

Bioassays of the Town of

Davie Wastewater Treatment Plant

Davie, Broward County, Florida

NPDES #FL0040541

Sampled 2/25/02

October 2002

Biology Section

Division of Resource Assessment & Management

Comprehensive Quality Assurance Plan #870346G

Bioassays of the Town of

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Bureau of Laboratories
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Introduction

Town of Davie WWTP, 3591 N.W. 76th Avenue, Davie, Broward County, Florida, NPDES #FL0040541, tests performed on 26 to 28 February 2002.

This wastewater treatment plant has a design flow of 5.0 MGD and an annual average daily flow of 2.922 MGD (January to June 2002). This WWTP consists of three plants. Treatment in each plant includes a contact tank, re-aeration tank, aerobic digester, chlorine contact chamber, and circular clarifier. The combined wastewater then travels 14 miles to the city of Hollywood WWTP where it is dechlorinated, and ultimately discharged into the Class III marine waters of the Atlantic Ocean (facility information provided by Hubert Philoctete, FDEP, West Palm Beach).

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 the Town of Davie WWTP using two freshwater species, the waterflea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*. The test results indicated toxicity to both test species within 48 hours of test initiation, with 100% mortality in *C. leedsi* test organisms, and 55% mortality in *C. dubia* test organisms (Table 1).

The total residual chlorine concentration in the bioassay sample was measured in the laboratory at a concentration of 0.92 mg/L. Bioassays were not performed on a dechlorinated aliquot of this sample. Total ammonia was not detected in the bioassay sample. In the preserved chemistry sample, total ammonia was measured at 0.056 mg N/L. Additional samples of effluent were collected from this facility and analyzed for herbicides, nutrients, metals, organic compounds, and pesticides. Several metals, nutrients, and one pesticide were identified (Table 2). The toxicity of this sample is attributed primarily to the total residual chlorine concentration.

Conclusion

The sample of effluent collected from this facility on February 25, 2002, showed acute toxicity to both test species within 48 hours. The cause of toxicity in the sample is attributed primarily to the total residual chlorine concentration.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Town of Davie Wastewater Treatment Plant, 3591 N.W. 76th Avenue, Davie, Broward County, Florida, NPDES# FL0040541, performed from 26 to 28 February 2002.

Facility:	**Town of Davie WWTP**	**NPDES #**	**FL0040541**	Facility Type:	**WWTP**	**Analysts:**	Della Parker-Hanson
Location:	3591 N.W. 76th Avenue	Contact/District:	Davis/Southeast				Joshua Ayres
County:	Broward	Test type:	static acute screen				Gary Hardie
Sample Collection Date:	2/25/2002 Time: 1050	# tests:	2	Receiving Water:	Atlantic Ocean/		Marshall Faircloth
Test Beginning Date:	2/26/2002 Time: 1500	Chlorination Type:	Chlorinated		Class III Marine Waters		Eva Pastora
Test Ending Date:	2/28/2002 Time: 1430				**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	8.2	-	8.3	24.8	-	23.4	8.0	-	7.7	280	250
Control B	0/20	5	5	5	-	-	8.3	-	-	23.2	-	-	7.7	-	230
Control C	0/20	5	5	5	-	-	8.3	-	-	23.0	-	-	7.9	-	230
Control D	0/20	5	5	5	-	-	8.3	-	-	22.7	-	-	7.8	-	190
100% A	20/0	5	2	2	7.3	-	8.2	24.8	-	23.3	8.0	-	7.7	595	870
100% B	20/0	5	2	2	-	-	8.2	-	-	23.3	-	-	7.7	-	895
100% C	20/0	5	3	3	-	-	8.2	-	-	23.3	-	-	7.7	-	920
100% D	20/0	5	2	2	-	-	8.2	-	-	22.7	-	-	7.6	-	870

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 23.0-25.5 °C.
Incubator #3 temperature range for the test period was 24.5-25.5°C.

Organism: ***Cyprinella leedsi*** Life stage: 13 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[C]			Dissolved Oxygen			Conductivity Uncorrected µmhos/cm	
Concentrations	Volume(mL)	0 hr	24 hr	48 hr[B]	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour
Control A	0/500	5	5	-	7.9	8.1	-	24.2	24.8	-	8.0	7.1	-	260	260
Control B	0/500	5	5	-	7.9	8.2	-	24.2	24.7	-	8.0	7.1	-	260	265
Control C	0/500	5	5	-	7.9	8.2	-	24.1	24.6	-	8.0	7.1	-	260	265
Control D	0/500	5	5	-	7.9	8.2	-	24.1	24.5	-	8.0	7.0	-	265	265
100% A	500/0	5	0	-	7.1	7.7	-	25.3	25.6	-	7.7	6.3	-	710	715
100% B	500/0	5	0	-	7.1	7.7	-	25.2	25.2	-	7.7	6.9	-	715	730
100 % C	500/0	5	0	-	7.1	7.7	-	25.2	24.7	-	7.7	6.9	-	710	725
100% D	500/0	5	0	-	7.1	7.7	-	25.2	26.1	-	7.7	6.6	-	710	750

[B] Test terminated at 24 hours due to complete mortality in the 100% sample organisms.
[C] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 23.0-25.5°C.
Incubator #3 temperature range for the test period was 24.5-25.5°C.

LIMS	
Job number:	TLH-2002-02-26-33
sample number:	579456

Data Transcription Verification	
date:	9/25/2002
by:	Joshua Ayres
	Christa Pierini

Total Residual CL2	mg/L	Method
Field:	2.54	Color wheel
Lab:	0.92	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):	134	134
Control water (water flea):	75	76
100% Sample:	275	644

Table 2. Results of chemical analyses on the effluent from Town of Davie WWTP sampled on February 25, 2002.

Metals

Cadmium	0.042	ug/L	I
Calcium	37.6	mg/L	A
Iron	420	ug/L	A
Magnesium	5.6	mg/L	A
Nickel	3.6	ug/L	I
Silver	0.5	ug/L	A
Zinc	31	ug/L	A

Pesticides and Herbicides

Atrazine	0.083	ug/L	I

Base, Neutral, & Acid Extractable Organics

None Detected

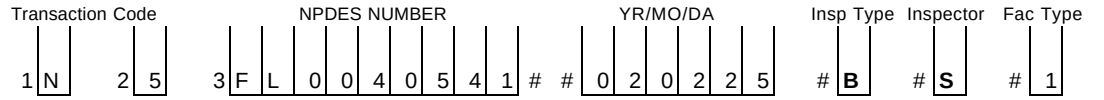
Nutrients

Nitrates and Nitrites	18	mg N/L	
Ortho-phosphate	0.94	mg P/L	
Total Kjeldahl Nitrogen	2.2	mg N/L	
Total Phosphorous	1	mg P/L	
Ammonia as Nitrogen	0.056	mg N/L	A

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

The Bioassay of Town of Davie WWTP effluent sampled on February 25, 2002, NPDES #FL0040541.

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



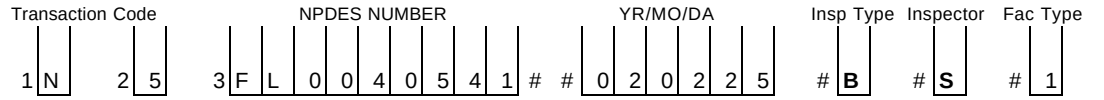
Remarks



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The Priority Pollutants Analysis for Town of Davie WWTP effluent sampled on February 25, 2002, NPDES #FL0040541.

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



Remarks



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