

Bioassays of

Fernandina Beach Wastewater Treatment Plant

Fernandina Beach, Nassau County, Florida

NPDES #FL0027260

Sampled 4/10/95

May 1995

Biology Section

Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan #870346G

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NPDES #FL0027260

Biology Section
Bureau of Laboratories
May 1995

Introduction

Fernandina Beach Wastewater Treatment Plant, Fernandina Beach, Nassau County, Florida, NPDES #FL0027260, tests performed on 11 to 13 April, 1995.

This facility is located at 1007 South 5th Street in Fernandina Beach. It has a 1.75 MGD design flow contact-stabilization sewage treatment plant and a 1.75 MGD design flow oxidation-ditch sewage treatment plant which operate in parallel. Effluent from each plant is combined and chlorinated for disinfection. Effluent is dechlorinated prior to discharge to the Amelia River (facility information from 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 with 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 in the sample was not detected in the laboratory. Total and unionized ammonia concentrations were 1.02 mg/L and 0.018 mg/L, respectively. Further chemical analyses were performed on the sample and several metals, herbicides, and pesticides were identified (Table 2).

Conclusion

The sample of effluent collected from this facility on April 10, 1995, did not show toxicity.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Fernandina Beach Wastewater Treatment Plant, Fernandina Beach, Nassau County, Florida, NPDES# FL0027260, performed on 11 to 13 April, 1995.

Facility:	**Fernandina Beach Wastewater Treatment Plant**	**NPDES #**	**FL0027260**	Facility Type:	**Wasterwater Treatment Plant**
Location:	1007 South 5th Street, Fernandina Beach	Contact/District:	T. McKelvey/Northeast		
County:	Nassau	Test type:	static acute screen		
Sample Collection Date:	**4/10/95** Time: 1445	# tests:	2	Receiving Water:	Amelia River
Test Beginning Date:	4/11/95 Time: 1145	Chlorination Type:	**Chlorinated**		
Test Ending Date:	4/13/95 Time: 1245		Dechlorinated in plant dechlorination unit		**Page 1 of1**

Total Residual CL2	mg/L	Method
Field:	0.65	-
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:	1.02	0.018

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	120	125
20% Dilute Mineral Water (cladocerans):	80	85
100% Sample:	130	265

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

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

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature [A]			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	8.1	-	8.2	23.8	-	23.7	7.8	-	7.9	185	200
Control B	0/20	5	5	5	-	-	8.2	-	-	23.5	-	-	7.9	-	200
Control C	0/20	5	5	5	-	-	8.2	-	-	23.4	-	-	8.1	-	200
Control D	0/20	5	5	5	-	-	8.2	-	-	23.4	-	-	8.2	-	205
100% A	20/0	5	5	5	7.6	-	8.3	23.9	-	23.5	7.9	-	8.4	905	965
100% B	20/0	5	5	5	-	-	8.3	-	-	23.4	-	-	8.3	-	990
100% C	20/0	5	5	5	-	-	8.3	-	-	23.3	-	-	8.3	-	1000
100% D	20/0	5	5	5	-	-	8.4	-	-	23.3	-	-	8.4	-	1000

[A] Temperature of the test incubator was continously recorded on a strip chart recorder. Incubator temperature range for the test period was 23.9-24.4°C.

Organism: ***Cyprinella leedsi*** Age: 11 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature [B]			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	8.1	8.3	25.3	24.0	24.3	7.7	7.9	8.1	255	250
Control B	0/500	5	5	5	7.7	8.1	8.3	-	-	24.1	7.7	7.0	8.1	255	250
Control C	0/500	5	5	5	7.7	8.1	8.3	-	-	24.0	7.8	8.0	8.2	255	250
Control D	0/500	5	4	4	7.7	8.1	8.3	-	-	24.1	7.7	8.0	7.7	255	260
100% A	500/0	5	5	5	7.4	7.9	8.2	25.7	24.0	24.2	7.8	7.7	7.7	955	930
100% B	500/0	5	5	5	7.4	7.9	8.1	-	-	24.0	7.8	7.7	7.8	960	930
100% C	500/0	5	5	5	7.4	7.9	8.1	-	-	24.0	7.8	7.8	7.8	960	930
100% D	500/0	5	5	5	7.4	7.9	8.1	-	-	24.0	7.8	7.9	7.8	955	930

[B] Temperature of test room was continously recorded on a strip chart recorder. Room temperature range for the test period was 25.5-26.5°C.

Table 2. Results of chemical analyses on the effluent from the Fernandina Beach Wastewater Treatment Plant sampled on April 10, 1995.

Metals

Aluminum	100	µg/L [I]
Calcium	56.3	mg/L [A]
Copper	5	µg/L [I]
Iron	64	µg/L [A]
Magnesium	23.6	mg/L [A]
Zinc	23	µg/L [A]

Base, Neutral, & Acid Extractable Organic Compounds

None Detected

Herbicides and Pesticides

Atrazine	0.10	µg/L [T]
Bromacil	0.40	µg/L [T]
Chlorpyrifos Ethyl	0.20	µg/L [T]
Mevinphos	0.40	µg/L [T]

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.

T Value reported is less than the criterion of detection.

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Fernandina Beach WWTP
County: NASSAU
Contact / District: Tim McKelvey / Northeast
NPDES Permit #: FL00 27260
LIMS Sample #: 103773 LIMS Job #: 95-APR-11-12
sample log 4/13/95

Sample Collection: Date 4/10/95 Time 1445
Test Beginning: Date 4/11/95 Time 1145
Test Ending: Date 4/13/95 Time 1245
Organism Batch #: 20 Diluent Batch #: 15
Organism Age: < 24 hours
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	23.8 @ 23.7	8.4 @ 24.3 °C	100.8 @ 102.0 981 @ 990 @ 24.8 °C
24 hr	___ @ 7.0 ___ @ ___	___ @ ___	___ @ ___ °C	___ @ ___ ___ @ ___ @ ___ °C
48 hr	7.0 @ 7.0 10.0 @ 10.0	23.8 @ 23.9	8.3 @ 24.5 °C	111.8 @ 98.6 990 @ 990 @ 24.9 °C

10300 @ 10175

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
Control	A	5	5	5	8.1		8.2	23.8		23.7	7.8		7.9	185		200
Control	B	5	5	5			8.2			23.5			7.9			200
Control	C	5	5	5			8.2			23.4			8.1			200
Control	D	5	5	5			8.2			23.4			8.2			205
100%	A	5	5	5	7.6		8.3	23.9		23.5	7.9		8.4	905		965
100%	B	5	5	5			8.3			23.4			8.3			990
100%	C	5	5	5			8.3			23.3			8.3			1000
100%	D	5	5	5			8.4			23.3			8.4			1000
Recorded by:		MF	MF	MF	MF		JN	MF		JN	MF		JN	MF		JN
Measured/Loaded by:		MF	MF	MF	MF		MF	MF		MF	MF		MF	MF		MF

Investigators' Signatures

Marshall Faircloth
Jennifer Scarapani
Joseph Smith
Gina Mikulosky
Reviewer

Water Quality Parameters	Salt Water JN Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.65	—	Tim McKelvey
Lab Total Residual Cl2 (mg/L):	—	<0.03	<0.03	DR-100	JM
Alkalinity (mg/L as $CaCO_3$) :	—	80	130	HACH	JRS
Hardness (mg/L as $CaCO_3$) :	—	85	265	HACH	JRS
Total ammonia (mg/L as N) :	<0.017	<0.017	1.02	orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: -58.0 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

form updated 10/05/94

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Fernandina Beach WWTP
County: NASSAU
Contact / District: Tim McKelvey / Northeast
NPDES Permit #: FL0027260
LIMS Sample #: 103773 LIMS Job #: 95-APR-1-12
sample log 4/13/95

Sample Collection: Date 4/10/95 Time 1445
Test Beginning: Date 4/11/95 Time 1300
Test Ending: Date 4/13/95 Time 1300
Organism Batch #: 14 Diluent Batch #: well
Organism Age: 11 days
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	23.8 @ 23.7	8.4 @ 24.3 °C	100.8 @ 102.0 981 @ 990 @ 24.8 °C
24 hr	7.0 @ 7.0 10.0 @ 10.0	25.1 @ 25.2	8.2 @ 25.0 °C	112.7 @ 98.6 997 @ 990 @ 24.9 °C
48 hr	7.0 @ 7.0 10.0 @ 10.0	23.8 @ 23.9	8.3 @ 24.5 °C	111.8 @ 98.6 990 @ 990 @ 24.9 °C

10300 @ 10175

		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	22	5	5	5	7.7	8.1	8.3	25.3	24.0	24.3	7.7	7.8	8.1	255	250	250
Control	11	5	5	5	7.7	8.1	8.3	~~28.3~~		24.1	7.7	7.9	8.1	255	250	250
Control	53	5	5	5	7.7	8.1	8.3			24.0	7.8	8.0	8.1	255	245	250
Control	350	5	4	4	7.7	8.1	8.3			24.1	7.7	8.0	8.2	255	250	260
100%	630	5	5	5	7.4	7.9	8.2	25.7	24.0	24.2	7.8	7.7	7.7	955	930	930
100%	210	5	5	5	7.4	7.9	8.1			24.0	7.8	7.7	7.7	960	930	930
100%	75	5	5	5	7.4	7.9	8.1			24.0	7.8	7.8	7.8	960	930	930
100%	28	5	5	5	7.4	7.9	8.1			24.0	7.8	7.9	7.8	955	930	930
								* wrote Number in wrong place JN 4/14/95								
Recorded by:		MF	MF	MF	MF	MF	JN	JN	JN	JN	JN	JN	JN	JN	JN	JN
Measured/Loaded by:		MF	MF	MF	MF	JN	MF	MF	MF	MF	MF	MF	MF	MF	MP	MF

Investigators' Signatures

Marshall Faircloth
Jennifer Sparapani
Mimi Mikulski
Reviewer

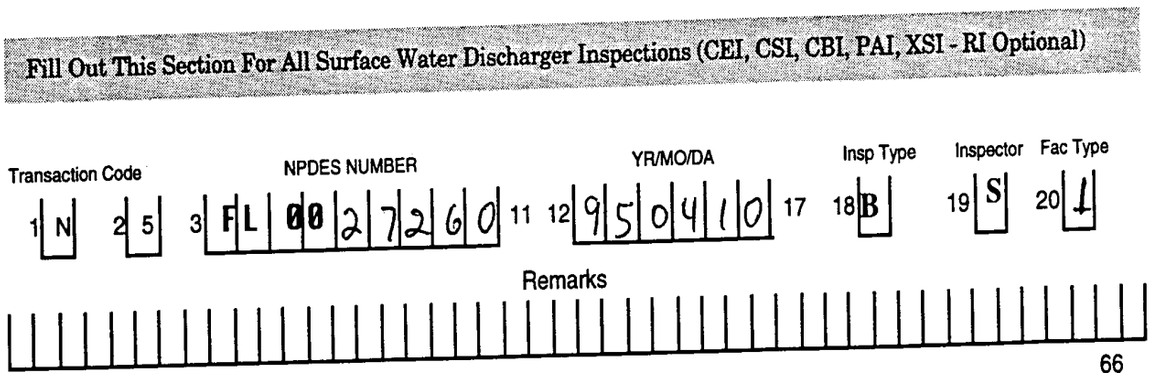
form updated 10/05/94

Water Quality Parameters

	Salt Water: Well Water	Salt Water: 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.65	—	Tim McKelvey
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	<0.03	DR-100	TM
Alkalinity (mg/L as $CaCO_3$):	125	—	130	HACH	JRS
Hardness (mg/L as $CaCO_3$):	125	—	265	HACH	JRS
Total ammonia (mg/L as N):	<0.017	—	1.02	orion	JN

Ammonia Meter #98136 Meter Slope: -58.0 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

The Bioassay of the Fernandina Beach Wastewater Treatment Plant effluent sampled on April 10, 1995, NPDES # FL0027260.



The Priority Pollutants Analysis for the Bioassay of the Fernandina Beach Wastewater Treatment Plant effluent sampled on April 10, 1995, NPDES # FL0027260.

