Bioassays of

Grande Olde Plaza Shopping Center
Wastewater Treatment Plant

Middleburg, Clay County, Florida

NPDES #FL0113735

Sampled 10/14/96

February 1997

Biology Section
Division of Administrative & Technical Services

Comprehensive Quality Assurance Plan #870346G

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Introduction

Grande Olde Plaza Shopping Center WWTP, 2710 Blanding Boulevard, Middleburg, Clay County, Florida, NPDES #FL0113735, tests performed on 5 to 7 November, 1996.

This extended-aeration wastewater treatment plant has a design flow of 0.04 MGD. Wastewater is treated by aeration, aerobic digestion, clarification, chlorination for disinfection, dechlorination, and filtration through sand filters. The flow from the sand filters passes through the bank of an unnamed creek which flows into the South Fork of Black Creek, a tributary of the St. Johns River. The owner of the facility has been issued a State of Florida Department of Environmental Protection Domestic Wastewater Facility permit (DO10-281453) for the purpose of construction to improve the facility (facility summary provided by Tim McKelvey, 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 did not show toxicity (Table 1).

Total residual chlorine in the sample was 0.04 mg/L in the field and was not detected in the laboratory. The total and unionized ammonia concentrations were 0.303 mg/L and < 0.017 mg/L, respectively. Further chemical analyses were performed on the sample and several metals were identified (Table 2). The copper (34 µg/L), lead (11 µg/L), silver (3.10 µg/L), and zinc (133 µg/L) concentrations exceeded their respective State of Florida Class III freshwater surface water criterion for copper (10.8 µg/L), lead (2.78 µg/L), silver (≤0.07 µg/L), and zinc (96.9 µg/L) (FAC 62-302.530).

Conclusion

The sample of effluent collected from this facility on November 4, 1996, did not show toxicity. Several constituents of the sample were in violation of State of Florida water quality standards.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Grande Olde Plaza WWTP, Middleburg , Clay County, Florida, NPDES# FL0113735, performed on 5 to 7 November, 1996.

Facility:	**Grande Olde Plaza WWTP**			**NPDES #**	**FL0113735**	Facility Type:	Wastewater Treatment Plant
Location:	2710 Blanding Blvd., Middleburg			Contact/District:	Tim McKelvey / Northeast		
County:	Clay			Test type:	static acute screen	Receiving Water:	unnamed creek to the South Fork of Black Creek to the St. Johns River
Sample Collection Date:	11/4/96	Time:	1523	# tests:	2		
Test Beginning Date:	11/5/96	Time:	1430	Chlorination Type:	Chlorinated		
Test Ending Date:	11/7/96	Time:	1430	Sample collected after plant dechlorination unit.			Page 1 of 1

Total Residual CL2	mg/L	Method
Field:	0.04	-
Lab:	<0.03	DR-100

Ammonia	Total (mg/L)	Unionized (mg/L)
Control Water (fish):	<0.017	0.00
20% Dilute Mineral Water (cladocerans):	<0.017	0.00
100% Sample:	0.303	0.003

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	115	125
20% Dilute Mineral Water (cladocerans):	65	85
100% Sample:	60	90

Salinity	(ppt)
Control Water:	0
100% Sample:	0

Organism: ***Ceriodaphnia dubia*** Life stage: < 24 hours old

	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	8.1	-	8.3	24.4	-	24.7	7.7	-	7.9	175	210
Control B	0/20	5	5	5	-	-	8.3	-	-	24.6	-	-	7.9	-	190
Control C	0/20	5	5	5	-	-	8.4	-	-	24.6	-	-	8.0	-	185
Control D	0/20	5	5	5	-	-	8.4	-	-	24.4	-	-	8.0	-	185
100% A	20/0	5	5	5	7.3	-	8.3	24.3	-	24.5	6.3	-	8.0	670	695
100% B	20/0	5	5	5	-	-	8.3	-	-	24.5	-	-	8.0	-	710
100% C	20/0	5	5	5	-	-	8.3	-	-	24.5	-	-	8.0	-	710
100% D	20/0	5	5	5	-	-	8.3	-	-	24.3	-	-	8.1	-	700

[A] Temperature of test incubator was continously recorded on a strip chart recorder.
Incubator temperature range for the test period was 24.4-25.6°C.

Organism: ***Cyprinella leedsi*** Age: 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	5	5	8.1	8.3	8.5	24.8	25.1	24.8	7.9	7.7	7.9	250	260
Control B	0/500	5	5	5	8.1	8.3	8.5	24.4	25.1	24.9	7.8	7.7	7.9	250	260
Control C	0/500	5	5	5	8.0	8.3	8.5	24.3	25.1	25.0	7.9	7.8	7.8	250	265
Control D	0/500	5	5	5	8.0	8.3	8.5	24.3	24.9	24.9	7.9	7.9	7.8	250	260
100% A	500/0	5	5	5	7.3	7.8	8.1	24.4	25.2	24.9	6.0	7.5	7.8	715	750
100% B	500/0	5	5	5	7.2	7.8	8.1	24.6	25.2	24.9	6.1	7.5	7.6	720	760
100% C	500/0	5	5	5	7.2	7.8	8.0	24.5	24.7	24.9	5.8	7.5	7.4	720	760
100% D	500/0	5	5	5	7.2	7.8	8.0	24.6	25.3	24.9	5.9	7.5	7.4	720	760

[B] Temperature of test room was continously recorded on a strip chart recorder.
Room temperature range for the test period was 24.0-25.0°C.

Table 2. Results of chemical analyses on the effluent from the Grande Olde Plaza Wastewater Treatment Plant sampled on November 4, 1996.

Metals

Aluminum	160	µg/L[A]
Cadmium	0.5	µg/L[A]
Calcium	19.0	mg/L[A]
Copper	34	µg/L[A]
Iron	520	µg/L[A]
Lead	11	µg/L[I]
Magnesium	7.63	mg/L[A]
Nickel	8	µg/L[I]
Silver	3.10	µg/L[A]
Zinc	133	µg/L[A]

Pesticides and Herbicides

none detected

Base, Neutral, & Acid Extractable Organics

none detected

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.

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Grand Old Plaza
County: CLAY
Contact / District: Tim McKelvey / Northeast
NPDES Permit #: FL0~~[illegible]~~ entry error B of 11-7-96 FL0001735
LIMS Sample #: 158422 LIMS Job #: 96-NOV-05-07
sample log 11-18-96
Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Test Number: 1 of 2

Sample Collection: Date 11-04-96 Time 1523
Test Beginning: Date 11-05-96 Time 1430
Test Ending: Date 11-07-96 Time 1430
Organism Batch #: 49 Diluent Batch #: 46
Organism Age: < 24 hours
Test Organism: Ceriodaphnia dubia

Remarks:
A readings under 24hr. DO etc for 48hrs Probe not adjusted to collect salinity. NO These are the correct readings MF

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	22.7 @ 22.7	8.2 @ 25.1 °C	103.0 @ 92.8 999 @ 1079 @ 25.0 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.8 @ 24.8	8.4 @ 24.2 °C	103.3 @ 92.8 1000 @ 1079 @ 25.1 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.9	8.2 @ 25.1 °C	102.6 @ 92.8 994 @ 1079 @ 24.9 °C 9900 9946

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm)		
Conc.	Chamber #	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
Control	A	5	5	5	8.1		8.3	24.4		24.7	7.7	7.9	6.3	175		210
Control	B	5	5	5			8.3			24.6		7.9	6.5			190
Control	C	5	5	5			8.4			24.6		8.0	6.4			185
Control	D	5	5	5			8.4			24.4		8.0	6.4			185
100%	A	5	5	5	7.3		8.3	24.3		24.5	6.3	8.0	6.4	670		695
100%	B	5	5	5			8.3			24.5		8.0	6.4			710
100%	C	5	5	5			8.3			24.5		8.0	6.5			710
100%	D	5	5	5			8.3			24.3		8.1	6.5			700
													10 11-07-96			
Measured/Loaded by:		JS	MF	MF	JS		JS	JS		JS	JS	JS	JS	JS		JS
Recorded by:		MF	MF	MF	DW		ND	DW		ND	DW	ND	NO	DW		ND

Investigators' Signatures

Julie Harper
D. Marshall Faircloth
Dennis Nicholson

reviewer

form updated 4/01/96

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.04	—	PAT O'CONNER
Lab Total Residual Cl2 (mg/L):	<.03	<.03	<.03	DR-100	JS
Alkalinity (mg/L as $CaCO_3$):	115	65	60	HACH	DN
Hardness (mg/L as $CaCO_3$):	125	85	90	HACH	DN
Total ammonia (mg/L as N):	<0.017	<0.017	0.787	orion	ND

Ammonia Meter #98136 Ammonia Meter Slope: 58.9 Ammonia Blank: 0.483 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Grand Oak Plaza
County: CLAY
Contact / District: Tim McKelvey / Northeast
NPDES Permit #: FL0013735 Entry error MF 11-7-96 FL0113735
LIMS Sample #: 158422 LIMS Job #: 96-NOU-05-07
sample log 11-18-96
Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Test Number: 2 of 2
Remarks:

Sample Collection: Date 11-04-96 Time 1523
Test Beginning: Date 11-05-96 Time 1425
Test Ending: Date 11-7-96 Time 1425
Organism Batch #: 83 Diluent Batch #: well
Organism Age: 13 days
Test Organism: Cyprinella leedsi

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	22.7 @ 22.7	8.2 @ 25.1 °C	103.0 @ 92.8 999 @ 1079 @ 25.0 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.8 @ 24.8	8.4 @ 24.2 °C	103.3 @ 92.8 1000 @ 1079 @ 25.1 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.9	6.2 @ 25.1 °C	102.6 @ 92.8 994 (9400) @ 1079 (9466) @ 24.8 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm)) 0 hr	UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm)) 24 h	UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm)) 48 h
Control A	D1	5	5	5	8.1	8.3	8.5	24.8	25.1	24.8	7.9	7.7	7.9	250	255	260
Control B	D2	5	5	5	8.1	8.3	8.5	24.4	25.1	24.9	7.8	7.7	7.9	250	255	260
Control C	D3	5	5	5	8.0	8.3	8.5	24.3	25.1	25.0	7.9	7.8	7.8	250	260	265
Control D	D4	5	5	5	8.0	8.3	8.5	24.3	24.9	24.9	7.9	7.9	7.8	250	255	260
100% A	D5	5	5	5	7.3	7.8	8.1	24.4	25.2	24.9	6.0	7.5	7.8	715	740	750
100% B	D6	5	5	5	7.2	7.8	8.1	24.6	25.2	24.9	6.1	7.5	7.6	720	745	760
100% C	D7	5	5	5	7.2	7.8	8.0	24.5	24.7	24.9	5.8	7.5	7.4	720	735	760
100% D	D8	5	5	5	7.2	7.8	8.0	24.6	25.3	24.9	5.9	7.5	7.4	720	750	760
Measured/Loaded by:		MF	DW	MF	JS	MF	JS	JS	MF	JS	JS	MF	JS	JS	MF	JS
Recorded by:		MF	DW	MF	DW	DW	ND	DW	DW	ND	DW	DW	ND	DW	DW	ND

Investigators' Signatures

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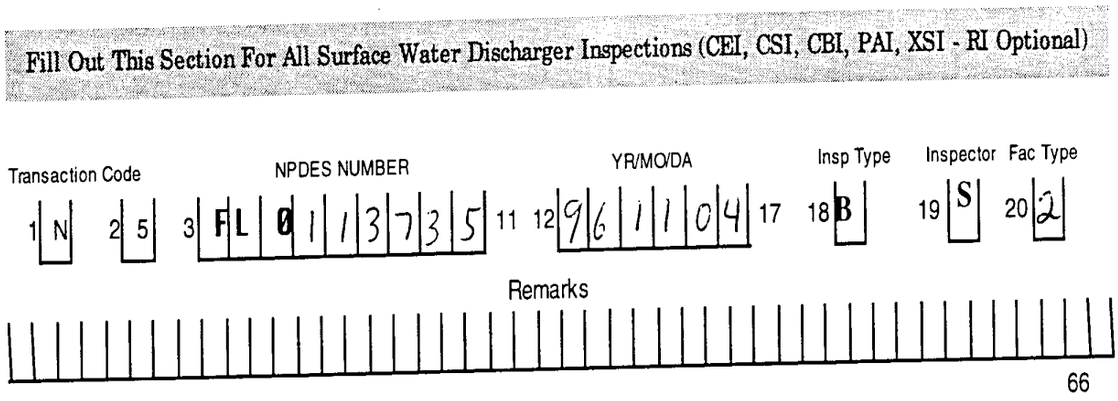
form updated 4/01/96

Water Quality Parameters

	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.04	—	PAT O'CONNER
Lab Total Residual Cl2 (mg/L):	<.03	<.03	<.03	DR-100	JS
Alkalinity (mg/L as $CaCO_3$):	115	65	60	HACH	DN
Hardness (mg/L as $CaCO_3$):	125	85	90	HACH	DN
Total ammonia (mg/L as N):	<0.017	<0.017	0.787	6710-1	ND

Ammonia Meter #98136 Ammonia Meter Slope: -58.9 Ammonia Blank: 0.483 Control Salinity: 0 ppt Sample Salinity: 0 ppt

The Bioassay of the Grande Olde Plaza WWTP effluent sampled on November 4, 1996, NPDES #FL0113735.



The Priority Pollutants Analysis for the Bioassay of the Grande Olde Plaza WWTP effluent sampled on November 4, 1996, NPDES #FL0113735.

