

Bioassays of

Lynn Haven Wastewater Treatment Plant

Lynn Haven, Bay County, Florida

NPDES #FL0169978

Sampled 3/5/01

August 2001

Biology Section

Division of Resource Assessment & Management

Comprehensive Quality Assurance Plan #870346G

Bioassays of

Lynn Haven Wastewater Treatment Plant

Lynn Haven, Bay County, Florida

NPDES #FL0169978

Biology Section
Bureau of Laboratories
August 2001

Introduction

Lynn Haven Wastewater Treatment Facility, Fifth Street and Montana Avenue, Lynn Haven, Bay County, Florida, NPDES #FL0169978, tests performed on 6 to 8 March 2001.

This domestic wastewater treatment facility has a design flow of 2.5 MGD and an average flow of 1.43 MGD. The wastewater treatment system consists of two sequential batch reactors (each 115 square ft by 13.8 ft deep (10.3 square meters by 4.2 meters deep)), a post equalization tank (329,000 gallons (1250.2 kiloliter)), and a digester to stabilize residuals (562,290 gallons (2136.7 kiloliters)). The effluent is then disinfected by UV light and filtered by two final filtration units prior to being discharged through a 1550-ft (472.75-meters) long pipe into the Class III marine waters of the St. Andrew Bay at a depth of 24 feet (7.4 meters) (facility summary provided by Glenn Butts, FDEP, Pensacola).

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 collected from this facility's Outfall 001. 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 by 48 hours (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 pesticides were identified (Table 2). The concentration of copper in the sample (4 µg/L) exceeded the surface water quality criteria for copper ($\leq$ 2.9 µg/L) in Class III marine waters.

Conclusion

The sample of effluent collected from this facility on March 5, 2001, did not show acute toxicity to either test species within 48 hours. The concentration of copper in the sample exceeded the surface water quality criteria for copper in Class III marine waters.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Lynn Haven Wastewater Treatment Facility, Fifth Street and Montana Avenue, Lynn Haven, Bay County, Florida, NPDES# FL0169978, performed on 6 to 8 March 2001.

Facility:	**Lynn Haven WWTF**		**NPDES #**	**FL0169978**	Facility Type: **WWTF**
Location:	Fifth Street & Montana Avenue		Contact/District:	G. Butts/G. Smith/Northwest	
County:	Bay		Test type:	static acute screen	
Sample Collection Date:	3/5/01	Time: 1045	# tests:	2	Receiving Water: St. Andrew Bay
Test Beginning Date:	3/6/01	Time: 1410	Chlorination Type:	Non-chlorinated	
Test Ending Date:	3/8/01	Time: 1320			**Page 1 of 1**

Total Residual Cl2	mg/L	Method
Field:	-	-
Lab:	<0.03	Hach

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):	149	141
20% Dilute Mineral Water (cladocerans):	78	76
100% Sample:	151	130

Salinity[C]	(ppt)
Control Water:	<1
100% Sample:	<1

[C] Salinity based on conductivity and temperature measurements.

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	7.8	-	8.2	23.5	-	23.4	7.9	-	8.3	180	205
Control B	0/20	5	5	5	-	-	8.2	-	-	23.4	-	-	8.2	-	185
Control C	0/20	5	5	5	-	-	8.2	-	-	23.5	-	-	8.4	-	185
Control D	0/20	5	5	5	-	-	8.2	-	-	23.5	-	-	8.5	-	190
100% A	20/0	5	5	5	7.8	-	8.5	23.8	-	23.3	8.0	-	8.3	600	670
100% B	20/0	5	5	5	-	-	8.6	-	-	23.3	-	-	8.4	-	680
100% C	20/0	5	5	5	-	-	8.6	-	-	23.3	-	-	8.3	-	680
100% D	20/0	5	5	5	-	-	8.6	-	-	23.5	-	-	8.3	-	670

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24.0-26.0°C.
Incubator #3 temperature range for the test period was 23.9-25.5°C.

Organism: *Cyprinella leedsi* Life stage: 14 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	7.8	8.2	8.2	23.8	25.6	22.7	7.6	7.0	8.2	270	260
Control B	0/500	5	5	5	8.0	8.2	8.3	23.3	24.8	23.0	7.8	7.1	8.0	260	260
Control C	0/500	5	5	5	8.0	8.2	8.3	23.5	25.1	22.8	7.6	7.0	8.0	255	260
Control D	0/500	5	5	5	8.0	8.2	8.3	23.7	24.9	23.3	8.0	7.0	8.0	255	260
100% A	500/0	5	5	5	7.9	8.2	8.3	23.8	24.3	23.4	7.9	7.2	7.9	600	615
100% B	500/0	5	5	5	7.9	8.2	8.3	24.0	24.6	22.8	7.9	7.3	8.0	605	600
100% C	500/0	5	5	5	7.9	8.2	8.3	24.1	24.9	23.1	7.9	7.3	8.0	605	620
100% D	500/0	5	5	5	7.9	8.2	8.3	24.2	25.0	23.3	7.9	7.1	7.9	600	610

[B] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24.0-26.0°C.
Incubator #3 temperature range for the test period was 24.2-25.0°C.

Table 2. Results of chemical analyses on the effluent from Lynn Haven WWTF sampled on March 5, 2001.

Metals

Cadmium	0.031	µg/L	I
Calcium	28.5	mg/L	
Copper	4	µg/L	
Iron	64	µg/L	I
Lead	0.41	µg/L	I
Magnesium	13	mg/L	
Nickel	3.8	µg/L	I
Silver	0.036	µg/L	I
Zinc	37	µg/L	

Pesticides and Herbicides

Atrazine	0.29	µg/L	
Diazinon	0.1	µg/L	I

Base, Neutral, & Acid Extractable Organics

None tected

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: Lynn Haven WWTP
County: Bay
Contact / District: G. Butts / G. Smith / NW-DIST
NPDES Permit #: FL0G 69 78
LIMS Sample #: 5120 45 LIMS Job #: TLH-2001-03-06-28
sample log 3/6/01
Test Type: ~~Screening~~ | Definitive
~~Static~~ | Static Renewal | Flow-through
Test Number: 1 of 2

Remarks:

Sample Collection: Date 3/5/01 Time 1045
Test Beginning: Date 3/6/01 Time 1410
Test Ending: Date 3/8/01 Time 1325
Organism Batch #: 12 Diluent Batch #: Dil.w = 4
Organism Age: 24hrs. SRT toxicant batch #: —
Test organism: C. dubia

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
CNTL. A	A	5	5	5	7.8	-	8.2	23.5	-	23.4	7.9	-	8.3	180	-	205
B	B	5	5	5	—	—	8.2	—	-	23.4	—	-	8.2	—	-	185
C	C	5	5	5	—	-	8.2	—	-	23.5	—	-	8.4	-	-	185
D	D	5	5	5	—	-	8.2	—	-	23.5	—	-	8.5	—	-	190
100% A	A	5	5	5	7.8	—	8.5	23.8	-	23.3	8.0	-	8.3	660	—	670
B	B	5	5	5	—	-	8.6	—	-	23.3	—	-	8.4	-	-	680
C	C	5	5	5	—	-	8.6	—	-	23.3	—	-	8.3	-	-	680
D	D	5	5	5	—	-	8.6	—	-	23.5	—	-	8.3	-	-	670
measured by:		SG	JG	SG	JH	—	SG	JH	-	SG	JH	-	SG	JH	-	SG
recorded by:		DH	JG	SG	DH	-	SG	DH	-	DH	DH	-	DH	DH	-	DH

Investigators' Signatures
Shannon Cicardi
Delia Parker-Hanson
Jessica Clyne
Marshall Faircloth

Temperature Range °C
Incubator # 2 23.9 → 25.5 °C
Room 524C 24.0 - 26.0 °C

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			NA	NA	NA	SG
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR100	VMK	X
Alkalinity (mg/L as $CaCO_3$):		76	151	Hach	DH	X
Hardness (mg/L as $CaCO_3$):		76	130	Hach	DH	SG
Total ammonia (mg/L as N):		<0.017	<0.017	Denver	DH/SG	X
Salinity:		<1	<1	YS.	DH	SG

A H Wolfe
reviewer

form updated 3/3/99

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Lynn Haven WWTP
County: Bay
Contact / District: G. Butts/G Smith/NW-DIST
NPDES Permit #: FL0069978
LIMS Sample #: 512045 LIMS Job #: TLH-2001-03-06-28
sample log 3/9/01/MF
Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Test Number: 2 of 2

Remarks:

Sample Collection: Date 3/5/01 Time 1245
Test Beginning: Date 3/6/01 Time 1410
Test Ending: Date 3/8/01 Time 1320
Organism Batch #: 14 Diluent Batch #: well
Organism Age: 14 days SRT toxicant batch #: —
Test organism: C. reticulata

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	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 48 h
CNTR. A	E1	5	5	5	7.8	8.2	8.2	23.8	25.6	22.7	7.6	7.0	8.2	270	290	260
B	E2	5	5	5	7.8	8.2	8.3	23.3	24.8	23.0	7.8	7.1	8.0	260	270	310
C	E3	5	5	5	7.8	8.2	8.3	23.5	25.1	22.8	7.6	7.0	8.0	255	265	310
D	E4	5	5	5	7.8	8.2	8.3	23.7	24.9	23.3	8.0	7.0	8.0	255	265	310
100% A	E5	5	5	5	7.9	8.2	8.3	23.8	24.5	23.4	7.9	7.2	7.9	600	540	765
B	E6	5	5	5	7.9	8.2	8.3	24.0	24.6	22.8	7.9	7.3	8.0	665	610	1.03
C	E7	5	5	5	7.9	8.2	8.3	24.1	24.9	23.1	7.9	7.3	8.0	665	620	1.02
D	E8	5	5	5	7.9	8.2	8.3	24.2	25.0	23.3	7.9	7.1	7.9	666	610	610
measured by:		YMK	JG	JA	JA	DPH	SG	JA	DPH	SG	JA	DPH	SG	JA	DPH	SG
recorded by:		JG	JG	JA	DPH	JG	JA	DPH	JG	JA	DPH	JG	JA	DPH	JG	JA

Investigators' Signatures
Shannon Berardi
Debbie Parker-Horne
Jaclyn Cyr
Marshall Faircloth
Jennifer Kattan

AH Wolfe
reviewer

form updated 3/3/99

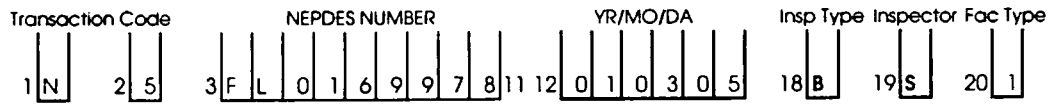
Temperature Range °C
Incubator # 3 24.2 → 25.0°C
Room B246 24.0 - 26.0°C

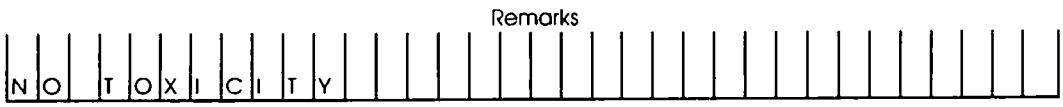
@ wrong sample 3/6/01 (SG)

Water Quality Parameters	Salt Water (Well Water)	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			NA	NA	NA	JG
Lab Total Residual Cl2 (mg/L):	<0.03		<0.03 7.55	DPD/CC	YMK	JG
Alkalinity (mg/L as $CaCO_3$):	149		~~144~~ 151	Hach	JA	JG
Hardness (mg/L as $CaCO_3$):	141		~~122~~ 130	Hach	JA	JG
Total ammonia (mg/L as N):	<0.017		<0.017	Denver	DPH/SG	JG
Salinity:	<1		<1	Ysi	JA	JG

The Bioassay of Lynn Haven Wastewater Treatment Facility effluent sampled on March 5, 2001, NPDES #FL0169978.

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

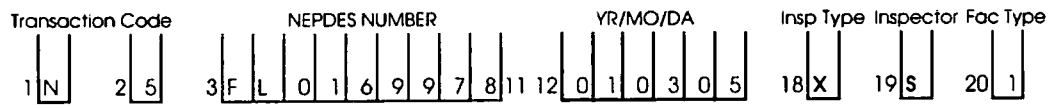


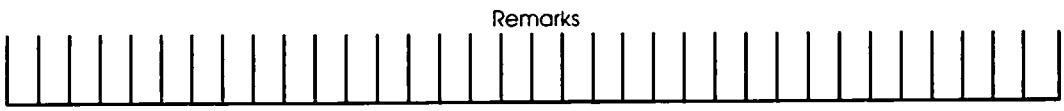


66

The Priority Pollutants Analysis for Bioassay of Lynn Haven Wastewater Treatment Facility effluent sampled on March 5, 2001, NPDES #FL0169978.

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





66