Bioassays of

Anastasia Island Wastewater Treatment Plant

St. Augustine, St. Johns County, Florida

NPDES #FL0038831

Sampled 2/19/96

March 1996

Biology Section

Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan #870346G

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Anastasia Island Wastewater Treatment Facility

St. Augustine, St. Johns County, Florida

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Biology Section
Bureau of Laboratories
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Introduction

Anastasia Island WWTF, St. Augustine, St. Johns County, Florida, NPDES # FL0038831, tests performed on 20 to 22 February, 1996.

This wastewater treatment facility is located at 16th Street west of Mizell Road, on Anastasia Island. It is a complete mix-activated sludge plant with a design flow of 4.0 MGD and an annual average flow of 1.188 MGD. Effluent is chlorinated for disinfection, dechlorinated with sulfur dioxide, and post-aerated prior to discharge via a pipeline to the Matanzas River. The facility is permitted to divert up to 0.8 MGD of chlorinated effluent through a tertiary filter with final disposal by spray irrigation to the Marsh Creek Country Club golf course (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*. Test results did not indicate toxicity (Table 1).

Total residual chlorine was not detected in the sample. Total ammonia and unionized ammonia concentrations were 0.415 mg/L and 0.007 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 February 19, 1996, did not show toxicity.

Table 1. Data recorded during the 48-hour acute toxicity screening bioassays of a sample of effluent from the Anastasia Island WWTF, St. Augustine, St. Johns County, Florida, NPDES# FL0038831, performed on 20 to 22 February, 1996.

Facility: **Anastasia Island WWTF** | **NPDES #** **FL0038831** | Facility Type: **Domestic WWTP**
Location: 16th St., west of Mizell Road, St. Augustine | Contact/District: T. McKelvey/Northeast
County: St. Johns | Test type: static acute screen
Sample Collection Date: **2/19/96** Time: 1220 | # tests: 2 | Receiving Water: Matanzas River
Test Beginning Date: 2/20/96 Time: 1420 | Chlorination Type: **Dechlorinated** in facility dechlorination unit
Test Ending Date: 2/22/96 Time: 1410 | **Page 1 of 1**

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	8.0	-	8.3	23.6	-	25.6	7.8	-	7.6	180	180
Control B	0/20	5	5	5	-	-	8.3	-	-	25.6	-	-	7.6	-	185
Control C	0/20	5	5	5	-	-	8.3	-	-	25.6	-	-	7.6	-	185
Control D	0/20	5	5	5	-	-	8.3	-	-	25.6	-	-	7.6	-	180
100% A	20/0	5	5	5	7.4	-	8.2	24.0	-	25.3	8.4	-	7.8	1225	1330
100% B	20/0	5	5	5	-	-	8.2	-	-	25.3	-	-	7.8	-	1290
100% C	20/0	5	5	5	-	-	8.2	-	-	25.3	-	-	7.8	-	1395
100% D	20/0	5	5	5	-	-	8.2	-	-	25.2	-	-	7.7	-	1410

[A] Temperature of test incubator was continously recorded on a strip chart recorder.
Incubator temperature range for the test period was 24.4-25.5°C.

Organism: ***Cyprinella leedsi*** Age: 12 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	7.8	8.1	8.5	24.7	23.7	24.0	7.6	8.0	7.9	250	245
Control B	0/500	5	5	5	7.8	8.1	8.5	24.7	23.6	24.0	7.7	8.0	7.9	250	245
Control C	0/500	5	5	5	7.8	8.1	8.5	24.7	23.6	24.0	7.7	8.0	8.0	250	245
Control D	0/500	5	5	5	7.8	8.2	8.5	24.8	23.8	24.0	7.7	8.0	8.0	250	250
100% A	500/0	5	5	5	7.3	7.8	7.9	24.6	23.9	24.3	8.3	7.9	7.3	1300	1300
100% B	500/0	5	5	5	7.3	7.8	7.9	24.5	23.9	24.3	8.4	7.9	7.3	1300	1295
100% C	500/0	5	5	5	7.3	7.8	7.9	24.5	23.9	24.3	8.6	7.8	7.4	1300	1300
100% D	500/0	5	5	5	7.3	7.8	7.9	24.5	24.1	24.3	8.6	7.7	7.4	1300	1315

[B] Temperature of test room was continously recorded on a strip chart recorder.
Room temperature range for the test period was 23.8-24.8°C.

Total Residual CL2	mg/L	Method
Field:	0.0	-
Lab:	<0.03	DR-100

Ammonia	Total (mg/L)	Unionized (mg/L)
Control Water (fish):	< 0.017	0.00
20% Dilute Mineral Water (cladocerans):	< 0.017	0.00
100% Sample:	0.415	0.007

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	120	125
20% Dilute Mineral Water (cladocerans):	70	80
100% Sample:	70	250

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

Table 2. Results of chemical analyses on the effluent from the Anastasia Island WWTF sampled on February 19, 1996.

Metals

Cadmium	0.12	µg/L[I]
Calcium	69.0	mg/L[A]
Copper	4	µg/L[I]
Iron	17	µg/L[A]
Magnesium	10.6	mg/L[A]
Zinc	41	µg/L[A]

Pesticides and Herbicides

none detected

Base, Neutral, & Acid Extractable Organics

none detected

A Value reported is the mean of two or more determinations.

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

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Anastasia WWTP
County: St. Johns
Contact / District: Tim Mickelvey - Kathleen Gerard / NE
NPDES Permit #: FL0038831
LIMS Sample #: 130235 LIMS Job #: 96-FEB-20-11

Sample Collection: Date 2/19/96 Time 1220
Test Beginning: Date 2/20/96 Time 1420
Test Ending: Date 2/22/96 Time 1410
Organism Batch #: 9 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	23.0 @ 23.0	8.1 @ 25.8 °C	105.6 @ 106.2 1412 @ 1409 @ 25.4 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	22.9 @ 23.0	8.1 @ 25.7 °C	108.0 @ 106.2 1410 @ 1409 @ 24.9 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.8 @ 22.9	8.1 @ 25.7 °C	106.2 @ 106.2 1408 @ 1409 @ 25.1 °C

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
CTL A	21	5	5	5	7.8	8.1	8.5	24.7	23.7	24.0	7.6	8.0	7.9	250	245	245
CTL B	302	5	5	5	7.8	8.1	8.5	24.7	23.6	24.0	7.7	8.0	7.9	250	245	245
CTL C	44	5	5	5	7.8	8.1	8.5	24.7	23.6	24.0	7.7	8.0	8.0	250	245	245
CTL D	308	5	5	5	7.8	8.2	8.5	24.8	23.8	24.0	7.7	8.0	8.0	250	250	250
100% A	399	5	5	5	7.3	7.8	7.9	24.6	23.5	24.3	8.3	7.9	7.3	1300	1285	1300
100% B	413	5	5	5	7.3	7.8	7.9	24.5	23.9	24.3	8.4	7.9	7.3	1300	1290	1295
100% C	412	5	5	5	7.3	7.8	7.9	24.5	23.9	24.3	8.6	7.8	7.4	1300	1290	1300
100% D	287	5	5	5	7.3	7.8	7.9	24.5	24.1	24.3	8.6	7.7	7.4	1300	1300	1315
Measured/Loaded by:		TR	MF	TM	TR	MF	TM	TR	MF	TM	TR	MF	TM	TR	MF	TM
Recorded by:		TR	MF	TM	TM	DW	JAS	TM	DW	JAS	TM	DW	JAS	TM	DW	JAS

Investigators' Signatures

Tim Mickelvey
Mark Faircloth
Joseph Smith
Jennifer Spagnuolo
reviewer

form updated 5/05/95

Water Quality Parameters

	Salt Water: Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.0	—	Amy Kalmbacher
Lab Total Residual Cl2 (mg/L):	< 0.03	—	< 0.03	DR. 100	TR
Alkalinity (mg/L as $CaCO_3$):	120	—	70	Hach	TR
Hardness (mg/L as $CaCO_3$):	125	—	250	Hach	TR
Total ammonia (mg/L as N):	< 0.017	—	.415	Orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: -56.1 Ammonia Blank: < 0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Anastasia WWTP
County: St. Johns
Contact / District: Tim McKelvey - Kathleen Gerard / NE
NPDES Permit #: FL0038831
LIMS Sample #: 130235 LIMS Job #: 96-FEB-20-11
sample log 2/24/96

Sample Collection: Date 2-19-96 Time 1220
Test Beginning: Date 2/20/1960 Time 1410
Test Ending: Date 2-22-96 Time 1410
Organism Batch #: 9 Diluent Batch #: 8
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	23.0@23.0	5.1 @25.5 °C	108.6@106.2
	9.0@9.0			1412@1409@25.4 °C
24 hr	7.0@7.0	22.9@23.0	8.1 @25.7 °C	108.0@106.2
	9.0@9.0			1410@1409@24.9 °C
48 hr	7.0@7.0	22.8@22.9	8.1 @25.7 °C	106.2@106.2
	9.0@9.0			1408@1409@25.1 °C

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	Cond. 24 h	Cond. 48 h
CTL	A	5	~~5~~	5	8.0		8.3	23.6		25.6	7.8		7.6	180		180
CTL	B	5	5	5			8.3			25.6			7.6			185
CTL	C	5	5	5			8.3			25.6			7.6			185
CTL	D	5	5	5			8.3			25.6			7.6			180
100%	A	5	5	5	7.4		8.2	24.0		25.3	8.4		7.8	1225		1330
100%	B	5	5	5			8.2			25.3			7.8			1290
100%	C	5	5	5			8.2			25.3			7.8			1395
100%	D	5	5	5			8.2			25.2			7.7			1410
			* initial # of animals 2/21/96 mf													
Measured/Loaded by:		INF	MF	TM	TR		TM	TR		TM	TR		TM	TR		TM
Recorded by:		TR	MF	TM	TM		JRS	TM		JRS	TM		JRS	TM		JRS

Investigators' Signatures

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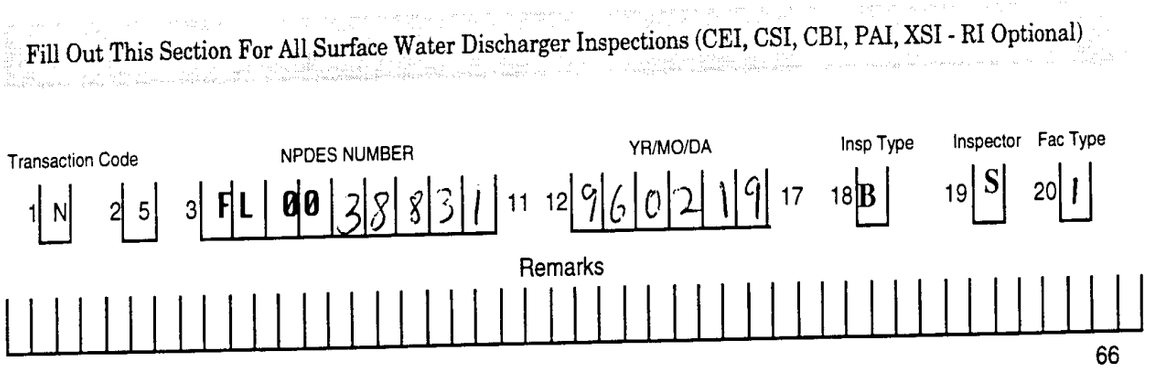
form updated 5/05/95

Water Quality Parameters

	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.0	—	Amy Kalmbacher
Lab Total Residual Cl2 (mg/L):	—	<0.03	<0.03	DR-100	TR
Alkalinity (mg/L as $CaCO_3$):	—	70	70	Hach	TR
Hardness (mg/L as $CaCO_3$):	—	80	250	Hach	TR
Total ammonia (mg/L as N):	—	<0.017	.415	Orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: -56.1 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

The Bioassay of the Anastasia Island WWTF effluent sampled on February 19, 1996, NPDES #FL0038831.



The Priority Pollutants Analysis for the Bioassay of the Anastasia Island WWTF effluent sampled on February 19, 1996, NPDES #FL0038831.

