

Bioassays of

Miller Street Wastewater Treatment Plant

Orange Park, Clay County, Florida

NPDES #FL0025151

Sampled 10/29/01

January 2002

Biology Section

Division of Resource Assessment & Management

Comprehensive Quality Assurance Plan #870346G

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Miller Street Wastewater Treatment Plant

Orange Park, Clay County, Florida

NPDES #FL0025151

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Bureau of Laboratories
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Introduction

Miller Street Wastewater Treatment Plant, 1000 Miller Street, Orange Park, Clay County, Florida, NPDES #FL0025151, tests performed on 30 October to 1 November 2001.

This wastewater treatment plant has a design flow of 5.0 MGD and an annual average daily flow of 3.129 MGD. The wastewater treatment system consists of grit removers, two flow equalization basins, two oxidation ditches with brush aerators, three clarifiers, and two chlorine contact basins. The residuals are thickened using a sludge gravity belt, aerobically digested, pressed, and stabilized with lime before being land applied. The effluent is dechlorinated using sulfur dioxide before being discharged through Outfall D001 into the Class III marine waters of the St. Johns River (facility summary provided by Jessica Weatherby, 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 four 48-hour static acute screening toxicity bioassays on a sample of effluent collected from Outfall D001 of this facility using both freshwater and saltwater test species. The freshwater test species used for these bioassays were the waterflea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*. The saltwater test species used were the mysid shrimp, *Americamysis bahia*, and the inland silverside, *Menidia beryllina*.

The original salinity of the sample was less than one part per thousand (ppt). For the saltwater tests, Forty Fathoms® artificial sea salts were used to adjust the salinity of two aliquots of the sample to approximately one ppt and six ppt for the silverside and mysid tests, respectively, to insure the minimum requirements of seawater ions for the test organisms were met. The control water was natural seawater (NSW) diluted to the test salinity. The salt-control water was FDEP well water salted to the salinity of the appropriate test. The purpose for the salt control was to test for possible toxic effects of the addition of artificial sea salts to the sample. No toxic effects were observed in any of the controls. The test results did not indicate toxicity to any of the test species within 48 hours (Tables 1 and 2).

Total residual chlorine was not detected in the sample in the field or in the laboratory. Total and unionized ammonia concentrations in the bioassay sample were 0.119 mg/L and 0.002 mg/L, respectively. Further chemical analyses were performed on the sample, and several metals and an herbicide were identified (Table 3).

Conclusion

The sample of effluent collected from this facility on October 29, 2001, did not show acute toxicity to any of the test species within 48 hours.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Miller Street Wastewater Treatment Plant, 1000 Miller Street, Orange Park, Clay County, Florida, NPDES# FL0025151 performed from 30 October to 1 November 2001.

Freshwater Species Tests

Facility:	**Miller Street WWTP**		**NPDES #**	**FL0025151**	Facility Type: **Wastewater**	**Analysts:**	Della Parker-Hanson
Location:	1000 Miller Street		Contact/District:	Tom Kallenmeyn/Northeast	**Treatment Plant**		Joshua Ayres
County:	Clay		Test type:	static acute screen			Marshall Faircloth
Sample Collection Date:	10/29/01	Time: 1115	# tests:	2	Receiving Water: St. Johns River		
Test Beginning Date:	10/30/01	Time: 1330	Chlorination Type:	Chlorinated			
Test Ending Date:	11/1/01	Time: 1450		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 ìmhos/cm	
Concentrations	Volume(mL)	0 hr	24 hr	48 hr		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	-	8.4	24.2	-	24.7	7.0	-	8.2	165	185
Control B	0/20	5	5	5	-	-	8.4	-	-	24.7	-	-	8.2	-	190
Control C	0/20	5	5	5	-	-	8.4	-	-	24.7	-	-	8.0	-	205
Control D	0/20	5	5	5	-	-	8.4	-	-	24.7	-	-	8.1	-	210
100% A	20/0	5	5	5	7.4	-	8.6	24.6	-	24.7	6.2	-	8.1	510	665
100% B	20/0	5	5	5	-	-	8.6	-	-	24.9	-	-	8.2	-	560
100% C	20/0	5	5	5	-	-	8.6	-	-	25.0	-	-	8.1	-	620
100% D	20/0	5	5	5	-	-	8.6	-	-	24.9	-	-	8.1	-	685

[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 #2 temperature range for the test period was 26.0-27.0°C.

Organism: ***Cyprinella leedsi*** Life stage: 10 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[B]			Dissolved Oxygen			Conductivity Uncorrected ìmhos/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	8.1	8.5	8.5	24.8	25.4	24.8	6.9	7.5	6.0	255	295
Control B	0/500	5	5	5	8.1	8.5	8.5	23.8	25.3	24.7	7.0	7.3	7.0	265	295
Control C	0/500	5	5	5	8.1	8.5	8.5	23.9	25.0	24.8	7.1	7.4	7.4	265	290
Control D	0/500	5	5	5	8.1	8.5	8.5	24.0	25.0	24.7	7.1	7.4	7.5	265	295
100% A	500/0	5	5	5	7.4	8.2	8.4	23.8	25.5	24.5	6.7	7.4	7.7	520	540
100% B	500/0	5	5	5	7.4	8.2	8.4	23.7	25.1	24.5	6.5	7.1	7.7	535	565
100 % C	500/0	5	5	5	7.4	8.2	8.4	23.7	25.1	24.5	6.3	7.1	7.7	535	600
100% D	500/0	5	5	5	7.4	8.2	8.4	23.7	25.1	24.7	6.3	7.0	7.7	535	590

[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 24.0-25.0°C.

Data Transcription Verification	
date:	1/17/02
by:	Cathy Oaks Della Parker-Hanson

Total Residual CL2	mg/L	Method
Field:	<0.01	-
Lab:	<0.03	Hach

Ammonia	Total (mg/L)	Unionized (mg/L)
Control water (fish):	<0.017	<0.017
Control water (waterflea):	<0.017	<0.017
100% Sample:	0.119	0.002

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control water (fish):	135	138
Control water (waterflea):	76	83
100% Sample:	123	128

Table 2. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Miller Street Wastewater Treatment Plant, 1000 Miller Street, Orange Park, Clay County, Florida, NPDES# FL0025151 performed from 30 October to 1 November 2001.

Saltwater Species Tests

Facility:	**Miller Street WWTP**		**NPDES #**	**FL0025151**	Facility Type:	**Wastewater**	**Analysts:** Della Parker-Hanson
Location:	1000 Miller Street		Contact/District:	Tom Kallenmeyn/Northeast		**Treatment Plant**	Joshua Ayres
County:	Clay		Test type:	static acute screen			Marshall Faircloth
Sample Collection Date:	10/29/01	Time: 1115	# tests:	2	Receiving Water:	St. Johns River	
Test Beginning Date:	10/30/01	Time: 1430	Chlorination Type:	Chlorinated			
Test Ending Date:	11/1/01	Time: 1450		sample collected after dechlorination		**Page 1 of 1**	**Reviewer:** David Whiting

Organism: ***Americamysis bahia*** Life stage: 4 days

	Sample/Diluen	SURVIVAL # Alive			pH			Temperature[A]			Dissolved Oxygen			Conductivity Uncorrected mmhos/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	8.0	8.2	8.3	24.7	24.7	24.3	7.5	7.2	7.4	10.1	11.1
Control B	0/500	5	5	5	8.0	8.2	8.3	24.7	24.7	24.1	7.5	7.2	7.5	10.3	12.1
Control C	0/500	5	5	5	8.0	8.2	8.3	24.7	24.5	24.6	7.6	7.2	7.3	10.4	11.2
Control D	0/500	5	5	5	8.0	8.2	8.3	24.6	24.4	24.4	7.5	7.5	7.2	10.2	12.1
Salt Ctrl A	0/500	5	5	5	8.1	8.3	8.4	24.7	24.5	24.4	7.6	7.4	7.5	10.2	12.3
Salt Ctrl B	0/500	5	5	5	8.1	8.3	8.4	25.1	24.1	24.4	7.5	7.4	7.5	10.2	11.4
Salt Ctrl C	0/500	5	5	5	8.1	8.3	8.4	25.1	24.3	24.5	7.4	7.3	7.4	10.1	11.3
Salt Ctrl D	0/500	5	5	5	8.1	8.3	8.4	25.1	24.4	24.4	7.4	7.4	7.4	10.1	11.1
100% A	500/0	5	5	5	8.5	8.1	8.3	25.2	24.6	24.6	7.2	7.4	7.5	10.3	12.7
100% B	500/0	5	5	5	8.5	8.1	8.3	25.3	24.6	24.3	6.9	7.5	7.5	10.4	11.7
100% C	500/0	5	5	5	8.5	8.1	8.3	25.3	24.8	24.3	6.8	7.0	7.3	10.3	11.5
100% D	500/0	5	5	5	8.5	8.1	8.3	25.3	24.7	24.4	6.9	6.9	7.3	10.3	11.3

[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 24.0-25.0°C.

Organism: ***Menidia beryllina*** Life stage: 11 days

	Sample/Diluen	SURVIVAL # Alive			pH			Temperature[B]			Dissolved Oxygen			Conductivity Uncorrected mmhos/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	8.0	8.3	8.4	24.7	24.6	24.7	7.9	6.9	7.4	2.05	2.13
Control B	0/500	5	5	5	8.0	8.3	8.4	24.6	24.4	24.7	7.9	7.0	7.4	2.08	2.37
Control C	0/500	5	5	5	8.0	8.3	8.4	24.6	24.4	24.5	7.7	7.1	7.4	2.03	2.43
Control D	0/500	5	5	5	8.0	8.3	8.4	24.6	24.7	24.3	7.7	7.1	7.5	2.10	2.32
Salt Ctrl A	0/500	5	4	4	8.0	8.3	8.4	25.7	24.5	24.4	7.7	7.6	7.4	2.05	2.33
Salt Ctrl B	0/500	5	5	5	7.9	8.3	8.4	25.7	24.5	24.4	7.7	7.2	7.4	2.08	2.35
Salt Ctrl C	0/500	5	5	5	7.9	8.3	8.5	25.8	24.6	24.3	7.7	7.2	7.4	2.07	2.67
Salt Ctrl D	0/500	5	5	5	7.9	8.3	8.5	25.7	24.7	24.0	7.6	7.3	7.6	2.07	2.34
100% A	500/0	5	5	5	7.4	8.1	8.3	25.0	24.5	24.5	6.9	7.0	7.4	2.08	2.30
100% B	500/0	5	5	5	7.4	8.1	8.3	24.9	24.5	24.3	6.9	6.9	7.2	2.09	2.57
100 % C	500/0	5	5	5	7.4	8.1	8.3	24.9	24.5	24.3	6.9	7.0	7.4	2.10	2.27
100% D	500/0	5	5	5	7.4	8.1	8.3	24.8	24.4	24.4	6.8	7.0	7.4	2.10	2.33

[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 24.0-25.0°C.

Data Transcription Verification	
date:	1/1702
by:	Della Parker-Hanson Cathy Oaks

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

Ammonia	Total (mg/L)	Unionized (mg/L)
NSW:	<0.051	<0.051
100% Sample:	<0.017	<0.017

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
NSW:	127	-
100% Sample:	123	128

Salinity [C]	ppt
NSW:	33
Mysid 100% sample:	6
Menidia 100% sample:	1
100% Sample:	<1

[C] Salinity based conductivity and temperature.

Table 3. Results of chemical analyses on the effluent from Miller Street Wastewater Treatment Plant sampled on October 29, 2001.

Metals

Calcium	28.3	mg/L
Iron	120	µg/L [I]
Lead	0.37	µg/L [I]
Magnesium	12.7	mg/L
Silver	0.11	µg/L
Zinc	50	µg/L

Pesticides and Herbicides

Atrazine	0.27	µg/L

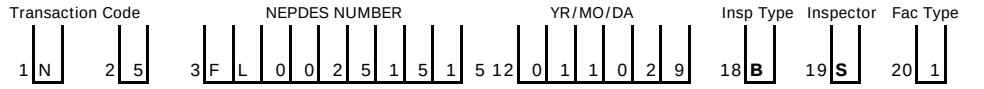
Base, Neutral, & Acid Extractable Organics

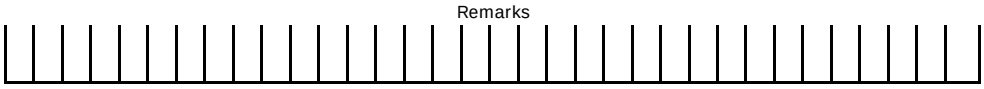
None detected

[I] The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

The Bioassay of Miller Street Wastewater Treatment Plant effluent sampled on October 29, 2001, NPDES #FL0025151.

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





The Priority Pollutants Analysis for Bioassay of Miller Street Wastewater Treatment Plant effluent sampled on October 29, 2001, NPDES #FL0025151.

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

