

Bioassays of the City of

Blountstown Wastewater Treatment Plant

Blountstown, Calhoun County, Florida

NPDES #FL0026867

Sampled 9/2/97

January 1998

Biology Section

Division of Administrative & Technical Services

Comprehensive Quality Assurance Plan #870346G

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Introduction

City of Blountstown WWTP, Iola Avenue At Sutton Creek, Blountstown, Calhoun County, Florida, NPDES #FL0026867, tests performed on 3 to 5 September, 1997.

This wastewater treatment plant has a design flow of 0.6 MGD and an annual average flow of 0.651 MGD. The flow during the sampling period was 0.898 MGD. Historically, the facility has had numerous permit violations, most notable of which were excessive flow, total suspended solids, fecal coliform bacteria, and nutrients. The existing wastewater treatment system includes: an oxidation ditch, a clarifier, an equalization tank used as an aerobic digester, a chlorine contact chamber, and a post-aeration chamber. Effluent is discharged to the class III waters of Sutton Creek, a tributary of the Apalachicola River. A proposed treatment system for the facility includes: bar screens, a grit removal chamber, dual batch reactors, an equalization/chemical precipitation tank, parallel filters, a chlorine contact chamber, a post-aeration chamber, and the existing oxidation ditch which would serve as an aerobic digester with the decant being returned to the head of the plant. Residuals would be dried on plastic media beds and transported to the Springhill Regional Landfill for disposal. During the six month period preceding the collection of these bioassay samples, a significant improvement was noted in effluent quality compared to historical data (facility summary provided by Glenn Butts, FDEP, Pensacola).

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 showed toxicity in the *Ceriodaphnia dubia* 100% whole effluent test, producing 15% mortality at 48-hours, but did not show toxicity in the *Cyprinella leedsi* test (Table 1).

Total residual chlorine was not detected in the sample. The total and unionized ammonia concentrations were 6.40 mg/L and 0.079 mg/L, respectively. Further chemical analyses were performed on the sample and several metals were identified (Table 2). The silver concentration (0.27 µg/L) exceeded the State of Florida Class III surface water criteria for freshwater of ≤0.07 µg/L for silver (FAC 62-302.530).

Conclusion

The sample of effluent collected from this facility on September, 1997, showed minimal toxicity to *Ceriodaphnia dubia* but did not show toxicity to *Cyprinella leedsi*. The cause of the observed mortality was not determined.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the City of Blountstown WWTP, Blountstown, Calhoun County, Florida, NPDES# FL0026867, performed on 3 to 5 September, 1997.

Facility:	City of Blountstown WWTP		NPDES #	FL0026867	Facility Type:	Wastewater Treatment Plant	
Location:	Iola Avenue at Sutton Creek		Contact/District:	Glenn Butts/Northwest			
County:	Calhoun		Test type:	static acute screen			
Sample Collection Date:	9/2/97	Time: 1045	# tests:	2	Receiving Water:	Sutton Creek	
Test Beginning Date:	9/3/97	Time: 1345	Chlorination Type:	Chlorinated			
Test Ending Date:	9/5/97	Time: 1415				Page 1 of 1	

Total Residual CL2	mg/L	Method
Field:	-	-
Lab:	<0.03	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:	6.40	0.079

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	130	130
Control Water (20% DMW) (cladocerans):	70	90
100% Sample:	185	145

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 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	25.0	-	25.5	7.8	-	7.3	170	190
Control B	0/20	5	5	5	-	-	8.3	-	-	25.2	-	-	7.3	-	185
Control C	0/20	5	5	5	-	-	8.3	-	-	25.0	-	-	7.5	-	180
Control D	0/20	5	5	5	-	-	8.3	-	-	24.6	-	-	7.5	-	190
100% A	20/0	5	5	4	7.3	-	8.5	23.6	-	25.2	7.1	-	7.5	735	715
100% B	20/0	5	5	3	-	-	8.5	-	-	24.9	-	-	7.5	-	755
100% C	20/0	5	5	5	-	-	8.5	-	-	24.7	-	-	7.5	-	750
100% D	20/0	5	5	5	-	-	8.5	-	-	24.5	-	-	7.5	-	785

[A] Temperature of test incubator was continously recorded on a strip chart recorder. Incubator temperature range for the test period was 25.2-25.6°C.

Organism: ***Cyprinella leedsi*** Age: 9 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[B]			Dissolved Oxygen			Conductivity 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	8.0	8.3	8.4	25.5	25.5	25.6	7.7	7.5	7.4	255	265
Control B	0/500	5	5	5	8.0	8.3	8.4	25.6	25.2	24.7	7.7	7.6	7.4	255	260
Control C	0/500	5	5	5	8.0	8.3	8.4	25.6	25.3	25.3	7.8	7.6	7.4	255	270
Control D	0/500	5	5	5	8.0	8.3	8.4	25.6	24.8	24.9	7.8	7.6	7.4	255	255
100% A	500/0	5	5	5	7.3	8.0	8.2	23.1	24.6	25.4	6.9	7.1	6.5	750	800
100% B	500/0	5	5	5	7.3	8.1	8.2	23.0	25.4	25.0	6.9	7.1	6.5	750	805
100% C	500/0	5	5	5	7.3	8.0	8.2	23.0	24.7	25.9	7.0	7.1	6.4	750	830
100% D	500/0	5	5	5	7.3	8.1	8.2	23.0	26.0	24.7	7.0	7.1	6.4	750	805

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

Table 2. Results of chemical analyses on the effluent from the City of Blountstown Wastewater Treatment Plant sampled on September 2, 1997.

Metals

Aluminum	93	µg/L [I]
Calcium	28.5	mg/L [A]
Copper	2.0	µg/L [A]
Iron	493	µg/L [A]
Lead	0.3	µg/L [I]
Magnesium	15.4	mg/L [A]
Silver	0.27	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: City of Blountstown
County: ~~Liberty~~ Calhoun
Contact / District: Glenn Bulls / NWD
NPDES Permit #: FL0026867
LIMS Sample #: 189607 LIMS Job #: 97-SEP-03-11-01
sample log: 9/10/97 KR

Sample Collection: Date 9-2-97 Time 1045
Test Beginning: Date 9-3-97 Time 1345
Test Ending: Date 9-5-97 Time 1415
Organism Batch #: 34 Diluent Batch #: 35
Organism Age: <24hr.

Test Organism: Ceriodaphnia dubia

Test Type: ~~Screening~~ | Definitive
~~Static~~ | Static Renewal | Flow-through
Temperature range: room N/A
incubator 25.2°C - 25.6°C
Test Number: 1 of 2
Remarks: D = dead, M = missing

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	24.9 @ 25.0	8.1 @ 25.8 °C	1049 @ 101.6 995 @ 1005 @ 25.3 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.7 @ 24.8	8.1 @ 25.7 °C	1163 @ 101.6 1001 @ 1005 @ 25.5 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.3 @ 24.9	8.2 @ 25.5 °C	1076 @ 101.6 992 @ 1005 @ 25.1 °C

		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
Ctl	A	5	5	5	8.3		8.3	25.0		25.5	7.8		7.3	170		190
Ctl	B	5	5	5			8.3			25.2			7.3			185
Ctl	C	5	5	5			8.3			25.0			7.5			180
Ctl	D	5	5	5			8.3			24.6			7.5			190
100%	A	5	5	4	7.3		8.5	23.6		25.2	7.1		7.5	735		715
100%	B	5	5	3			8.5			24.9			7.5			755
100%	C	5	5	5			8.5			24.7			7.5			750
100%	D	5	5	5			8.5			24.5			7.5			785
Measured/Loaded by:		ND	ND	MF	ND		ND	ND		ND	ND		ND	ND		ND
Recorded by:		KR	ND	MF	ND		KS	ND		KS	ND		KS	ND		KS

Investigators' Signatures
Kelisa Kelstyn
Mark Chaisson
Marshall Faircloth
Kari Johnson

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):			not measured		
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR100	KR
Alkalinity (mg/L as $CaCO_3$):		70	185	Hach	ND
Hardness (mg/L as $CaCO_3$):		90	145	Hach	ND
Total ammonia (mg/L as N):		<0.017	6.40	Orion	MF

Ammonia Meter #98136 Meter Slope: -57.7
Ammonia Blank: <0.017
Control Salinity: 0 ppt
Sample Salinity: 0 ppt

Reg'd Lab verified MF 10/1/97
entries verified by MF

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: City of Bloomlstown
County: ~~Liberty~~ Calhoun
Contact / District: Glenn Butts / NWD
NPDES Permit #: FL0026867
LIMS Sample #: 189607 LIMS Job #: 97-SEP-03-11-01
sample log: 9/10/97 KR

Sample Collection: Date 9-2-97 Time 1445
Test Beginning: Date 9-3-97 Time 1430
Test Ending: Date 9-5-97 Time 1415
Organism Batch #: 67 Diluent Batch #: well
Organism Age: 9 days (hatch 8/25/97)
Test Organism: Cyprinella leedsi

Test Type: (Screening) I Definitive
(Static) I Static Renewal I Flow-through
Temperature range: room 25.0°C - 26.0°C
incubator 24.0°C - 25.0°C
Test Number: 2 of 2
Remarks: D = dead, M = missing

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	24.9 @ 25.0	8.1 @ 25.8°C	1049 @ 101.6 995 @ 1005 @ 25.3°C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.7 @ 24.8	8.1 @ 25.7°C	116.3 @ 101.6 109 @ 1005 @ 25.5°C
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.8 @ 24.9	8.2 @ 25.5°C	1026 @ 101.6 992 @ 1005 @ 25.1°C

Conc.	Chamber #	Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm))		
		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
Ctl A	A1	5	5	5	8.0	8.3	8.4	25.5	24.5	25.6	7.7	7.5	7.4	255	255	260
Ctl B	A2	5	5	5	8.0	8.3	8.4	25.6	25.2	24.7	7.7	7.6	7.4	255	215	260
Ctl C	A3	5	5	5	8.0	8.3	8.4	25.6	25.3	25.3	7.8	7.6	7.4	255	265	270
Ctl D	A4	5	5	5	8.0	8.3	8.4	25.6	24.8	24.9	7.8	7.6	7.4	255	255	255
100% A	A5	5	5	5	7.3	8.0	8.2	23.1	24.6	25.4	6.9	7.1	6.5	750	775	800
100% B	A6	5	5	5	7.3	8.1	8.2	23.0	25.4	25.0	6.9	7.1	6.5	750	805	805
100% C	A7	5	5	5	7.3	8.0	8.2	23.0	24.7	25.9	7.0	7.1	6.4	750	790	830
100% D	A8	5	5	5	7.3	8.1	8.2	23.0	24.6	24.7	7.0	7.1	6.4	750	820	805
Measured/Loaded by:		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Recorded by:		KR	ND	ND	KJ	KR	KJ	KJ	KR	KJ	KJ	KR	KJ	KJ	KR	KJ

Investigators' Signatures
Kellie Kalstan
Kesi Johnson
Marshall Fairbeth

reviewer

form updated 4/01/96

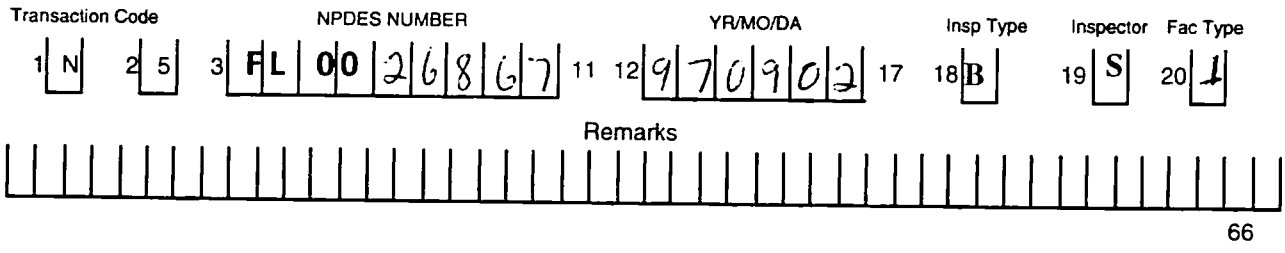
Water Quality Parameters entries verified by MF

	Salt Water: Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			not measured		
Lab Total Residual Cl2 (mg/L):	<0.03		<0.03	DROW	KR
Alkalinity (mg/L as $CaCO_3$):	130		185	Hach	ND
Hardness (mg/L as $CaCO_3$):	130		145	Hach	ND
Total ammonia (mg/L as N):	<0.017		6.40	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -57.7
Ammonia Blank: <0.017
Control Salinity: 0 ppt
Sample Salinity: 0 ppt

The Bioassay of the City of Blountstown WWTP effluent sampled on September 2, 1997, NPDES #FL0026867.

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



The Priority Pollutants Analysis for the Bioassay of the City of Blountstown WWTP effluent sampled on September 2, 1997, NPDES #FL0026867.

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

