Bioassays of

Gainesville Regional Utilities Main Street Wastewater Treatment Plant

Gainesville, Alachua County, Florida

NPDES #FL0027251

Sampled 12/9/96

March 1997

Biology Section

Division of Administrative & Technical Services

Comprehensive Quality Assurance Plan #870346G

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Biology Section
Bureau of Laboratories
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Introduction

Gainesville Regional Utilities Main Street WWTP, 200 Southeast 16th Avenue, Gainesville, Alachua County, Florida, NPDES #FL0027251, tests performed on 10 to 12 December, 1996.

This advanced secondary wastewater treatment plant has a design flow of 7.50 MGD and an annual average flow of 6.19 MGD. Wastewater is treated by the activated-sludge process followed by nitrification, denitrification, chemical addition (polymer resins), filtration, chlorination, and dechlorination. Effluent is discharged into Sweetwater Branch, which flows through a dredged canal in Paynes Prairie to the Alachua Sink (facility summary provided by Kathleen Gerard, FDEP, Jacksonville).

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).

The total residual chlorine of the sample was < 0.03 mg/L in the laboratory and 0.25 mg/L in the field. The total ammonia and unionized ammonia concentrations of the sample were 0.226 mg/L and 0.005 mg/L, respectively. Further chemical analyses were performed on the sample and several metals were identified (Table 2).

Conclusion

The sample of effluent collected from this facility on December 9, 1996, did not show toxicity.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Gainesville Regional Utilities Main Street WWTP, Gainesville, Alachua County, Florida, NPDES# FL0027251, performed on 10 to 12 December, 1996.

Facility: Gainesville Regional Utilities Main Street WWTP
Location: 200 Southeast 16th Avenue, Gainesville
County: Alachua
Sample Collection Date: 12/9/96 Time: 1600
Test Beginning Date: 12/10/96 Time: 1540
Test Ending Date: 12/12/96 Time: 1540

NPDES # FL0027251
Contact/District: J. Martin/Northeast
Test type: static acute screen
tests: 2
Chlorination Type: chlorinated
sample collected after plant dechlorination.

Facility Type: Wastewater Treatment Plant
Receiving Water: Sweetwater Branch

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

Concentrations	Sample/Diluent Volume(mL)	SURVIVAL # Alive 0 hr	24 hr	48 hr	pH 0 hour	24 hour	48 hour	Temperature[A] 0 hour	24 hour	48 hour	Dissolved Oxygen 0 hour	24 hour	48 hour	Conductivity Uncorrected µmhos/cm 0 hour	48 hour
Control A	0/20	5	5	5	7.6	-	8.1	23.6	-	24.5	7.3	-	8.1	164	190
Control B	0/20	5	5	5	-	-	8.2	-	-	24.6	-	-	8.0	-	190
Control C	0/20	5	5	5	-	-	8.2	-	-	24.5	-	-	8.0	-	190
Control D	0/20	5	5	5	-	-	8.2	-	-	24.5	-	-	8.0	-	190
100% A	20/0	5	5	5	7.3	-	8.1	23.5	-	24.5	7.5	-	8.1	1030	1115
100% B	20/0	5	5	5	-	-	8.1	-	-	24.6	-	-	8.1	-	1115
100% C	20/0	5	5	5	-	-	8.1	-	-	24.6	-	-	8.1	-	1140
100% D	20/0	5	5	5	-	-	8.1	-	-	24.5	-	-	8.1	-	1160

[A] Temperature of test incubator was continously recorded on a strip chart recorder.
Incubator temperature range for the test period was 24.4-25.4°C.

Organism: ***Cyprinella leedsi*** Age: 15 days

Concentrations	Sample/Diluent Volume(mL)	SURVIVAL # Alive 0 hr	24 hr	48 hr	pH 0 hour	24 hour	48 hour	Temperature[B] 0 hour	24 hour	48 hour	Dissolved Oxygen 0 hour	24 hour	48 hour	Conductivity Uncorrected µmhos/cm 0 hour	48 hour
Control A	0/500	5	5	5	7.9	8.3	8.3	24.6	23.8	23.6	6.9	7.8	7.6	252	250
Control B	0/500	5	5	5	7.9	8.3	8.4	24.8	23.7	23.5	7.1	7.8	7.6	253	245
Control C	0/500	5	5	5	7.9	8.3	8.4	24.8	23.7	23.5	7.1	7.8	7.6	253	245
Control D	0/500	5	5	5	7.9	8.3	8.4	24.7	23.6	23.4	7.1	7.8	7.6	253	245
100% A	500/0	5	5	5	7.5	7.9	8.0	24.2	23.9	23.5	7.9	7.8	7.6	1132	1160
100% B	500/0	5	5	5	7.5	7.7	8.0	24.0	23.9	23.6	8.2	7.7	7.6	1147	1155
100% C	500/0	5	5	5	7.4	7.7	7.9	24.0	23.8	23.6	8.4	7.7	7.5	1149	1155
100% D	500/0	5	5	5	7.4	7.7	7.9	24.1	23.8	23.6	8.2	7.8	7.4	1148	1155

[B] Temperature of test room was continously recorded on a strip chart recorder.
Room temperature range for the test period was 23-24°C.

Total Residual CL2	mg/L	Method
Field:	0.25	-
Lab:	<0.03	DR-100

Ammonia	Total (mg/L)	Unionized (mg/L)
Control Water (fish):	0.032	0.002
20% Dilute Mineral Water (cladocerans):	0.038	0.001
100% Sample:	0.226	0.005

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	120	125
20% Dilute Mineral Water (cladocerans):	70	85
100% Sample:	50	205

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

Table 2. Results of chemical analyses on the effluent from the Gainesville Regional Utilities Main Street Wastewater Treatment Plant sampled on December 9, 1996.

Metals

Aluminum	445	µg/L
Calcium	29.9	mg/L
Copper	0.6	µg/L[I]
Iron	461	µg/L
Magnesium	32.8	mg/L
Zinc	14	µg/L[J]

Pesticides and Herbicides

none detected

Base, Neutral, & Acid Extractable Organics

none detected

I Value reported is less than the minimum quantitation limit and greater than or equal to the minimum detection limit.

J Estimated value.

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: GRU Main Street WWTP
County: Alachua
Contact / District: J. Martin / NED
NPDES Permit #: FL0027251
LIMS Sample #: 162172 **LIMS Job #:** 96-DEC-10-03
sample log 12/13/96 DW

Sample Collection: Date 12/9/96 Time 16:00
Test Beginning: Date 12/10/96 Time 15:40
Test Ending: Date 12-12-96 Time 15:40
Organism Batch #: 54 **Diluent Batch #:** 51
Organism Age: <24 hrs
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	22.2 @ 22.2	8.6 @ 22.9 °C	102.7 @ 92.8 986 @ 1001 @ 24.0 °C 980 @ 997
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.6 @ 23.6	8.4 @ 23.9 °C	104.7 @ 101.0 10.3 @ 1001 @ 25.0 °C 986 @ 997
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.0 @ 23.0	8.5 @ 23.1 °C	104.7 @ 101.0 997 @ 10.1 @ 24.7 °C 980 @ 997

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Ctr	A	5	5	5	7.6		8.1	23.6		24.5	7.3		8.1	164		190
Ctr	B	5	5	5			8.2			24.6	8.0		8.0			190
Ctr	C	5	5	5			8.2			24.5	12:30 pm reading missing		8.0			190
Ctr	D	5	5	5			8.2			24.5			8.0			190
100%	A	5	5	5	7.3		8.1	23.5		24.5	7.5		8.1	1030		1115
100%	B	5	5	5			8.1			24.6			8.1			1115
100%	C	5	5	5			8.1			24.6			8.1			1140
100%	D	5	5	5			8.1			24.5			8.1			1160
Measured/Loaded by:		DN	DN	DW	JS		DW	JS		DW	JS		DW	JS		DW
Recorded by:		JS	DN	DW	JF		DW	JF		DW	JF		DW	JF		DW

Investigators' Signatures

12/10/96

reviewer

form updated 4/01/96

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.25	—	Kathleen Ezrard
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	<.03	DR-100	JS
Alkalinity (mg/L as $CaCO_3$):	120	70	50	Hach	ND
Hardness (mg/L as $CaCO_3$):	125	85	205	Hach	ND
Total ammonia (mg/L as N):	0.032	0.038	0.226	ORION	DN

Ammonia Meter #98136 Ammonia Meter Slope: -54.6 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: GRU Main Street WWTP
County: Alachua
Contact / District: J. Martin / NED
NPDES Permit #: FL0027251
LIMS Sample #: 162172 LIMS Job #: 96-DEC-10-03
sample log 12/13/96 DW
Test Type: Screening / Definitive
Static / Static Renewal / Flow-through
Test Number: 2 of 2
Remarks:

Sample Collection: Date 12/9/96 Time 16:00
Test Beginning: Date 12/10/96 Time 15:30
Test Ending: Date 12-12-96 Time 1530
Organism Batch #: 92 Diluent Batch #: well
Organism Age: 15 days
Test Organism: Cyprinella leedsi

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0	22.2 @ 22.2	8.6 @ 22.7 °C	102.7 @ 92.8
	9.0 @ 9.0			986 @ 1001 @ 24.0 °C
				7500 @ 9997
24 hr	7.0 @ 7.0	23.6 @ 23.6	8.4 @ 23.7 °C	104.2 @ 101.0
	9.0 @ 9.0			1003 @ 1001 @ 25.0 °C
				7500 @ 9997
48 hr	7.0 @ 7.0	23.0 @ 23.0	8.5 @ 23.1 °C	104.5 @ 102.2
	9.0 @ 9.0			997 @ 1001 @ 24.7 °C
				7501 @ 9997

Conc.	Chamber #	Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) / Cond. (µmhos/cm)		
		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
Ctr A	C9	5	5	5	7.9	8.3	8.3	24.6	23.8	23.6	6.9	7.8	7.6	252	250	250
Ctr B	C10	5	5	5	7.9	8.3	8.4	24.8	23.7	23.5	7.1	7.8	7.6	253	245	245
Ctr C	C11	5	5	5	7.9	8.3	8.4	24.8	23.7	23.5	7.1	7.8	7.6	253	245	245
Ctr D	C12	5	5	5	7.9	8.3	8.4	24.7	23.6	23.4	7.1	7.8	7.6	253	245	245
100% A	C13	5	5	5	7.5	7.9	8.0	24.7	23.9	23.5	7.9	7.8	7.6	1132	1155	1160
100% B	C14	5	5	5	7.5	7.7	8.0	24.0	23.9	23.6	8.2	7.7	7.6	1147	1155	1155
100% C	C15	5	5	5	7.4	7.7	7.9	24.0	23.8	23.6	8.4	7.7	7.5	1149	1150	1153
100% D	C16	5	5	5	7.4	7.7	7.9	24.1	23.8	23.6	8.2	7.8	7.4	1148	1155	1155
Measured/Loaded by:		DN	DN	DW	JS	DN	DW	JS	DN	DW	JS	DN	DW	JS	DN	DW
Recorded by:		JS	DN	DW	JF	ND	ND	JF	ND	ND	JF	ND	ND	JF	ND	ND

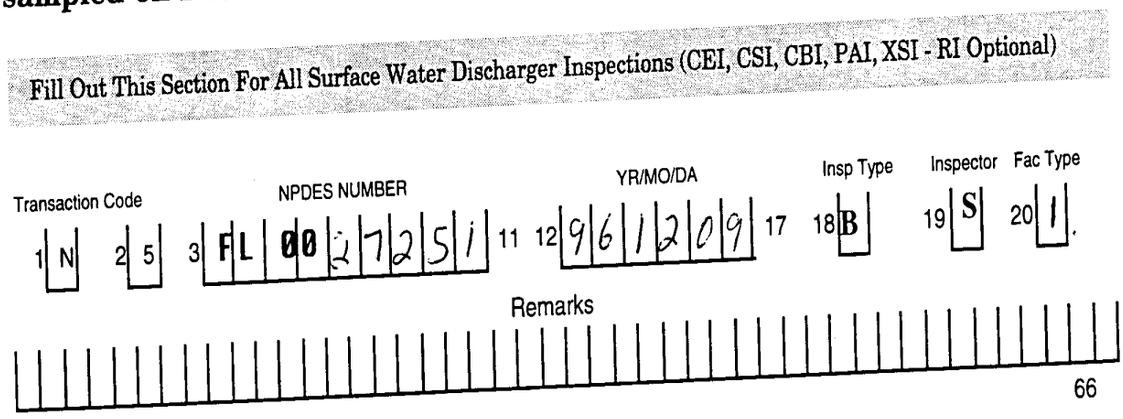
Investigators' Signatures

12/10/96
Julie Sharp
Dawn Nuckols
Marshall Faircloth
reviewer / form updated 4/01/96

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.25	—	Kathleen Gerard
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	<0.03	DR-100	JS
Alkalinity (mg/L as $CaCO_3$):	120	70	50	Hach	ND
Hardness (mg/L as $CaCO_3$):	125	85	205	Hach	ND
Total ammonia (mg/L as N):	0.032	0.038	0.226	ORION	DN

Ammonia Meter #98136 Meter Slope: -54.6 Ammonia Blank: 0.038 mV/Conc/mg/L/N/ppt recorded min/unity slope allowed
Ammonia <0.017A Control Salinity: 0 ppt
Sample Salinity: 0 ppt

The Bioassay of the Gainesville Regional Utilities Main Street WWTP effluent sampled on December 9, 1996, NPDES #FL0027251.



The Priority Pollutants Analysis for the Bioassay of the Gainesville Regional Utilities Main Street WWTP effluent sampled on December 9, 1996, NPDES #FL0027251

