salt Water ASW NSW Test 2 | Moderately Hard Water | Original Sample | Method | Measured by | Verified by |
|---|---|---|---|---|---|---|---|---|---|
| Field Total Residual Cl2 (mg/L): | N/A | N/A | N/A | N/A | N/A | 0.3 | Accuvac | L.Pillsbury | SP |
| Lab Total Residual Cl2 (mg/L): | <0.03 | <0.03 | | | | <0.03 | HACH | SP | SP MF |
| Alkalinity (mg/L as $CaCO_3$): | 80 | 165 | | | | 171 | HACH | EW | SP |
| Hardness (mg/L as $CaCO_3$): | 101 | 152 | | | | 262 | HACH | EW | SP |
| Total Ammonia (mg/L as N): | <0.017 | <0.017 | | | | <0.017 | DENVER | MF | SP |
| Salinity (ppt): | <1 | <1 | | | | <1 | YSI | SP FP | MF |

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## Appendix 1. Bench Sheets (continued)

FDEP Biology Section - - Bioassay Bench Sheet
Survival

LIMS Sample #: 844082 Test #: 1 Test Started: Date 6-22-05 Time: 1430
Organism: C. dubia Test Ended: Date 6-26-05 Time: 1200
Organism Batch: 21-05 Diluent/ Batch: DMW / 19-05
Organism Age: <24 hrs Food: YCT *P. subcapitata* *Artemia*
Chamber Size 30 mL Batch: 5-05 1-05 _____
Test Volume 20 mL Feeding: ~~Prior to test~~ - ~~Prior to renewal~~ Daily

| Concentration | Replicate | Chamber # | Test Hour 0 hr | 24 hr | 48 hr BR | 48 hr AR | 72 hr | 96 hr |
|---|---|---|---|---|---|---|---|---|
| CTRL | A | A | 5 | 5 | 5 | 5 | 5 | 5 |
| | B | B | 5 | 5 | 5 | 5 | 5 | 5 |
| | C | C | 5 | 5 | 5 | 5 | 5 | 5 |
| | D | D | 5 | 5 | 5 | 5 | 5 | 5 |
| 6.25% | A | A | 5 | 5 | 5 | 5 | 5 | 5 |
| | B | B | 5 | 5 | 5 | 5 | 5 | 5 |
| | C | C | 5 | 5 | 5 | 5 | 5 | 5 |
| | D | D | 5 | 5 | 5 | 5 | 5 | 5 |
| 12.5% | A | A | 5 | 5 | 5 | 5 | 5 | 5 |
| | B | B | 5 | 5 | 5 | 5 | 5 | 5 |
| | C | C | 5 | 5 | 5 | 5 | 5 | 5 |
| | D | D | 5 | 5 | 5 | 5 | 5 | 5 |
| 25% | A | A | 5 | 5 | 5 | 5 | 5 | 5 |
| | B | B | 5 | 5 | 5 | 5 | 5 | 5 |
| | C | C | 5 | 5 | 5 | 5 | 5 | 5 |
| | D | D | 5 | 5 | 5 | 5 | 5 | 5 |
| 50% | A | A | 5 | 5 | 5 | 5 | 5 | 5 |
| | B | B | 5 | 5 | 5 | 5 | 5 | 5 |
| | C | C | 5 | 5 | 5 | 5 | 5 | 5 |
| | D | D | 5 | 5 | 5 | 5 | 5 | 5 |
| 100% | A | A | 5 | 5 | 5 | 5 | 5 | 5 |
| | B | B | 5 | 5 | 5 | 5 | 5 | 5 |
| | C | C | 5 | 5 | 5 | 5 | 5 | 5 |
| | D | D | 5 | 5 | 5 | 5 | 5 | 5 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Organisms loaded by: DN Checked by: _____ DN 830 830 DN MF
Loading Verified by: RC (initials)
Comments:

m = missing d = dead BR = before renewal AR = after renewal
Test Results:
% mortality in 100% sample 0
$LC_{50}$: >100% If Calculated: 95% CI _____ Method: _____
Screening Tests: Report LC50 as >100%, =100%, or <100%.
Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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## Appendix 1. Bench Sheets (continued)

FDEP Biology Section - - Bioassay Bench Sheet
Survival

LIMS Sample #: 844092 Test #: 2 Test Started: Date 6-23-05 Time: 1445
Organism: C. tedsi Test Ended: Date 6-26-05 Time: 1200
Organism Batch: 18-05 Diluent/ Batch: Well / N/A
Organism Age: 7 days Food: YCT *P. subcapitata* Artemia
Chamber Size 1000 mL Batch: 351361425GR
Test Volume 400 mL Feedings Prior to test - Prior to renewal - Daily

| Concentration | Replicate | Chamber # | Test Hour 0 hr | 24 hr | 48 hr BR | 48 hr AR | 72 hr | 96 hr |
|---|---|---|---|---|---|---|---|---|
| CTRL | A | D1 | 5 | 5 | 5 | 5 | 4 D | 4 |
| | B | D2 | 5 | 5 | 5 | 5 | 5 | 5 |
| | C | D3 | 5 | 5 | 5 | 5 | 5 | 5 |
| | D | D4 | 5 | 5 | 5 | 5 | 5 | 5 |
| 6.25% | A | D5 | 5 | 5 | 5 | 5 | 4 D | 4 |
| | B | D6 | 5 | 5 | 5 | 5 | 5 | 5 |
| | C | D7 | 5 | 5 | 5 | 5 | 5 | 5 |
| | D | D8 | 5 | 5 | 5 | 5 | 5 | 5 |
| 12.5% | A | D9 | 5 | 5 | 5 | 5 | 5 | 5 |
| | B | D10 | 5 | 5 | 5 | 5 | 5 | 5 |
| | C | D11 | 5 | 5 | 5 | 5 | 5 | 5 |
| | D | D12 | 5 | 5 | 5 | 5 | 5 | 5 |
| 25% | A | D13 | 5 | 5 | 5 | 5 | 5 | 5 |
| | B | D14 | 5 | 5 | 5 | 5 | 5 | 5 |
| | C | D15 | 5 | 5 | 5 | 5 | 5 | 5 |
| | D | D16 | 5 | 5 | 5 | 5 | 5 | 5 |
| 50% | A | D17 | 5 | 5 | 5 | 5 | 5 | 5 |
| | B | D18 | 5 | 5 | 5 | 5 | 5 | 5 |
| | C | D19 | 5 | 5 | 5 | 5 | 5 | 5 |
| | D | D20 | 5 | 5 | 5 | 5 | 5 | 5 |
| 100% | A | D21 | 5 | 5 | 5 | 5 | 5 | 5 |
| | B | D22 | 5 | 5 | 5 | 5 | 5 | 5 |
| | C | D23 | 5 | 5 | 5 | 5 | 5 | 5 |
| | D | D24 | 5 | 5 | 5 | 5 | 5 | 5 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Organisms loaded by: JD | | Checked by: | | SP | JD | JD | JD | JD |
| Loading Verified by: SP | | (initials) | | | | | | |

Comments:

m = missing d = dead BR = before renewal AR = after renewal
Test Results:
% mortality in 100% sample 0
$LC_{50}$: >100% If Calculated: 95% CI _____ Method: _____
Screening Tests: Report LC50 as >100%, =100%, or <100%.
Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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## Appendix 1. Bench Sheets (continued)



Bioassay Parameters

LIMS Sample #: 844052 Test #: 1 of 2

TEST SOP: TA07_01_ Test Species: *Ceriodaphnia dubia* *Cyprinella leedsi* *Pimephales promelas*

*Americamysis bahia* *Menidia beryllina* Other:

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| Concentration CTRL | 0 Hr. | 24 Hr. | 48 Hr. before renewal | 48 Hr. after renewal | 72 Hr. | 96 Hr. |
|---|---|---|---|---|---|---|
| Replicate | A | | B | B | C | C |
| pH (S.U.) | 8.2 | | 7.9 | 8.1 | | 8.2 |
| Temperature °C | 24.4 | | 24.3 | 24.0 | | 24.0 |
| Dissolved Oxygen mg/L | 7.0 | | 7.9 | 7.6 | | 8.4 |
| Conductivity ~~umhos~~ mmhos | 200 | | 209 | 200 | | 280 |
| (initials) Measured by: | JN | | SP | DN | | DN |
| (initials) Recorded by: | JN | | SP | DN | | DN |

Comments:

| Concentration 0.35% | 0 Hr. | 24 Hr. | 48 Hr. before renewal | 48 Hr. after renewal | 72 Hr. | 96 Hr. |
|---|---|---|---|---|---|---|
| Replicate | A | | B | B | | C |
| pH (S.U.) | 8.2 | | 8.1 | 8.2 | | 8.3 |
| Temperature °C | 24.7 | | 24.1 | 24.1 | | 24.0 |
| Dissolved Oxygen mg/L | 7.3 | | 8.0 | 7.7 | | 8.5 |
| Conductivity ~~umhos~~ mmhos | 250 | | 374 | 240 | | 270 |
| (initials) Measured by: | JN | | SP | DN | | DN |
| (initials) Recorded by: | JN | | SP | DN | | DN |

Comments:

| Concentration 1.25% | 0 Hr. | 24 Hr. | 48 Hr. before renewal | 48 Hr. after renewal | 72 Hr. | 96 Hr. |
|---|---|---|---|---|---|---|
| Replicate | A | | B | B | | C |
| pH (S.U.) | 8.1 | | 8.3 | 8.2 | | 8.1 |
| Temperature °C | 24.8 | | 24.0 | 24.0 | | 24.0 |
| Dissolved Oxygen mg/L | 7.5 | | 7.9 | 7.8 | | 8.5 |
| Conductivity ~~umhos~~ mmhos | 340 | | 344 | 290 | | 320 |
| (initials) Measured by: | JN | | SP | DN | | DN |
| (initials) Recorded by: | JN | | SP | DN | | DN |

Comments:

| Concentration 2.5% | 0 Hr. | 24 Hr. | 48 Hr. before renewal | 48 Hr. after renewal | 72 Hr. | 96 Hr. |
|---|---|---|---|---|---|---|
| Replicate | A | | B | B | | C |
| pH (S.U.) | 8.0 | | 8.3 | 8.1 | | 8.1 |
| Temperature °C | 24.8 | | 24.0 | 24.0 | | 24.0 |
| Dissolved Oxygen mg/L | 7.5 | | 8.0 | 7.8 | | 8.1 |
| Conductivity ~~umhos~~ mmhos | 360 | | 435 | 380 | | 425 |
| (initials) Measured by: | JN | | SP | DN | | DN |
| (initials) Recorded by: | JN | | SP | DN | | DN |

Comments:

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Bioassay Parameters

**LIMS Sample # :** 844082 **Test # :** 1 **of** 2

**TEST SOP: TA07_** 01 **Test Species:** (*Ceriodaphnia dubia*) *Cyprinella leedsi* *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

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| Concentration 50% | 0 Hr. | 24 Hr. | 48 Hr. before renewal | 48 Hr. after renewal | 72 Hr. | 96 Hr. |
|---|---|---|---|---|---|---|
| Replicate | A | | B | B | | C |
| pH (S.U.) | 8.0 | | 8.4 | 8.0 | | 8.5 |
| Temperature °C | 24.7 | | 24.1 | 24.0 | | 24.0 |
| Dissolved Oxygen mg/L | 6.5 | | 7.9 | 7.4 | | 8.7 |
| Conductivity ~~µmhos~~ mmhos | 475 | | 560 | 510 | | 560 |
| (initials) Measured by: | JD | | SF | DN | | DN |
| (initials) Recorded by: | JD | | SF | DN | | DN |

Comments:

| Concentration 100% | 0 Hr. | 24 Hr. | 48 Hr. before renewal | 48 Hr. after renewal | 72 Hr. | 96 Hr. |
|---|---|---|---|---|---|---|
| Replicate | A | | B | B | | C |
| pH (S.U.) | 7.8 | | 8.5 | 7.9 | | 8.6 |
| Temperature °C | 24.7 | | 24.0 | 24.0 | | 24.0 |
| Dissolved Oxygen mg/L | 6.8 | | 8.0 | 6.5 | | 8.3 |
| Conductivity ~~µmhos~~ mmhos | 895 | | 1092 | 900 | | 1150 |
| (initials) Measured by: | JD | | SF | DN | | DN |
| (initials) Recorded by: | JD | | SF | DN | | DN |

Comments:

| Concentration | 0 Hr. | 24 Hr. | 48 Hr. before renewal | 48 Hr. after renewal | 72 Hr. | 96 Hr. |
|---|---|---|---|---|---|---|
| Replicate | | | | | | |
| pH (S.U.) | | | | | | |
| Temperature °C | | | | | | |
| Dissolved Oxygen mg/L | | | | | | |
| Conductivity ~~µmhos~~ mmhos | | | | | | |
| (initials) Measured by: | | | | | | |
| (initials) Recorded by: | | | | | | |

Comments:

| Concentration | 0 Hr. | 24 Hr. | 48 Hr. before renewal | 48 Hr. after renewal | 72 Hr. | 96 Hr. |
|---|---|---|---|---|---|---|
| Replicate | | | | | | |
| pH (S.U.) | | | | | | |
| Temperature °C | | | | | | |
| Dissolved Oxygen mg/L | | | | | | |
| Conductivity ~~µmhos~~ mmhos | | | | | | |
| (initials) Measured by: | | | | | | |
| (initials) Recorded by: | | | | | | |

Comments:

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Bioassay Parameters

**LIMS Sample #:** 844082 **Test #:** 2 of 2

**TEST SOP: TA07_** 02 **Test Species:** *Ceriodaphnia dubia* (*Cyprinella leedsi*) *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

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| Concentration CTRL | 0 Hr. | 24 Hr. | 48 Hr. before renewal | 48 Hr. after renewal | 72 Hr. | 96 Hr. |
|---|---|---|---|---|---|---|
| Replicate | A | B | C | C | D | A |
| pH (S.U.) | 7.9 | 7.7 | 8.5 | 8.0 | 7.8 | 8.4 |
| Temperature °C | 24.3 | 24.0 | 25.3 | 24.8 | 24.7 | 24.0 |
| Dissolved Oxygen mg/L | 6.9 | 8.2 | 7.9 | 7.8 | 7.4 | 7.6 |
| Conductivity (µmhos) mmhos | 285 | 303 | 315 | 285 | 280 | 345 |
| (initials) Measured by: | SP | SP | JD | JD | MF | JD |
| (initials) Recorded by: | SP | SP | JD | JD | MF | JD |

Comments:

| Concentration 6.25% | 0 Hr. | 24 Hr. | 48 Hr. before renewal | 48 Hr. after renewal | 72 Hr. | 96 Hr. |
|---|---|---|---|---|---|---|
| Replicate | A | B | C | C | D | A |
| pH (S.U.) | 8.0 | 8.3 | 8.4 | 8.0 | 7.8 | 8.3 |
| Temperature °C | 24.4 | 24.0 | 24.7 | 24.8 | 25.6 | 24.0 |
| Dissolved Oxygen mg/L | 6.9 | 7.7 | 7.7 | 7.8 | 7.2 | 7.4 |
| Conductivity (µmhos) mmhos | 308 | 337 | 340 | 330 | 370 | 330 |
| (initials) Measured by: | SP | SP | JD | JD | MF | JD |
| (initials) Recorded by: | SP | SP | JD | JD | MF | JD |

Comments:

| Concentration 12.5% | 0 Hr. | 24 Hr. | 48 Hr. before renewal | 48 Hr. after renewal | 72 Hr. | 96 Hr. |
|---|---|---|---|---|---|---|
| Replicate | A | B | C | C | D | A |
| pH (S.U.) | 8.0 | 8.3 | 8.4 | 8.0 | 7.8 | 8.3 |
| Temperature °C | 24.4 | 24.0 | 24.6 | 24.7 | 24.3 | 24.2 |
| Dissolved Oxygen mg/L | 6.9 | 7.9 | 7.6 | 7.6 | 7.1 | 7.4 |
| Conductivity (µmhos) mmhos | 350 | 365 | 380 | 365 | 370 | 375 |
| (initials) Measured by: | SP | SP | JD | JD | MF | JD |
| (initials) Recorded by: | SP | SP | JD | JD | MF | JD |

Comments:

| Concentration 25% | 0 Hr. | 24 Hr. | 48 Hr. before renewal | 48 Hr. after renewal | 72 Hr. | 96 Hr. |
|---|---|---|---|---|---|---|
| Replicate | A | B | C | C | D | A |
| pH (S.U.) | 7.9 | 8.3 | 8.4 | 8.0 | 7.8 | 8.3 |
| Temperature °C | 24.5 | 24.0 | 24.7 | 24.7 | 24.7 | 24.4 |
| Dissolved Oxygen mg/L | 7.3 | 7.9 | 7.8 | 7.4 | 7.2 | 7.6 |
| Conductivity (µmhos) mmhos | 433 | 451 | 480 | 445 | 440 | 425 |
| (initials) Measured by: | SP | SP | JD | JD | MF | JD |
| (initials) Recorded by: | SP | SP | JD | JD | MF | JD |

Comments:

V.1 2/24/04

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Page

Bioassay Parameters

**LIMS Sample # :** 5414082 **Test # :** 2 **of** 2

**TEST SOP: TA07_** 02 **Test Species:** *Ceriodaphnia dubia* (*Cyprinella leedsi*) *Pimephales promelas*
*Americamysis bahia* *Menidia beryllina* Other:_____

V.1 2/24/04

| Concentration 50% | 0 Hr. | 24 Hr. | 48 Hr. before renewal | 48 Hr. after renewal | 72 Hr. | 96 Hr. |
|---|---|---|---|---|---|---|
| Replicate | A | B | C | C | D | A |
| pH (S.U.) | 8.0 | 8.3 | 8.4 | 7.9 | 7.8 | 8.1 |
| Temperature °C | 24.5 | 24.0 | 24.1 | 24.7 | 24.8 | 24.1 |
| Dissolved Oxygen mg/L | 7.1 | 8.0 | 7.8 | 6.8 | 6.9 | 7.7 |
| Conductivity (µmhos) mmhos | 595 | 615 | 665 | 630 | 580 | 596 |
| (initials) Measured by: | BP | BP | JD | JD | MF | JD |
| (initials) Recorded by: | BP | BP | JD | JD | MF | JD |

Comments:

| Concentration 100% | 0 Hr. | 24 Hr. | 48 Hr. before renewal | 48 Hr. after renewal | 72 Hr. | 96 Hr. |
|---|---|---|---|---|---|---|
| Replicate | A | B | C | C | D | A |
| pH (S.U.) | 7.8 | 8.3 | 8.4 | 7.7 | 7.8 | 8.3 |
| Temperature °C | 24.7 | 24.0 | 24.6 | 24.7 | 24.5 | 24.4 |
| Dissolved Oxygen mg/L | 6.0 | 8.0 | 7.5 | 5.5 | 7.0 | 7.9 |
| Conductivity (µmhos) mmhos | 922 | 945 | 970 | 940 | 941 | 960 |
| (initials) Measured by: | BP | BP | JD | JD | MF | JD |
| (initials) Recorded by: | BP | BP | JD | JD | MF | JD |

Comments:

| Concentration | 0 Hr. | 24 Hr. | 48 Hr. before renewal | 48 Hr. after renewal | 72 Hr. | 96 Hr. |
|---|---|---|---|---|---|---|
| Replicate | | | | | | |
| pH (S.U.) | | | | | | |
| Temperature °C | | | | | | |
| Dissolved Oxygen mg/L | | | | | | |
| Conductivity µmhos mmhos | | | | | | |
| (initials) Measured by: | | | | | | |
| (initials) Recorded by: | | | | | | |

Comments:

| Concentration | 0 Hr. | 24 Hr. | 48 Hr. before renewal | 48 Hr. after renewal | 72 Hr. | 96 Hr. |
|---|---|---|---|---|---|---|
| Replicate | | | | | | |
| pH (S.U.) | | | | | | |
| Temperature °C | | | | | | |
| Dissolved Oxygen mg/L | | | | | | |
| Conductivity µmhos mmhos | | | | | | |
| (initials) Measured by: | | | | | | |
| (initials) Recorded by: | | | | | | |

Comments:

V.1 2/24/04

000034

## Appendix 2. Chemical Analyses performed on the effluent from Lowry Park Zoo Outfall D-001, sampled on June 21, 2005.

| Date Sampled | Field ID | Analysis Group | Component | Result | Units | Remark | MDL | PQL |
|---|---|---|---|---|---|---|---|---|
| 6/21/2005 10:30 | Outfall D-001 | Bio-AGP/LimNut | Algal Growth Potential | 23.7 | mg DryWt/L | | 0.3 | 0.9 |
| 6/21/2005 10:30 | Outfall D-001 | Bio-BOD | Biochemical Oxygen Demand-5 Day,N-Inhib | 0.77 | mg/L | I | | |
| 6/21/2005 10:30 | Outfall D-001 | Bio-Chl-a | Chlorophyll-A, Monochromatic, Water | 10 | ug/L | A | 0.85 | 2.6 |
| 6/21/2005 10:30 | Outfall D-001 | Bio-Chl-a | Phaeophytin-A, Monochromatic, Water | 0 | ug/L | A | 0.85 | 2.6 |
| 6/21/2005 10:30 | Outfall D-001 | Bio-Toxicology | Bioassay-Acute-Def-FW-C.dubia, LC50 | 100 | LC50 | L | | |
| 6/21/2005 10:30 | Outfall D-001 | Bio-Toxicology | Bioassay-Acute-Def-FW-Fish, LC50 | 100 | LC50 | L | | |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 1,2,4-Trichlorobenzene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 1,2-Dichlorobenzene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 1,3-Dichlorobenzene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 1,4-Dichlorobenzene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 2,4,6-Trichlorophenol | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 2,4-Dichlorophenol | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 2,4-Dimethylphenol | 49 | ug/L | U | 49 | 200 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 2,4-Dinitrophenol | 15 | ug/L | U | 15 | 59 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 2,4-Dinitrotoluene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 2,6-Dinitrotoluene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 2-Chloronaphthalene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 2-Chlorophenol | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 2-Methyl-4,6-dinitrophenol | 2.9 | ug/L | U | 2.9 | 12 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 2-Nitrophenol | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 3,3'-Dichlorobenzidine | 39 | ug/L | UJ | 39 | 160 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 4,4'-DDD | 1.5 | ug/L | U | 1.5 | 5.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 4,4'-DDE | 1.5 | ug/L | U | 1.5 | 5.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 4,4'-DDT | 1.5 | ug/L | U | 1.5 | 5.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 4-Bromophenyl phenyl ether | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 4-Chloro-3-methylphenol | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 4-Chlorophenyl phenyl ether | 2 | ug/L | U | 2 | 7.8 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | 4-Nitrophenol | 15 | ug/L | U | 15 | 59 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Acenaphthene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Acenaphthylene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Aldrin | 1.5 | ug/L | U | 1.5 | 5.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | alpha-BHC | 1.5 | ug/L | U | 1.5 | 5.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Anthracene | 0.98 | ug/L | U | 0.98 | 3.9 |

## Appendix 2. Chemical Analyses (continued)

| Date Sampled | Field ID | Analysis Group | Component | Result | Units | Remark | MDL | PQL |
|---|---|---|---|---|---|---|---|---|
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Benzidine | 98 | ug/L | U | 98 | 390 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Benzo(a)anthracene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Benzo(a)pyrene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Benzo(b)fluoranthene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Benzo(g,h,i)perylene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Benzo(k)fluoranthene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | beta-BHC | 1.5 | ug/L | U | 1.5 | 5.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Bis(2-chloroethoxy)methane | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Bis(2-chloroethyl)ether | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Bis(2-chloroisopropyl)ether | 2.9 | ug/L | U | 2.9 | 12 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Bis(2-ethylhexyl)phthalate | 15 | ug/L | U | 15 | 59 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Butyl benzyl phthalate | 4.9 | ug/L | U | 4.9 | 20 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Chrysene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | delta-BHC | 1.5 | ug/L | U | 1.5 | 5.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Dibenzo(a,h)anthracene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Dieldrin | 1.5 | ug/L | U | 1.5 | 5.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Diethyl phthalate | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Dimethyl phthalate | 49 | ug/L | U | 49 | 200 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Di-n-butyl phthalate | 4.9 | ug/L | U | 4.9 | 20 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Di-n-octyl phthalate | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Endosulfan I | 3.9 | ug/L | U | 3.9 | 16 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Endosulfan II | 3.9 | ug/L | U | 3.9 | 16 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Endosulfan sulfate | 1.5 | ug/L | U | 1.5 | 5.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Endrin | 1.5 | ug/L | U | 1.5 | 5.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Endrin aldehyde | 3.9 | ug/L | U | 3.9 | 16 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Fluoranthene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Fluorene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | gamma-BHC | 1.5 | ug/L | U | 1.5 | 5.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Heptachlor | 1.5 | ug/L | U | 1.5 | 5.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Heptachlor epoxide | 1.5 | ug/L | U | 1.5 | 5.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Hexachlorobenzene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Hexachlorobutadiene | 2.9 | ug/L | U | 2.9 | 12 |

## Appendix 2. Chemical Analyses (continued)

| Date Sampled | Field ID | Analysis Group | Component | Result | Units | Remark | MDL | PQL |
|---|---|---|---|---|---|---|---|---|
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Hexachlorocyclopentadiene | 2.9 | ug/L | UJ | 2.9 | 12 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Hexachloroethane | 2.9 | ug/L | U | 2.9 | 12 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Indeno(1,2,3-cd)pyrene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Isophorone | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Naphthalene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Nitrobenzene | 2 | ug/L | U | 2 | 7.8 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | N-Nitrosodimethylamine | 2 | ug/L | U | 2 | 7.8 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | N-Nitrosodi-n-propylamine | 2 | ug/L | U | 2 | 7.8 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | N-Nitrosodiphenylamine | 2.9 | ug/L | U | 2.9 | 12 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Pentachlorophenol | 2.9 | ug/L | U | 2.9 | 12 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Phenanthrene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Phenol | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:30 | Outfall D-001 | BNA-Water | Pyrene | 0.98 | ug/L | U | 0.98 | 3.9 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 1,2,4-Trichlorobenzene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 1,2-Dichlorobenzene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 1,3-Dichlorobenzene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 1,4-Dichlorobenzene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 2,4,6-Trichlorophenol | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 2,4-Dichlorophenol | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 2,4-Dimethylphenol | 52 | ug/L | U | 52 | 210 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 2,4-Dinitrophenol | 15 | ug/L | U | 15 | 62 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 2,4-Dinitrotoluene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 2,6-Dinitrotoluene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 2-Chloronaphthalene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 2-Chlorophenol | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 2-Methyl-4,6-dinitrophenol | 3.1 | ug/L | U | 3.1 | 12 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 2-Nitrophenol | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 3,3'-Dichlorobenzidine | 41 | ug/L | UJ | 41 | 160 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 4,4'-DDD | 1.5 | ug/L | U | 1.5 | 6.2 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 4,4'-DDE | 1.5 | ug/L | U | 1.5 | 6.2 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 4,4'-DDT | 1.5 | ug/L | U | 1.5 | 6.2 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 4-Bromophenyl phenyl ether | 1 | ug/L | U | 1 | 4.1 |

## Appendix 2. Chemical Analyses (continued)

| Date Sampled | Field ID | Analysis Group | Component | Result | Units | Remark | MDL | PQL |
|---|---|---|---|---|---|---|---|---|
| 6/21/2005 10:50 | Field Blank | BNA-Water | 4-Chloro-3-methylphenol | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 4-Chlorophenyl phenyl ether | 2.1 | ug/L | U | 2.1 | 8.2 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | 4-Nitrophenol | 15 | ug/L | U | 15 | 62 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Acenaphthene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Acenaphthylene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Aldrin | 1.5 | ug/L | U | 1.5 | 6.2 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | alpha-BHC | 1.5 | ug/L | U | 1.5 | 6.2 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Anthracene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Benzidine | 100 | ug/L | U | 100 | 410 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Benzo(a)anthracene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Benzo(a)pyrene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Benzo(b)fluoranthene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Benzo(g,h,i)perylene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Benzo(k)fluoranthene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | beta-BHC | 1.5 | ug/L | U | 1.5 | 6.2 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Bis(2-chloroethoxy)methane | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Bis(2-chloroethyl)ether | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Bis(2-chloroisopropyl)ether | 3.1 | ug/L | U | 3.1 | 12 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Bis(2-ethylhexyl)phthalate | 15 | ug/L | U | 15 | 62 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Butyl benzyl phthalate | 5.2 | ug/L | U | 5.2 | 21 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Chrysene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | delta-BHC | 1.5 | ug/L | U | 1.5 | 6.2 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Dibenzo(a,h)anthracene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Dieldrin | 1.5 | ug/L | U | 1.5 | 6.2 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Diethyl phthalate | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Dimethyl phthalate | 52 | ug/L | U | 52 | 210 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Di-n-butyl phthalate | 5.2 | ug/L | U | 5.2 | 21 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Di-n-octyl phthalate | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Endosulfan I | 4.1 | ug/L | U | 4.1 | 16 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Endosulfan II | 4.1 | ug/L | U | 4.1 | 16 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Endosulfan sulfate | 1.5 | ug/L | U | 1.5 | 6.2 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Endrin | 1.5 | ug/L | U | 1.5 | 6.2 |

## Appendix 2. Chemical Analyses (continued)

| Date Sampled | Field ID | Analysis Group | Component | Result | Units | Remark | MDL | PQL |
|---|---|---|---|---|---|---|---|---|
| 6/21/2005 10:50 | Field Blank | BNA-Water | Endrin aldehyde | 4.1 | ug/L | U | 4.1 | 16 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Fluoranthene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Fluorene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | gamma-BHC | 1.5 | ug/L | U | 1.5 | 6.2 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Heptachlor | 1.5 | ug/L | U | 1.5 | 6.2 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Heptachlor epoxide | 1.5 | ug/L | U | 1.5 | 6.2 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Hexachlorobenzene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Hexachlorobutadiene | 3.1 | ug/L | U | 3.1 | 12 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Hexachlorocyclopentadiene | 3.1 | ug/L | UJ | 3.1 | 12 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Hexachloroethane | 3.1 | ug/L | U | 3.1 | 12 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Indeno(1,2,3-cd)pyrene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Isophorone | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Naphthalene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Nitrobenzene | 2.1 | ug/L | U | 2.1 | 8.2 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | N-Nitrosodimethylamine | 2.1 | ug/L | U | 2.1 | 8.2 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | N-Nitrosodi-n-propylamine | 2.1 | ug/L | U | 2.1 | 8.2 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | N-Nitrosodiphenylamine | 3.1 | ug/L | U | 3.1 | 12 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Pentachlorophenol | 3.1 | ug/L | U | 3.1 | 12 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Phenanthrene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Phenol | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:50 | Field Blank | BNA-Water | Pyrene | 1 | ug/L | U | 1 | 4.1 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Alachlor | 0.58 | ug/L | U | 0.58 | 2.3 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Ametryn | 0.049 | ug/L | U | 0.049 | 0.2 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Atrazine | 0.049 | ug/L | U | 0.049 | 0.2 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Azinphos Methyl | 0.049 | ug/L | U | 0.049 | 0.2 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Bromacil | 0.19 | ug/L | U | 0.19 | 0.76 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Butylate | 0.19 | ug/L | U | 0.19 | 0.76 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Chlorpyrifos Ethyl | 0.049 | ug/L | U | 0.049 | 0.2 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Chlorpyrifos Methyl | 0.097 | ug/L | U | 0.097 | 0.39 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Diazinon | 0.049 | ug/L | UJ | 0.049 | 0.2 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Ethion | 0.049 | ug/L | U | 0.049 | 0.2 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Ethoprop | 0.097 | ug/L | U | 0.097 | 0.39 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Fenamiphos | 0.19 | ug/L | U | 0.19 | 0.76 |

## Appendix 2. Chemical Analyses (continued)

| Date Sampled | Field ID | Analysis Group | Component | Result | Units | Remark | MDL | PQL |
|---|---|---|---|---|---|---|---|---|
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Fonofos | 0.097 | ug/L | U | 0.097 | 0.39 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Hexazinone | 0.097 | ug/L | U | 0.097 | 0.39 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Malathion | 0.15 | ug/L | UJ | 0.15 | 0.6 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Metalaxyl | 0.24 | ug/L | U | 0.24 | 0.96 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Metolachlor | 0.49 | ug/L | U | 0.49 | 2 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Metribuzin | 0.097 | ug/L | U | 0.097 | 0.39 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Mevinphos | 0.19 | ug/L | U | 0.19 | 0.76 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Naled | 0.78 | ug/L | U | 0.78 | 3.1 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Norflurazon | 0.097 | ug/L | U | 0.097 | 0.39 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Parathion Ethyl | 0.15 | ug/L | U | 0.15 | 0.6 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Parathion Methyl | 0.097 | ug/L | U | 0.097 | 0.39 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Phorate | 0.049 | ug/L | U | 0.049 | 0.2 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Prometryn | 0.15 | ug/L | U | 0.15 | 0.6 |
| 6/21/2005 10:30 | Outfall D-001 | GC-Water | Simazine | 0.049 | ug/L | U | 0.049 | 0.2 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Alachlor | 0.59 | ug/L | U | 0.59 | 2.4 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Ametryn | 0.05 | ug/L | U | 0.05 | 0.2 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Atrazine | 0.05 | ug/L | U | 0.05 | 0.2 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Azinphos Methyl | 0.05 | ug/L | U | 0.05 | 0.2 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Bromacil | 0.2 | ug/L | U | 0.2 | 0.8 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Butylate | 0.2 | ug/L | U | 0.2 | 0.8 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Chlorpyrifos Ethyl | 0.05 | ug/L | U | 0.05 | 0.2 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Chlorpyrifos Methyl | 0.099 | ug/L | U | 0.099 | 0.4 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Diazinon | 0.05 | ug/L | UJ | 0.05 | 0.2 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Ethion | 0.05 | ug/L | U | 0.05 | 0.2 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Ethoprop | 0.099 | ug/L | U | 0.099 | 0.4 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Fenamiphos | 0.2 | ug/L | U | 0.2 | 0.8 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Fonofos | 0.099 | ug/L | U | 0.099 | 0.4 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Hexazinone | 0.099 | ug/L | U | 0.099 | 0.4 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Malathion | 0.15 | ug/L | UJ | 0.15 | 0.6 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Metalaxyl | 0.25 | ug/L | U | 0.25 | 1 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Metolachlor | 0.5 | ug/L | U | 0.5 | 2 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Metribuzin | 0.099 | ug/L | U | 0.099 | 0.4 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Mevinphos | 0.2 | ug/L | U | 0.2 | 0.8 |

## Appendix 2. Chemical Analyses (continued)

| Date Sampled | Field ID | Analysis Group | Component | Result | Units | Remark | MDL | PQL |
|---|---|---|---|---|---|---|---|---|
| 6/21/2005 10:50 | Field Blank | GC-Water | Naled | 0.79 | ug/L | U | 0.79 | 3.2 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Norflurazon | 0.099 | ug/L | U | 0.099 | 0.4 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Parathion Ethyl | 0.15 | ug/L | U | 0.15 | 0.6 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Parathion Methyl | 0.099 | ug/L | U | 0.099 | 0.4 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Phorate | 0.05 | ug/L | U | 0.05 | 0.2 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Prometryn | 0.15 | ug/L | U | 0.15 | 0.6 |
| 6/21/2005 10:50 | Field Blank | GC-Water | Simazine | 0.05 | ug/L | U | 0.05 | 0.2 |
| 6/21/2005 10:30 | Outfall D-001 | Metals-Water | Aluminum | 102 | ug/L | | 5 | 20 |
| 6/21/2005 10:30 | Outfall D-001 | Metals-Water | Arsenic | 4 | ug/L | U | 4 | 16 |
| 6/21/2005 10:30 | Outfall D-001 | Metals-Water | Cadmium | 0.05 | ug/L | U | 0.05 | 0.2 |
| 6/21/2005 10:30 | Outfall D-001 | Metals-Water | Calcium | 73.9 | mg/L | | 0.05 | 0.2 |
| 6/21/2005 10:30 | Outfall D-001 | Metals-Water | Chromium | 2 | ug/L | U | 2 | 8 |
| 6/21/2005 10:30 | Outfall D-001 | Metals-Water | Copper | 1.8 | ug/L | I | 0.5 | 2 |
| 6/21/2005 10:30 | Outfall D-001 | Metals-Water | Iron | 76 | ug/L | | 10 | 40 |
| 6/21/2005 10:30 | Outfall D-001 | Metals-Water | Lead | 0.28 | ug/L | I | 0.075 | 0.3 |
| 6/21/2005 10:30 | Outfall D-001 | Metals-Water | Magnesium | 8.9 | mg/L | | 0.01 | 0.04 |
| 6/21/2005 10:30 | Outfall D-001 | Metals-Water | Nickel | 2 | ug/L | U | 2 | 8 |
| 6/21/2005 10:30 | Outfall D-001 | Metals-Water | Selenium | 1.5 | ug/L | I | 0.5 | 2 |
| 6/21/2005 10:30 | Outfall D-001 | Metals-Water | Silver | 0.025 | ug/L | U | 0.025 | 0.1 |
| 6/21/2005 10:30 | Outfall D-001 | Metals-Water | Zinc | 7.5 | ug/L | I | 3 | 12 |
| 6/21/2005 10:50 | Field Blank | Metals-Water | Aluminum | 5 | ug/L | U | 5 | 20 |
| 6/21/2005 10:50 | Field Blank | Metals-Water | Arsenic | 4 | ug/L | U | 4 | 16 |
| 6/21/2005 10:50 | Field Blank | Metals-Water | Cadmium | 0.05 | ug/L | U | 0.05 | 0.2 |
| 6/21/2005 10:50 | Field Blank | Metals-Water | Calcium | 0.05 | mg/L | U | 0.05 | 0.2 |
| 6/21/2005 10:50 | Field Blank | Metals-Water | Chromium | 2 | ug/L | U | 2 | 8 |
| 6/21/2005 10:50 | Field Blank | Metals-Water | Copper | 0.5 | ug/L | U | 0.5 | 2 |
| 6/21/2005 10:50 | Field Blank | Metals-Water | Iron | 10 | ug/L | U | 10 | 40 |
| 6/21/2005 10:50 | Field Blank | Metals-Water | Lead | 0.075 | ug/L | U | 0.075 | 0.3 |
| 6/21/2005 10:50 | Field Blank | Metals-Water | Magnesium | 0.01 | mg/L | U | 0.01 | 0.04 |
| 6/21/2005 10:50 | Field Blank | Metals-Water | Nickel | 2 | ug/L | U | 2 | 8 |
| 6/21/2005 10:50 | Field Blank | Metals-Water | Selenium | 0.5 | ug/L | U | 0.5 | 2 |
| 6/21/2005 10:50 | Field Blank | Metals-Water | Silver | 0.025 | ug/L | U | 0.025 | 0.1 |
| 6/21/2005 10:50 | Field Blank | Metals-Water | Zinc | 3 | ug/L | U | 3 | 12 |

## Appendix 2. Chemical Analyses (continued)

| Date Sampled | Field ID | Analysis Group | Component | Result | Units | Remark | MDL | PQL |
|---|---|---|---|---|---|---|---|---|
| 6/21/2005 10:30 | Outfall D-001 | Nutrients-Liquid | Ammonia-N | 0.028 | mg N/L | | 0.01 | 0.02 |
| 6/21/2005 10:30 | Outfall D-001 | Nutrients-Liquid | Kjeldahl Nitrogen | 1.2 | mg N/L | | 0.06 | 0.2 |
| 6/21/2005 10:30 | Outfall D-001 | Nutrients-Liquid | NO2NO3-N | 0.85 | mg N/L | | 0.008 | 0.02 |
| 6/21/2005 10:30 | Outfall D-001 | Nutrients-Liquid | O-Phosphate-P | 0.19 | mg P/L | | 0.012 | 0.03 |
| 6/21/2005 10:30 | Outfall D-001 | Nutrients-Liquid | Total-P | 0.27 | mg P/L | | 0.02 | 0.06 |
| 6/21/2005 10:30 | Outfall D-001 | Nutrients-Liquid | TSS | 4 | mg/L | U | 4 | 16 |
| 6/21/2005 10:30 | Outfall D-001 | Nutrients-Liquid | Turbidity | 3.5 | NTU | | 0.05 | 0.05 |
| 6/21/2005 10:50 | Field Blank | Nutrients-Liquid | Ammonia-N | 0.01 | mg N/L | U | 0.01 | 0.02 |
| 6/21/2005 10:50 | Field Blank | Nutrients-Liquid | Kjeldahl Nitrogen | 0.06 | mg N/L | U | 0.06 | 0.2 |
| 6/21/2005 10:50 | Field Blank | Nutrients-Liquid | NO2NO3-N | 0.005 | mg N/L | I | 0.004 | 0.01 |
| 6/21/2005 10:50 | Field Blank | Nutrients-Liquid | O-Phosphate-P | 0.004 | mg P/L | U | 0.004 | 0.01 |
| 6/21/2005 10:50 | Field Blank | Nutrients-Liquid | Total-P | 0.02 | mg P/L | U | 0.02 | 0.06 |

## The Bioassay of Lowry Park Zoo effluent sampled on June 21, 2005, NPDES #FL0186651.

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

| Transaction Code | NPDES NUMBER | YR/MO/DA | Insp Type | Inspector | Fac Type |
|---|---|---|---|---|---|
| 1 N 2 5 | 3 FL0186651 11 | 12 050621 | 18 **B** | 19 **S** | 20 2 |

Remarks

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## The Priority Pollutants Analysis of Lowry Park Zoo effluent sampled on June 21, 2005, NPDES #FL0186651.

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

| Transaction Code | NPDES NUMBER | YR/MO/DA | Insp Type | Inspector | Fac Type |
|---|---|---|---|---|---|
| 1 N 2 5 | 3 FL0186651 11 | 12 050621 | 18 **X** | 19 **S** | 20 2 |

Remarks

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## Biological Analyses of Lowry Park Zoo effluent sampled on June 21, 2005, NPDES #FL0186651.

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

| Transaction Code | NPDES NUMBER | YR/MO/DA | Insp Type | Inspector | Fac Type |
|---|---|---|---|---|---|
| 1 N 2 5 | 3 FL0186651 11 | 12 050621 | 18 **S** | 19 **S** | 20 2 |

Remarks

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