

Bioassays of the City of

Holly Hill Wastewater Treatment Facility

Holly Hill, Volusia County, Florida

NPDES #FL002766-01

Sampled 5/13/02

November 2002

Biology Section

Division of Resource Assessment & Management

Comprehensive Quality Assurance Plan #870346G

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Biology Section
Bureau of Laboratories
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Introduction

City of Holly Hill Wastewater Treatment Facility, 453 LPGA Boulevard, Holly Hill, Volusia County, Florida, NPDES #FL002766-01, tests performed on 14 to 16 May 2002.

This oxidation-ditch domestic wastewater treatment plant has a design flow of 2.4 MGD and an annual average flow of 1.87 MGD (February, 2001-January, 2002). Treatment of the wastewater includes flow equalization, influent screening, grit removal, aeration, denitrification, secondary clarification, chemical feed, filtration, chlorination for disinfection, with postaeration and dechlorination with sulfur dioxide. Residuals undergo aerobic digestion followed by thickening and dewatering by belt press. After processing, residuals are land applied. After treatment, the effluent is discharged into the Class III marine waters of the Halifax River (facility information provided by David Smicherko, FDEP, Orlando).

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. The freshwater test species used were the waterflea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*. Acute toxicity was not observed for either test species exposed to the 100% sample for 48 hours (Table 1).

Neither ammonia nor total residual chlorine was detected in the bioassay sample in the laboratory; however, total residual chlorine was detected in the field during sampling at a concentration of 0.02 mg/L. Total ammonia was detected in the sample collected and preserved for chemical analysis at a concentration of 0.074 mg/L. Additional samples of effluent were collected from this facility and analyzed for herbicides, nutrients, metals, organic compounds, and pesticides. Several metals, nutrients, an herbicide, and a pesticide were detected (Table 2)

Conclusion

The sample of effluent collected from this facility on May 13, 2002, was not acutely toxic to either test species during the 48-hour bioassay tests.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the City of Holly Hill WWTF, 453 LPGA Boulevard, Holly Hill, Volusia County, Florida, NPDES# FL002766-01, performed from 14 to 16 May 2002.

Facility:	**City of Holly Hill WWTF**		**NPDES #**	**FL002766-01**	Facility Type: **WWTF**	**Analysts:**	Della Parker-Hanson
Location:	453 LPGA Boulevard, Holly Hill		Contact/District:	Kane/Central			Joshua Ayres
County:	Volusia		Test type:	static acute screen			Gary Hardie
Sample Collection Date:	5/13/2002	Time: 0922	# tests:	2	Receiving Water: Halifax River		Marshall Faircloth
Test Beginning Date:	5/14/2002	Time: 1435	Chlorination Type:	Chlorinated	Class III Marine		
Test Ending Date:	5/16/2002	Time: 1430		sample collected after dechlorination	**Page 1 of 1**	**Reviewer:**	David Whiting

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	23.0	-	24.6	8.2	-	7.5	170	190
Control B	0/20	5	5	5	-	-	8.2	-	-	24.5	-	-	7.5	-	190
Control C	0/20	5	5	5	-	-	8.3	-	-	24.4	-	-	7.5	-	190
Control D	0/20	5	5	5	-	-	8.3	-	-	24.0	-	-	7.5	-	185
100% A	20/0	5	5	5	7.2	-	8.6	25.6	-	24.1	7.6	-	7.6	670	870
100% B	20/0	5	5	5	-	-	8.6	-	-	24.2	-	-	7.6	-	920
100% C	20/0	5	5	5	-	-	8.6	-	-	24.1	-	-	7.6	-	905
100% D	20/0	5	5	5	-	-	8.6	-	-	23.8	-	-	7.6	-	940

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24.0-25.0°C.
Incubator #3 temperature range for the test period was 23.8-25.0°C.

Organism: ***Cyprinella leedsi*** Life stage: 13 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	4	4	7.9	8.2	8.4	23.9	24.0	24.6	7.7	7.1	7.5	290	280
Control B	0/500	5	5	5	8.0	8.3	8.4	23.8	24.0	24.3	7.7	7.1	7.5	260	275
Control C	0/500	5	5	5	8.0	8.3	8.4	23.8	23.8	24.9	7.8	7.0	7.4	260	275
Control D	0/500	5	5	5	8.0	8.2	8.4	23.8	24.0	24.3	7.8	7.2	7.2	255	275
100% A	500/0	5	5	5	7.4	8.1	8.3	24.8	23.9	24.2	7.5	6.9	7.4	700	755
100% B	500/0	5	5	5	7.4	8.1	8.3	24.9	23.7	24.5	7.4	7.0	7.2	705	760
100 % C	500/0	5	5	5	7.4	8.0	8.3	24.9	24.2	24.9	7.4	6.7	6.9	685	760
100% D	500/0	5	5	5	7.4	8.1	8.3	25.1	24.1	24.3	7.4	6.8	6.8	685	740

[B] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24.0-25.0°C.
Incubator #3 temperature range for the test period was 23.8-25.0°C.

LIMS	
Job number:	TLH-2002-05-14-06
sample number:	593803

Data Transcription Verification	
date:	10/11/2002
by:	Joshua Ayres
	Christa Pierini

Total Residual CL2	mg/L	Method
Field:	0.02	-
Lab:	<0.03	Hach

Ammonia	Total (mg/L)	Unionized (mg/L)
Control water (fish):	<0.017	<0.017
Control water (water flea):	<0.017	<0.017
100% Sample:	<0.017	<0.017

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control water (fish):	136	127
Control water (water flea):	79	78
100% Sample:	140	188

Table 2. Results of chemical analyses on the effluent from the City of Holly Hill WWTF sampled on May 13, 2002.

Metals

Aluminum	110	ug/L	I
Cadmium	0.027	ug/L	I
Calcium	65.0	mg/L	
Copper	2.0	ug/L	I
Iron	48	ug/L	I
Lead	0.79	ug/L	I
Magnesium	6.5	mg/L	
Selenium	0.60	ug/L	I
Silver	0.051	ug/L	I

Pesticides and Herbicides

Atrazine	0.081	ug/L	I
Fonofos	0.13	ug/L	I

Nutrients

Ammonia as Nitrogen	0.074	mg N/L	A
Total Kjeldahl Nitrogen	1.1	mg N/L	
Nitrates and Nitrites	1.6	mg N/L	
Total Phosphorus	0.47	mg P/L	

Base, Neutral, & Acid Extractable Organics

None detected

[A] The reported value is an average of two or more values.
[I] The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

The Bioassay of the City of Holly Hill WWTF effluent sampled on May 13, 2002, NPDES #FL002766-01.

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

Transaction Code		NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N	2 5	3 F L 0 0 2 7 6 6 0 1	0 2 0 5 1 3	# **B**	# **S**	# 1

Remarks

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The Priority Pollutants Analysis for the Bioassay of the City of Holly Hill WWTF effluent sampled on May 13, 2002, NPDES #FL002766-01.

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

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Remarks

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