

Bioassays of

Meadowlands Sewage Treatment Plant

Lakeland, Polk County, Florida

NPDES #FL0041416

Sampled 1/31/95

March 1995

Biology Section

Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan #870346G

Bioassays of

Meadowlands Sewage Treatment Plant

Lakeland, Polk County, Florida

NPDES #FL0041416

Biology Section
Bureau of Laboratories
March 1995

Introduction

Meadowlands Sewage Treatment Plant, Lakeland, Polk County, Florida, NPDES #FL0041416, tests performed on 1 to 3 February, 1995.

This extended-aeration process sewage treatment plant, located on Pipkin Road in Lakeland, has a design flow of 0.2 MGD and an annual average flow of 0.066 MGD. Treatment of influent includes screening, flow equalization, the activated sludge biological process, aeration, secondary clarification, and filtration through denitrification filters. Effluent is disinfected with chlorine and dechlorinated with sulfur dioxide prior to discharge to Poley Creek, a tributary of the north prong of the Alafia River (facility summary provided by Joseph Squitieri, FDEP Tampa, with supplemental information from the NPDES files, FDEP Tallahassee).

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 two 48-hour static acute screening toxicity bioassays on a sample of effluent from this facility. The test species used for these bioassays were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*. The test results did not indicate toxicity (Table 1).

Total residual chlorine and total ammonia were not detected in the sample. Further chemical analyses were performed on the sample and several metals and a herbicide were identified (Table 2). The metals and herbicide do not appear to be present in concentrations known to be toxic to the test species.

Conclusion

The sample of effluent collected from this facility on January 31, 1995, did not show toxicity.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Meadowlands Sewage Treatment Plant, Lakeland, Polk County, Florida, NPDES# FL0041416, performed on 1 to 3 February,1995.

Facility:	**Meadowlands Sewage Treatment Plant**	**NPDES #**	**FL0041416**	Facility Type:	**Sewage Treatment**
Location:	Lakeland	Contact/District:	L. Carter/SW		
County:	Polk	Test type:	static acute screen	Receiving Water:	Poley Creek to the north
Sample Collection Date:	**1/31/95** Time: 1205	# tests:	2		prong of the Alafia River
Test Beginning Date:	2/1/95 Time: 1330	Chlorination Type:	**Chlorinated**		
Test Ending Date:	2/3/95 Time: 1330		Sample collected after plant dechlorination		**Page 1 of 1**

Total Residual CL2	mg/L	Method
Field:	0.01	-
Lab:	< 0.03	DR-100

Ammonia	Total (mg/L)	Unionized (mg/L)
Control Water (fish):	< 0.017	<0.017
20% Dilute Mineral Water (cladocerans):	< 0.017	<0.017
100% Sample:	<0.017	<0.017

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	120	125
20% Dilute Mineral Water (cladocerans):	65	80
100% Sample:	210	120

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

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

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature*			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	8.0	-	8.0	21.3	-	23.3	8.4	-	7.5	160	180
Control B	0/20	5	5	5	-	-	8.0	-	-	23.2	-	-	7.6	-	175
Control C	0/20	5	5	5	-	-	8.1	-	-	23.2	-	-	7.7	-	170
Control D	0/20	5	5	5	-	-	8.1	-	-	23.1	-	-	7.7	-	175
100% A	20/0	5	5	5	7.5	-	8.8	21.4	-	23.1	8.4	-	7.8	600	720
100% B	20/0	5	5	5	-	-	8.7	-	-	23.1	-	-	7.8	-	725
100% C	20/0	5	5	5	-	-	8.7	-	-	23.1	-	-	7.8	-	700
100% D	20/0	5	5	5	-	-	8.7	-	-	23.1	-	-	7.8	-	680

*Temperature of test incubator was continously recorded on a strip chart recorder.
Temperature range for the test period was 24.2-24.7°C.

Organism: ***Cyprinella leedsi*** Age: 12 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature**			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	7.7	8.2	8.2	20.4	21.6	22.8	8.5	8.8	8.1	230	265
Control B	0/500	5	5	5	7.8	8.1	8.2	-	21.4	22.4	8.7	8.8	8.1	230	255
Control C	0/500	5	5	5	7.8	8.1	8.2	-	21.3	22.4	8.7	8.8	8.2	230	255
Control D	0/500	5	5	5	7.8	8.1	8.2	-	21.4	22.5	8.8	8.7	8.2	230	260
100% A	500/0	5	5	5	7.5	8.1	8.3	21.3	21.6	22.5	8.6	7.8	8.2	640	680
100% B	500/0	5	5	5	7.5	8.1	8.3	-	21.4	22.4	8.5	7.7	8.1	640	680
100% C	500/0	5	5	5	7.5	8.1	8.3	-	21.3	22.3	8.6	7.7	8.0	640	680
100% D	500/0	5	5	5	7.5	8.1	8.3	-	21.4	22.4	8.7	7.7	8.0	640	680

**Temperature of test room was continously recorded on a strip chart recorder.
Temperature range for the test period was 22-24°C.

Table 2. Results of chemical analyses on the effluent from the Meadowlands Sewage Treatment Plant sampled on January 31, 1995.

Metals		
Aluminum	270	µg/L
Calcium	31.7	mg/L
Copper	41	µg/L
Iron	19	µg/L
Magnesium	8.77	mg/L
Zinc	32	µg/L
Herbicides		
Atrazine	0.25	µg/L
Base-Neutral & Acid Extractables		
none detected		

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Meadowlands STP
County: POLK
Contact / District: L. Carter / SW TAMPA
NPDES Permit #: FL0041416
LIMS Sample #: 98277 LIMS Job #: 95-Feb-01-15

Sample Collection: Date 1/31/95 Time 12:05
Test Beginning: Date 2/1/95 Time 1330
Test Ending: Date 2/3/95 Time 1330
Organism Batch #: 7 Diluent Batch #: 6
Organism Age: <24hrs
Test Organism: ceriodaphnia dubia

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

Test Number: 1 of 2

Remarks:

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	20.4 @ 20.5	8.8 @ 21.2 °C	102 @ 104.1 925 @ 1000 @ 21.2 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	20.6 @ 20.7	8.7 @ 22.0 °C	101 @ 104.1 940 @ 1000 @ 22.3 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.5 @ 22.6	8.5 @ 23 °C	103 @ 104.1 962 @ 1000 @ 23.4 °C

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm)		
Conc.	Chamber #	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
Control A	A	5	5	5	8.0		8.0	21.3		23.3	8.4		7.5	160		180
Control B	B	5	5	5			8.0			23.2			7.6			175
Control C	C	5	5	5			8.1			23.2			7.7			170
Control D	D	5	5	5			8.1			23.1			7.7			175
100% A	A	5	5	5	7.5		6.8	21.4		23.1	8.4		7.8	600		720
100% B	B	5	5	5			8.7			23.1			7.8			725
100% C	C	5	5	5			8.7			23.1			7.8			700
100% D	D	5	5	5			8.7			23.1			7.8			680
Recorded by:		TM	MF	TM	JN		JN	JLS		JN	JLS		JN	JN		JN
Measured/Loaded by:		MF	MF	TM	JLS		TM	JN		TM	JN		TM	JLS		TM

Investigators' Signatures

Tina M. Kuebler
Kathryn North
Marshall Faircloth
Tobin G. Rude
Reviewer

Water Quality Parameters	Salt Water (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.01	—	L Carter
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR-100	TM/JN
Alkalinity (mg/L as $CaCO_3$):	120	65	210	Hach	JN
Hardness (mg/L as $CaCO_3$):	125	80	120	Hach	JN
Total ammonia (mg/L as N):	<0.017	<0.017	<0.017	Orion	TM

Ammonia Meter #98136 Ammonia Meter Slope: -57.0 Ammonia Blank: <0.017 Control Salinity: ( ) ppt Sample Salinity: ( ) ppt

form updated 10/05/94

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Meadowlands STP
County: POLK
Contact / District: Lisa Carter / SW TAMPA
NPDES Permit #: FL00
LIMS Sample #: 98277 LIMS Job #: 95-Feb-01-15

Sample Collection: Date 1/31/95 Time 12:05
Test Beginning: Date 2/1/95 Time 1330
Test Ending: Date 2/3/95 Time 1330
Organism Batch #: 3 Diluent Batch #: well
Organism Age: 12 days Old
Test Organism: cyprinella leedsi

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

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	20.4 @ 20.5	8.8 @ 21.2 °C	102 @ 104.1 925 @ 1000 @ 21.2 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	20.6 @ 20.7	8.7 @ 22.0 °C	940 @ 9500 @ 10000 9520 @ 1000 @ 22.3 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.5 @ 22.6	8.5 @ 23 °C	103 @ 104.1 962 @ 1000 @ 23.4 °C 9530 at 10000

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm)		
Conc.	Chamber #	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
Control A	63	5	5	5	7.7	8.2	8.2	20.4	21.6	22.8	8.5	8.8	8.1	230	255	265
Control B	26	5	5	5	7.8	8.1	8.2		21.4	22.4	8.7	8.8	8.1	230	250	255
Control C	147	5	5	5	7.8	8.1	8.2		21.3	22.4	8.7	8.8	8.2	230	245	255
Control D	18	5	5	5	7.8	8.1	8.2		21.4	22.5	8.8	8.7	8.2	230	255	260
100% A	501	5	5	5	7.5	8.1	8.3	21.3	21.6	22.5	8.6	7.8	8.2	640	660	680
100% B	174	5	5	5	7.5	8.1	8.3		21.4	22.4	8.5	7.7	8.1	640	660	680
100% C	309	5	5	5	7.5	8.1	8.3		21.3	22.3	8.6	7.7	8.0	640	655	680
100% D	305	5	5	5	7.5	8.1	8.3		21.4	22.4	8.7	7.7	8.0	640	660	680
Recorded by:		TM	TR	TM	JN	TR	JN	JLS	TR	JN	JLS	TR	JN	JN	TR	JN
Measured/Loaded by:		TM	MF	TM	JLS	JN	TM	JN	JN	TM	JN	JN	TM	JLS	JN	TM

Investigators' Signatures

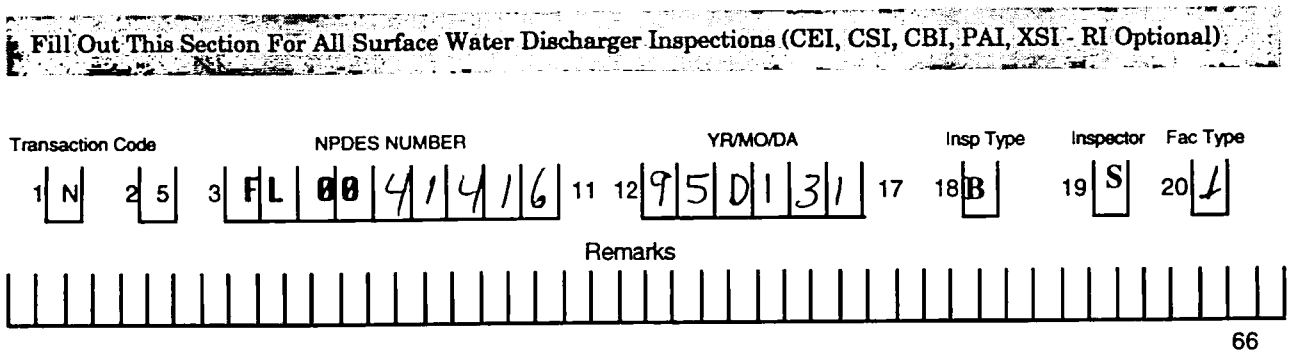
Tina Mikulski
Joseph Mott
Marshall Faircloth
Robin G. Raden
Reviewer

Water Quality Parameters	Salt Water: Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.01	—	L Carter
Lab Total Residual Cl2 (mg/L):	<0.03		<0.03	DR-100	JN / TM
Alkalinity (mg/L as $CaCO_3$):	120		210	Hach	JN
Hardness (mg/L as $CaCO_3$):	125		120	Hach	JN
Total ammonia (mg/L as N):	<0.017	<0.017	<0.017	Orion	TM

Ammonia Meter #98136 Ammonia Meter Slope: -57.0 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

form updated 10/05/94

The Bioassay of the Meadowlands STP effluent sampled on January 31, 1995, NPDES #FL0041416.



The Priority Pollutants Analysis for the Bioassay of the Meadowlands STP effluent sampled on January 31, 1995, NPDES #FL0041416.

