

Bioassays of the City of

Belle Glade Wastewater Treatment Plant

Belle Glade, Palm Beach County, Florida

NPDES #FL0027740

Sampled 6/23/97

October 1997

Biology Section

Division of Administrative & Technical Services

Comprehensive Quality Assurance Plan #870346G

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Biology Section
Bureau of Laboratories
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Introduction

City of Belle Glade WWTP, 2055 W. Canal Street South, Belle Glade, Palm Beach County, Florida, NPDES #FL0027740, tests performed on 24 to 26 June, 1997.

This wastewater treatment plant has a design flow of 3.0 MGD with a daily flow ranging from 2 MGD to 7 MGD. Wastewater receives secondary treatment, chlorination, and dechlorination by aeration. Effluent is disposed of by deep-well injection. The facility has two percolation ponds which can be used for effluent storage during emergencies, but the facility is not permitted to discharge from the ponds. This WWTP is a non-discharge facility and, as such the permit renewal will be non-NPDES (facility summary provided by Lisa M. Scott, FDEP, Southeast District, 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 from this facility. Two additional 48-hour screening bioassays were performed on aliquots of the sample that were dechlorinated in the laboratory by the addition of 0.8 mL of 0.025N sodium thiosulfate per liter of sample. The test species used for these bioassays were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*. Neither the chlorinated nor the dechlorinated tests showed toxicity (Table 1).

Total residual chlorine of the 100% whole effluent sample was 1.0 mg/L in the field and 0.45 mg/L in the laboratory. Total residual chlorine (TRC) of the dechlorinated aliquot of sample was measured at 0.08 mg/L. Total ammonia was not detected in the sample. Further chemical analyses were performed on the sample and several metals and the herbicide, atrazine, were identified (Table 2).

Conclusion

The sample of effluent collected from this facility on June 23, 1997, did not show toxicity.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the City of Belle Glade WWTP, Belle Glade, Palm Beach County, Florida, NPDES# FL0027740, performed on 24 to 26 June, 1997.

Facility:	City of Belle Glade WWTP			NPDES #	FL0027740	Facility Type:	Wastewater Treatment Plant
Location:	2055 W. Canal St. South, Belle Glade			Contact/District:	Terry Davis/Southeast		
County:	Palm Beach			Test type:	static acute screen		
Sample Collection Date:	6/23/97	Time:	1015	# tests:	2	Receiving Water:	No Discharge
Test Beginning Date:	6/24/97	Time:	1500	Chlorination Type:	Chlorinated		
Test Ending Date:	6/26/97	Time:	1450				Page 1 of 1

Total Residual CL2	mg/L	Method
Field:	1.00	-
Lab: 100% sample:	0.45	DR-100
dechlorinated sample:	0.08	DR-100

Ammonia	Total (mg/L)	Unionized (mg/L)
Control Water (fish):	<0.017	<0.017
Control Water (20% DMW) (cladocerans):	<0.017	<0.017
100% Sample:	<0.017	<0.017

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	125	130
Control Water (20% DMW) (cladocerans):	70	85
100% Sample:	220	410

Salinity	(ppt)
Control Water (fish):	0
Control Water (20% DMW) (cladocerans):	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	8.2	-	8.1	25.2	-	25.3	7.5	-	7.1	165	180
Control B	0/20	5	5	5	-	-	8.2	-	-	25.4	-	-	7.2	-	185
Control C	0/20	5	5	5	-	-	8.2	-	-	25.3	-	-	7.2	-	190
Control D	0/20	5	5	5	-	-	8.2	-	-	25.3	-	-	7.2	-	200
100% A	20/0	5	5	5	7.7	-	8.6	25.6	-	25.3	7.1	-	7.3	1055	1065
100% B	20/0	5	5	5	-	-	8.6	-	-	25.4	-	-	7.3	-	1115
100% C	20/0	5	5	5	-	-	8.6	-	-	25.3	-	-	7.2	-	1115
100% D	20/0	5	4	4	-	-	8.6	-	-	25.3	-	-	7.2	-	1165
Decl100% A	20/0	5	5	5	7.8	-	8.6	26.2	-	25.3	7.1	-	7.2	1115	1160
Decl100% B	20/0	5	5	5	-	-	8.6	-	-	25.4	-	-	7.2	-	1145
Decl100% C	20/0	5	5	5	-	-	8.6	-	-	25.4	-	-	7.2	-	1155
Decl100% D	20/0	5	5	5	-	-	8.6	-	-	25.2	-	-	7.2	-	1200

Decl = Dechlorinated sample

[A] Temperature of test incubator was continously recorded on a strip chart recorder. Incubator temperature range for the test period was 24.5-25.5°C.

Organism: *Cyprinella leedsi* Age: 12 days

	Sample/Diluent	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	7.9	8.3	8.3	25.5	24.9	23.9	7.4	7.5	7.5	255	255
Control B	0/500	5	5	5	7.9	8.3	8.3	25.5	23.6	24.4	7.4	7.6	7.4	255	260
Control C	0/500	5	5	5	7.9	8.3	8.3	25.5	23.6	24.4	7.5	7.6	7.2	255	260
Control D	0/500	5	5	5	7.9	8.3	8.4	25.4	24.9	24.0	7.5	7.7	7.2	255	260
100% A	500/0	5	5	5	7.6	8.3	8.5	26.8	25.8	23.7	6.9	7.3	7.3	1150	1130
100% B	500/0	5	5	5	7.6	8.2	8.4	26.9	24.2	23.1	6.9	7.3	7.3	1155	1110
100% C	500/0	5	5	5	7.6	8.3	8.5	26.9	23.1	25.6	7.0	7.7	6.9	1155	1195
100% D	500/0	5	5	5	7.6	8.2	8.4	26.8	24.2	24.2	6.9	7.6	7.0	1155	1120
Decl100% A	500/0	5	5	5	7.7	8.3	8.4	26.7	24.0	24.1	7.0	7.5	7.0	1150	1130
Decl100% B	500/0	5	5	5	7.7	8.3	8.4	26.8	23.6	24.5	7.1	7.5	6.9	1160	1165
Decl100% C	500/0	5	5	5	7.7	8.3	8.4	26.8	25.2	23.2	7.1	7.1	7.1	1160	1150
Decl100% D	500/0	5	5	5	7.7	8.3	8.4	26.9	24.2	24.9	7.1	7.2	7.0	1160	1160

Decl = Dechlorinated sample

[B] Temperature of test incubator was continously recorded on a strip chart recorder. Incubator temperature range for the test period was 24.5-25.5°C.

Table 2. Results of chemical analyses on the effluent from the City of Belle Glade Wastewater Treatment Plant sampled on June 23, 1997.

Metals

Aluminum	105	µg/L
Calcium	122	mg/L
Copper	2.4	µg/L
Iron	47	µg/L
Lead	0.3	µg/L[I]
Magnesium	24.8	mg/L
Zinc	23	µg/L

Pesticides and Herbicides

Atrazine	0.11	µg/L[I]

Base, Neutral, & Acid Extractable Organics

none detected

[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: City of Belleglade WWTP
County: Palm Beach
Contact / District: T. DAVIS / SE
NPDES Permit #: FL0027740
LIMS Sample #: 18/602 LIMS Job #: 97-JLW-24-06
sample log: 6/26/97 KR (100%) 6/27/97 By (dal) KR

Sample Collection: Date 6/23/97 Time 1015
Test Beginning: Date 6/24/97 Time 15 00
Test Ending: Date 6/26/97 Time 14:50
Organism Batch #: 24 Diluent Batch #: 23
Organism Age: < 24 hours
Test Organism: Ceriodaphnia dubia

Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Temperature range: room 25.0-26.0
incubator 24.5-25.5
Test Number: 1 of 2
Remarks: D = dead, M = missing

Aliquot of sample dechlorinated with 0.5mL of 0.25N Sodium thiosulfate per liter of sample for dechlorinated T&T. TRC of dechlorinated sample measured 0.05mg/L.

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	24.6 @ 24.7	8.3 @ 24.6 °C	104.4 @ 103.6 993 @ 1003 @ 25.5 °C 9580 @ 9774
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.8 @ 24.9	8.1 @ 25.7 °C	103.0 @ 103.6 999 @ 1003 @ 25.5 °C 10020 9744
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.9 @ 24.9	8.3 @ 24.5 °C	108.6 @ 103.6 1007 @ 1003 @ 25.5 °C 10100 @ 9944

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) 0 hr	UNCORRECTED Cond. (mmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) 48 h
ctr	A	5	5	5	8.2		8.1	25.2		25.3	7.5		7.1	165		180
ctr	B	5	5	5			8.2			25.4			7.2			185
ctr	C	5	5	5			8.2			25.3			7.2			190
ctr	D	5	5	5			8.2			25.3			7.2			200
100%	A	5	5	5	7.7		8.6	25.6		25.3	7.1		7.3	1055		1065
100%	B	5	5	5			8.6			25.4			7.3			1115
100%	C	5	5	5			8.6			25.3			7.2			1115
100%	D	5	4M	4			8.6			25.3			7.2			1165
100% DeCl	A	5	5	5	7.8		8.6	26.2		25.3	7.1		7.2	1185		1160
100% DeCl	B	5	5	5			8.6			25.4			7.2			1145
100% DeCl	C	5	5	5			8.6			25.4			7.2			1155
100% DeCl	D	5	5	5			8.6			25.2			7.2			1200
Measured/Loaded by:		JS	DD	ND	MF		ND	MF		ND	MF		ND	MF		ND
Recorded by:		MF	ND	ND	MA		KR	MA		KR	MA		KR	MA		KR

Investigators' Signatures

Ken Johnson
Julie Thayer
Marshall Faircloth
Michelle Anderson
Kellie Ralston
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):		1.0	—	Terry Davis
Lab Total Residual Cl2 (mg/L):	<0.03	0.450	DR-100	JS
Alkalinity (mg/L as $CaCO_3$):	70	220	Hach	ND
Hardness (mg/L as $CaCO_3$):	85	410	Hach	ND
Total ammonia (mg/L as N):	<0.017	<0.017	Orion	ND/MF

Ammonia Meter #98136 Ammonia Meter Slope: -55.3 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: City of Belleglade WWTP
County: Palm Beach
Contact / District: T. Davis ISE
NPDES Permit #: FL0027740
LIMS Sample #: 181602 LIMS Job #: 97-JUN-24-06
sample log: 6/24/97 KR (100%)

Sample Collection: Date 6/23/97 Time 1015
Test Beginning: Date 6/24/97 Time 15 00
Test Ending: Date 6/26/97 Time 14.50
Organism Batch #: 46 Diluent Batch #: well
Organism Age: 12 days
Test Organism: Cyprinella leedsi

Test Type: (Screening) / Definitive (6/27/97 DR (acc) KR)
(Static) / Static Renewal / Flow-through
Temperature range: room 25.0-26.0 incubator 24.5-25.5
Test Number: 2 of 2
Remarks: D = dead, M = missing
Aliquot of simple dechlorinated with 0.8 mL of 0.25 N Sodium Thiosulfate per liter of sample for dechlorination. Test TRC of dechlorinated sample measured 0.08 mg/L

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	24.6 @ 24.7	8.3 @ 24.6 °C	104.4 @ 103.6 993 @ 1023 @ 25.5 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.8 @ 24.9	8.1 @ 25.7 °C	9544 @ 9550 1098 @ 1036 999 @ 1003 @ 25.5 °C 10020 9744
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.9 @ 24.9	8.3 @ 24.5 °C	108.6 @ 103.6 1007 @ 1003 @ 25.5 °C 10100 @ 9744

Conc.	Chamber #	Number Live 0 hr	24 h	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) (µmhos/cm) 0 hr	Cond. 24 h	Cond. 48 h
Ctr A	61	7 9	5	5	7.9	8.3	8.3	25.5	24.9	23.9	7.4	7.5	7.5	255	260	255
Ctr B	62	7.9	5	5	7.9	8.3	8.3	25.5	23.6	24.4	7.4	7.6	7.4	255	250	260
Ctr C	63	7.9	5	5	7.9	8.3	8.3	25.5	23.6	24.4	7.5	7.6	7.2	255	250	260
Ctr D	64	7.9	5	5	7.9	8.3	8.4	25.4	24.9	24.0	7.5	7.7	7.2	255	260	260
100% A	65	7.6	5	5	7.6	8.3	8.5	26.8	25.8	23.7	6.9	7.3	7.3	1150	1160	1130
100% B	66	7.6	5	5	7.6	8.2	8.4	26.9	24.2	23.1	6.9	7.3	7.3	1155	1110	1110
100% E	67	7.6	5	5	7.6	8.3	8.5	26.9	23.1	25.6	7.0	7.7	6.9	1155	1100	1195
100% D	68	7.6	5	5	7.6	8.2	8.4	26.8	24.2	24.2	6.9	7.6	7.0	1155	1110	1120
10% DCI A	69	7.7	5	5	7.7	8.3	8.4	26.7	24.0	24.1	7.0	7.5	7.0	1150	1090	1130
10% DCI B	610	7.7	5	5	7.7	8.3	8.4	26.8	23.6	24.5	7.1	7.5	6.9	1160	1120	1165
10% DCI C	611	7.7	5	5	7.7	8.3	8.4	26.8	25.2	23.2	7.1	7.1	7.1	1160	1150	1150
10% DCI D	612	7.7	5	5	7.7	8.3	8.4	26.9	24.2	24.9	7.1	7.2	7.0	1160	1110	1160
		A wrote pH data in Number Column MF/MA 6/24/97														
Measured/Loaded by:		AMF	ND	ND	MF	KJ	ND	MF	KJ	ND	MF	KJ	ND	MF	KJ	ND
Recorded by:		JS	ND	ND	MA	JS	KR	MA	JS	KR	MA	JS	KR	MA	JS	KR

Investigators' Signatures
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reviewer

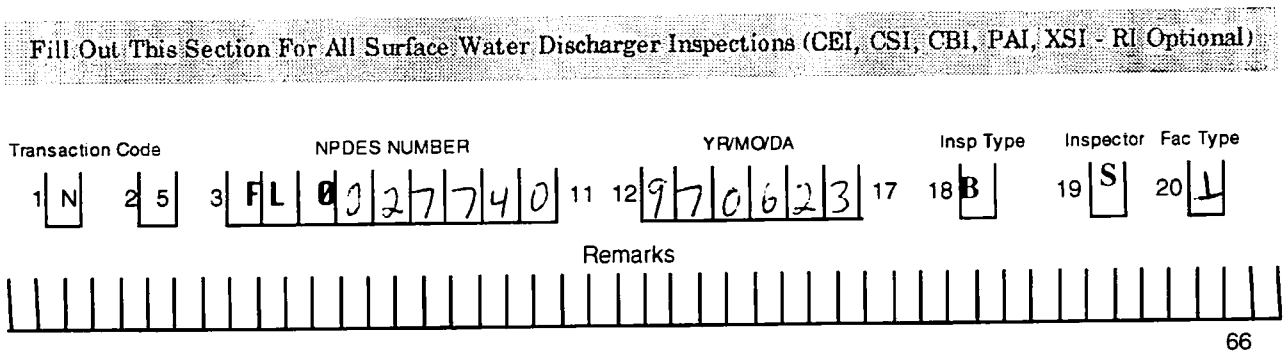
form updated 4/08/96

Salt Water (Well Water) | 20% Min Water

Water Quality Parameters	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):	1.0	—	Terry Davis
Lab Total Residual Cl2 (mg/L): <0.03	0.450	DR-100	JS
Alkalinity (mg/L as $CaCO_3$): 125	220	Hach	ND
Hardness (mg/L as $CaCO_3$): 130	410	Hach	ND
Total ammonia (mg/L as N): <0.017	<0.017	Orion	ND/MF

Ammonia Meter #98136 Meter Slope: -55.3 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample ppt

The Bioassay of the City of Belle Glade WWTP effluent sampled on June 23, 1997, NPDES #FL0027740.



The Priority Pollutants Analysis for the Bioassay of the City of Belle Glade WWTP effluent sampled on June 23, 1997, NPDES #FL0027740.

