

Bioassays of

Port Orange Wastewater Treatment Facility

Port Orange, Volusia County, Florida

NPDES #FL0020559

Sampled 5/20/02

December 2002

Biology Section

Division of Resource Assessment & Management

Comprehensive Quality Assurance Plan #870346G

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Port Orange Wastewater Treatment Facility

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Bureau of Laboratories
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Introduction

Port Orange Wastewater Treatment Facility, 817 Oak Street, Port Orange, Volusia County, Florida, NPDES #FL0020559, test performed on 21 to 23 of May 2002.

This advanced secondary domestic wastewater treatment plant has a design flow of 12.0 MGD and an annual average daily flow of 7.34 MGD (February, 2001-January, 2002). The majority of the reclaimed water is directed to public access reuse with an annual average flow of 1.92 MGD discharged to surface waters (February, 2001-January, 2002). Treatment includes influent screening, grit removal, biological nutrient removal using the anoxic/oxic system, clarification, chemical feed, filtration, reaeration, chlorination for disinfection, dechlorination using sulfur dioxide, aerobic digestion, and dewatering of residuals. After treatment, reclaimed water is directed to a public access reuse system and the remaining effluent is discharged into the Class III marine waters of the Halifax River (facility information provided by Phil Kane and 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* (Table 1). There was no indication of toxicity to test organisms of either species after 48 hours of effluent exposure.

Total ammonia and total residual chlorine were not detected in the bioassay sample in the laboratory. Additional samples of effluent were collected from this facility and analyzed for nutrients, metals, organic compounds, herbicides, and pesticides. Several metals, nutrients, and two pesticides were detected (Table 2). Total ammonia was detected at a concentration of 0.05 mg/L in the preserved chemistry sample. Copper was detected at a concentration of 3.3 ug/L, which is above the Class III marine waters surface water quality criterion of ≤ 2.9 ug/L (FDEP-62-302.530 Criteria for Surface Water Quality Classifications).

Conclusion

The sample of effluent collected on May 20, 2002, from this facility did not indicate acute toxicity to test organisms after 48 hours.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Port Orange WWTF, 817 Oak Street, Port Orange, Volusia County, Florida, NPDES# FL0020559, performed from 21 to 23 May 2002.

Facility:	**Port Orange WWTF**		**NPDES #**	**FL0020559**	Facility Type: **WWTF**	**Analysts:**	Jacquelyn Brynda
Location:	817 Oak Street		Contact/District:	Kane/Central			Joshua Ayres
County:	Volusia		Test type:	static acute screen			Gary Hardie
Sample Collection Date:	5/20/2002	Time: 0931	# tests:	2	Receiving Water: Halifax River		Marshall Faircloth
Test Beginning Date:	5/21/2002	Time: 1355	Chlorination Type:	dechlorinated	Class III marine		
Test Ending Date:	5/23/2002	Time: 1320			**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	8.3	-	8.3	23.8	-	25.0	8.0	-	7.4	175	180
Control B	0/20	5	5	5	-	-	8.3	-	-	25.2	-	-	7.4	-	200
Control C	0/20	5	5	5	-	-	8.3	-	-	25.1	-	-	7.4	-	220
Control D	0/20	5	5	5	-	-	8.3	-	-	25.1	-	-	7.5	-	190
100% A	20/0	5	5	5	7.4	-	8.3	23.8	-	24.9	8.0	-	7.4	680	805
100% B	20/0	5	5	5	-	-	8.3	-	-	24.9	-	-	7.4	-	840
100% C	20/0	5	5	5	-	-	8.3	-	-	24.9	-	-	7.4	-	910
100% D	20/0	5	5	5	-	-	8.3	-	-	24.7	-	-	7.4	-	920

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 23.0-24.5 °C.
Incubator #3 temperature range for the test period was 24.5-25.0°C.

Organism: ***Cyprinella leedsi*** Life stage: 8 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	7.9	8.4	8.5	24.4	24.4	24.1	7.8	7.8	7.6	285	305
Control B	0/500	5	5	5	8.0	8.4	8.5	24.5	24.4	24.0	7.8	7.8	7.6	260	290
Control C	0/500	5	5	5	8.0	8.4	8.5	24.4	23.8	24.2	7.8	8.0	7.6	260	285
Control D	0/500	5	5	5	8.0	8.4	8.4	24.4	23.8	24.3	7.8	8.0	7.5	260	285
100% A	500/0	5	5	5	7.4	8.0	8.0	24.3	23.9	24.3	7.6	8.0	7.4	685	730
100% B	500/0	5	5	5	7.4	8.0	8.0	24.3	23.8	24.2	7.5	7.8	7.3	700	740
100 % C	500/0	5	5	5	7.4	8.0	8.0	24.3	23.7	24.2	7.4	7.8	7.3	700	730
100% D	500/0	5	5	5	7.4	8.0	8.0	24.2	23.7	23.9	7.4	7.8	7.3	700	730

[B] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 23.0-24.5°C.
Incubator #3 temperature range for the test period was 24.5-25.0°C.

LIMS	
Job number:	TLH-2002-05-21-55-01
sample number:	595078

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

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
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):	152	163
Control water (water flea):	78	81
100% Sample:	79	106

Table 2. Results of chemical analyses on the effluent from Port Orange WWTF sampled on May 20, 2002.

Metals

Calcium	30.5	mg/L	
Copper	3.3	ug/L	
Iron_271	75	ug/L	I
Lead	0.45	ug/L	I
Magnesium	6.2	mg/L	
Selenium	0.91	ug/L	I
Silver	0.04	ug/L	I

Pesticides and Herbicides

Atrazine	0.43	ug/L	
Fonofos	0.25	ug/L	I

Nutrients

Total Kjeldahl Nitrogen	1.4	mg N/L	A
Total Phosphorous	1.9	mg P/L	A
Ammonia-N	0.058	mg N/L	
Nitrates/Nitrites	13	mg N/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 Port Orange WWTF effluent sampled on May 20, 2002, NPDES #FL0020559.

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 0 5 5 9 # #		0 2 0 5 2 0		# **B**	# **S**	# 1

Remarks

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The Priority Pollutants Analysis for Bioassay of Port Orange WWTF effluent sampled on May 20, 2002, NPDES #FL0020559.

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 0 5 5 9 # #		0 2 0 5 2 0		# **B**	# **S**	# 1

Remarks

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