

Bioassays of

Ridaught Landing Wastewater Treatment Plant

Middleburg, Clay County, Florida

NPDES #FL0039721

Sampled 3/19/01

September 2001

Biology Section

Division of Resource Assessment & Management

Comprehensive Quality Assurance Plan #870346G

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Bureau of Laboratories
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Introduction

Ridaught Landing Wastewater Treatment Plant, 2878-1 Tuscarora Trail, Middleburg, Clay County, Florida, NPDES #FL0039721, tests performed on 20 to 22 March 2001.

This advanced wastewater treatment facility has a design flow of 1.875 MGD and an annual average flow of 0.831 MGD. Wastewater is treated by two static screens, one aerated grit chamber, one oxidation ditch with an anoxic zone for denitrification, two secondary clarifiers, and one traveling bridge filter. The wastewater is chlorinated in the chlorine contact chamber, and dechlorinated using sodium bisulfate. The effluent then flows through a digester prior to being transported through a transmission pipeline to the Fleming Island Regional Wastewater Treatment Facility for reuse at the Eagle Harbor Community and at the Centrex Developments.

The effluent that does not meet the requirements for the Public Access Reuse System at Fleming Island Regional WWTF is treated further with filtration, chlorination, and dechlorination before being discharged into the Class III fresh waters of the St. Johns River via Little Black Creek. During the sampling event, Fleming Island Regional WWTP kept all effluents separated so that the effluent sampled was only from the Ridaught Landing WWTP (personal communication and facility summary provided by J. Lippincott, FDEP, Jacksonville).

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 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 indicated only minimal toxicity by 48 hours (Table 1), showing 15% mortality in the *C. dubia* test and no mortality in the *C. leedsi* test.

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).

Conclusion

The sample of effluent collected from this facility on March 19, 2001, indicated only minimal acute toxicity to *C. dubia* within 48 hours. No mortality was observed in the *C. leedsi* test within 48 hours. The cause of mortality in the *C. dubia* test was not determined.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Ridaught Landing Wastewater Treatment Plant, 2878-1 Tuscarora Trail, Middleburg, Clay County, Florida, NPDES# FL0039721, performed on 20 to 22 March 2001.

Facility:	**Ridaught Landing WWTP**	**NPDES #**	**FL0039721**	Facility Type:	**Wastewater Treatment Plant**	**Analysts:**	Shannon Gerardi, Della Parker-Hanson, Joshua Ayres, Marshall Faircloth
Location:	2878-1 Tuscarora Trail	Contact/District:	P. O'Connor/ Northeast				
County:	Clay	Test type:	static acute screen				
Sample Collection Date:	3/19/01 Time: 1009	# tests:	2	Receiving Water:	St. Johns River		
Test Beginning Date:	3/20/01 Time: 1100	Chlorination Type:	Chlorinated				
Test Ending Date:	3/22/01 Time: 1325		sample collected after dechlorination		**Page 1 of 1**	**Reviewer:**	Steve Wolfe

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	-	8.0	24.7	-	23.8	7.5	-	7.7	175	235
Control B	0/20	5	5	5	-	-	8.2	-	-	23.8	-	-	7.8	-	205
Control C	0/20	5	5	5	-	-	8.2	-	-	23.7	-	-	7.6	-	190
Control D	0/20	5	5	5	-	-	8.2	-	-	23.8	-	-	7.7	-	185
100% A	20/0	5	4	4	6.8	-	8.1	23.9	-	23.5	8.0	-	7.9	475	595
100% B	20/0	5	5	5	-	-	8.1	-	-	23.6	-	-	7.9	-	540
100% C	20/0	5	5	5	-	-	8.1	-	-	23.3	-	-	8.0	-	555
100% D	20/0	5	3	3	-	-	8.1	-	-	23.5	-	-	7.9	-	525

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 25.0-26.0°C.
Incubator #2 temperature range for the test period was 24.5-25.0°C.

Organism: ***Cyprinella leedsi*** Life stage: 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	7.9	8.2	8.5	24.8	24.2	24.5	7.5	7.2	7.6	255	275
Control B	0/500	5	5	5	7.9	8.3	8.5	24.5	24.2	24.2	7.6	7.8	7.8	250	270
Control C	0/500	5	5	5	7.9	8.3	8.5	24.5	24.1	24.4	7.5	7.8	7.7	250	270
Control D	0/500	5	5	5	7.9	8.3	8.5	24.5	24.0	24.2	7.5	7.7	7.6	255	270
100% A	500/0	5	5	5	6.8	7.5	7.8	24.3	24.1	24.3	8.1	7.5	7.5	480	515
100% B	500/0	5	5	5	6.8	7.4	7.8	24.2	24.1	24.5	8.1	7.3	7.4	485	520
100% C	500/0	5	5	5	6.8	7.5	7.8	24.1	23.9	24.3	8.1	7.4	7.5	485	520
100% D	500/0	5	5	5	6.8	7.4	7.8	23.9	24.0	24.4	8.2	7.4	7.5	480	515

[B] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 25.0-26.0°C.
Incubator #3 temperature range for the test period was 24.5-26.0°C.

Data Transcription Verification	
date:	9/25/01
by:	Joshua Ayres, Della Parker-Hanson

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):	151	150
20% Dilute Mineral Water (cladocerans):	78	85
100% Sample:	65	98

Table 2. Results of chemical analyses on the effluent from Ridaught Landing Wastewater Treatment Plant sampled on March 19, 2001.

Metals

Calcium	22.7	mg/L	A
Iron	226	µg/L	A
Magnesium	10	mg/L	A
Nickel	2.1	µg/L	I
Zinc	33	µg/L	A

Pesticides and Herbicides

Atrazine	1	µg/L	
Fonofos	0.13	µg/L	I

Base, Neutral, & Acid Extractable Organics

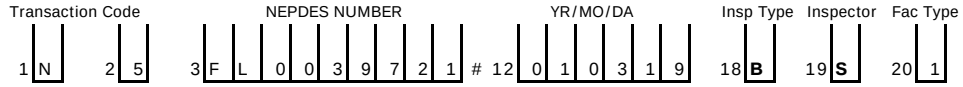
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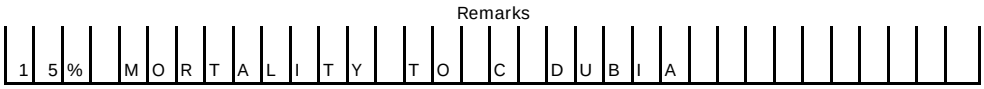
A Value reported is the mean of two or more determinations.

I Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit.

The Bioassay of Ridaught Landing Wastewater Treatment Plant effluent sampled on March 19, 2001, NPDES #FL0039721.

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

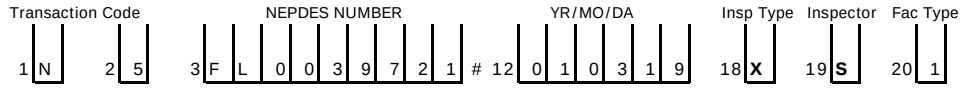


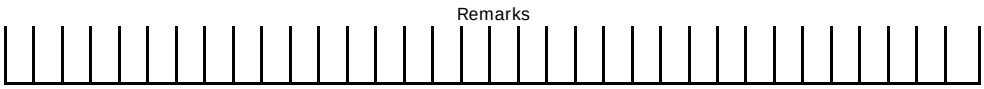


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The Priority Pollutants Analysis for Bioassay of Ridaught Landing Wastewater Treatment Plant effluent sampled on March 19, 2001, NPDES #FL0039721.

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