DEPARTMENT OF ENVIRONMENTAL PROTECTION

FLORIDA

Bioassays of the City of

Arcadia Wastewater Treatment Plant

Arcadia, DeSoto County, Florida

NPDES #FL0027511

Sampled 4/1/96

June 1996

Biology Section

Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan #870346G

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Biology Section
Bureau of Laboratories
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Introduction

City of Arcadia WWTP, 223 South Parker Avenue, Arcadia, DeSoto County, Florida, NPDES # FL0027511, tests performed on 2 to 4 April, 1996.

This wastewater treatment plant has a design flow of 2.0 MGD and an annual average flow of 0.75 MGD. The treatment process includes primary filtration, recirculation, tertiary filtration, and clarification. Effluent is chlorinated for disinfection, dechlorinated with sulfur dioxide, and post-aerated prior to discharge via a pipeline to an unnamed tributary of the Peace River (facility summary provided by Andrea Grainger, FDEP, Tampa).

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*. Test results did not indicate toxicity (Table 1).

Total residual chlorine was not detected in the sample. Total ammonia and unionized ammonia concentrations were 0.81 mg/L and 0.026 mg/L, respectively. Further chemical analyses were performed on the sample and several metals, the pesticides diazinon and fonofos, and the herbicide bromacil were identified (Table 2). The silver concentration of 0.44 µg/L exceeds the State of Florida Class III surface water criterion for silver of a maximum of 0.07 µg/L (FAC 62-302.530).

Conclusion

The sample of effluent collected from this facility on April 1, 1996, did not show toxicity.

Table 1. Data recorded during the 48-hour acute toxicity screening bioassays of a sample of effluent from the City of Arcadia WWTP, Arcadia, DeSoto County, Florida, NPDES# FL0027511, performed on 2 to 4 April, 1996.

Facility:	**City of Arcadia Wastewater Treatment Plant**	**NPDES #**	**FL0027511**	Facility Type:	**Domestic WWTP**
Location:	223 South Parker Avenue, Arcadia	Contact/District:	A. Grainger/Southwest		
County:	DeSoto	Test type:	static acute screen		
Sample Collection Date:	4/1/96 Time: 1240	# tests:	2	Receiving Water:	Unnamed tributary to the Peace River
Test Beginning Date:	4/2/96 Time: 1500	Chlorination Type:	**Dechlorinated** in facility dechlorination unit	**Page 1 of 1**	
Test Ending Date:	4/4/96 Time: 1500				

Total Residual CL2	mg/L	Method
Field:	0.01	-
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:	0.81	0.026

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	120	125
20% Dilute Mineral Water (cladocerans):	80	90
100% Sample:	150	130

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	8.2	-	8.3	23.2	-	24.0	8.0	-	7.7	195	205
Control B	0/20	5	5	5	-	-	8.3	-	-	24.0	-	-	7.6	-	205
Control C	0/20	5	5	5	-	-	8.3	-	-	23.9	-	-	7.6	-	215
Control D	0/20	5	5	5	-	-	8.3	-	-	23.9	-	-	7.6	-	220
100% A	20/0	5	5	5	7.9	-	8.5	23.2	-	23.9	7.9	-	7.6	725	805
100% B	20/0	5	5	5	-	-	8.5	-	-	23.9	-	-	7.5	-	815
100% C	20/0	5	5	5	-	-	8.5	-	-	23.8	-	-	7.5	-	810
100% D	20/0	5	5	5	-	-	8.5	-	-	23.8	-	-	7.5	-	820

[A] Temperature of test incubator was continously recorded on a strip chart recorder.
Incubator temperature range for the test period was 24.4-25.3°C.

Organism: ***Cyprinella leedsi*** Age: 12 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	8.0	8.4	8.4	24.3	23.2	23.8	7.6	7.6	7.8	250	250
Control B	0/500	5	5	5	8.0	8.4	8.4	24.3	23.3	23.7	7.6	7.6	7.8	250	250
Control C	0/500	5	5	5	8.0	8.4	8.4	24.3	23.3	23.7	7.7	7.7	7.9	250	250
Control D	0/500	5	5	5	8.0	8.4	8.4	24.3	23.4	23.8	7.7	7.7	7.9	250	250
100% A	500/0	5	5	5	7.7	8.0	8.0	24.1	23.3	23.7	7.7	7.5	6.0	825	820
100% B	500/0	5	5	5	7.7	8.0	7.9	24.1	23.1	23.6	7.6	7.3	6.2	820	812
100% C	500/0	5	5	5	7.7	8.0	7.9	24.1	23.2	23.5	7.6	7.0	6.1	820	820
100% D	500/0	5	5	5	7.7	8.0	8.0	24.1	23.3	23.6	7.6	7.2	6.0	820	820

[B] Temperature of test room was continously recorded on a strip chart recorder.
Room temperature range for the test period was 23.8-24.5°C.

Table 2. Results of chemical analyses on the effluent from the City of Arcadia WWTP sampled on April 1, 1996.

Metals

Aluminum	2340	µg/L[A]
Calcium	23.0	mg/L[A]
Copper	11	µg/L[A]
Iron	170	µg/L[A]
Magnesium	13.7	mg/L[A]
Silver	0.44	µg/L[A]
Zinc	37	µg/L[A]

Pesticides and Herbicides

Bromacil	0.38	µg/L[I]
Diazinon	0.12	µg/L[I]
Fonofos	0.20	µg/L[I]

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 Arcadia WWTP
County: DeSoto
Contact / District: A. Grainger / SW
NPDES Permit #: FL0027511
LIMS Sample #: 134459 (24hr/2103 4-4-96) LIMS Job #: 96-APR-02-12

Sample Collection: Date 4/1/96 Time 1240
Test Beginning: Date 4/2/96 Time 1430
Test Ending: Date 4-4-96 Time 1430
Organism Batch #: 16 Diluent Batch #: ~~wet~~ 15 DW 4/2/96
Organism Age: <24hr
Test Organism: Ceriodaphnia dubia

Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through

Test Number: 1 of 2

Remarks:

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	22.1 @ 22.1	8.2 @ 25.0 °C	104.2 @ 106.1 1375 @ 1409 @ 23.5 °C (0930 / 1406)
24 hr	7.0 @ 7.0 9.0 @ 9.0	22.6 @ 22.7	8.4 @ 23.9 °C	106.8 @ 106.2 1405 @ 1409 @ 24.4 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.3 @ 22.4	8.4 @ 23.7 °C	105.4 @ 106.2 1371 @ 1409 @ 23.1 °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	8.2		8.3	23.2		24.0	8.0		7.7	195		205
ctl	B	5	5	5			8.3			24.0			7.6			205
ctl	C	5	5	5			8.3			23.9			7.6			215
ctl	D	5	5	5			8.3			23.9			7.6			220
100%	A	5	5	5	7.9		8.5	23.2		23.9	7.9		7.6	725		805
100%	B	5	5	5			8.5			23.9			7.5			815
100%	C	5	5	5			8.5			23.8			7.5			810
100%	D	5	5	5			8.5			23.8			7.5			820
Measured/Loaded by:		MF	MF	MF	TM		TM	TM		TM	TM		TM	TM		TM
Recorded by:		TM	MF	MF	TR		JLS	TR		JLS	TR		JLS	TR		JLS

Investigators' Signatures

Robin C. Rader
Linda Mikulski
Marshall Faircloth
Jennifer Sargent
Jon Smith
David White
Reviewer

form updated 5/05/95

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.01	—	Andrea Grainger
Lab Total Residual Cl2 (mg/L):	—	<0.03	<0.03	Dr.100	JLS
Alkalinity (mg/L as $CaCO_3$):	—	80	150	HACH	JLS
Hardness (mg/L as $CaCO_3$):	—	90	130	HACH	JLS
Total ammonia (mg/L as N):	—	<0.017	0.81	Orion	TM

Ammonia Meter #98136 Ammonia Meter Slope: -58.2 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: City of Arcadia CWTP
County: DeSoto
Contact / District: A. Grainger / 1 SW
NPDES Permit #: FL00 27511
LIMS Sample #: 134459 LIMS Job #: 96-APR-02-12

Sample Collection: Date 4/1/96 Time 1240
Test Beginning: Date 4/2/96 Time 1500
Test Ending: Date 4-4-96 Time 1500
Organism Batch #: 21 Diluent Batch #: WC11
Organism Age: 12 days
Test Organism: Cyprinella leedsi

Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through

Test Number: 2 of 2

Remarks:

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 8.0 @ 8.0	22.1 @ 22.1	8.2 @ 25.0 °C	104.2 @ 106.2 1375 @ 1408 @ 23.5 °C 9530 9869
24 hr	7.0 @ 7.0 9.0 @ 9.0	22.6 @ 22.7	8.4 @ 23.9 °C	106.8 @ 106.2 1405 @ 1409 @ 24.4 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.3 @ 22.4	8.4 @ 23.7 °C	105.4 @ 106.2 1371 @ 1409 @ 23.1 °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
Ctr A	1272	5	5	5	8.0	8.4	8.4	24.3	23.2	23.8	7.6	7.6	7.8	250	245	250
Ctr B	333	5	5	5	8.0	8.4	8.4	24.3	23.3	23.7	7.6	7.6	7.8	250	245	250
Ctr C	775	5	5	5	8.0	8.4	8.4	24.3	23.3	23.7	7.7	7.7	7.9	250	245	250
Ctr D	136	5	5	5	8.0	8.4	8.4	24.3	23.4	23.8	7.7	7.7	7.8	250	245	250
10% A	148	5	5	5	7.7	8.0	8.0	24.1	23.3	23.7	7.7	7.5	6.0	825	805	820
100% B	44	5	5	5	7.7	8.0	7.9	24.1	23.1	23.6	7.6	7.3	6.2	820	805	815
100% C	45	5	5	5	7.7	8.0	7.9	24.1	23.2	23.5	7.6	7.0	6.1	820	810	820
100% D	210	5	5	5	7.7	8.0	8.0	24.1	23.3	23.6	7.6	7.2	6.0	820	810	820
Measured/Loaded by:		MF	MF	MF	TM	MF	JLS	TM	MF	JLS	TM	MF	JLS	TM	MF	JLS
Recorded by:		MF	MF	MF	TR	JN	JM	TR	JN	JM	TR	JN	JM	TR	JN	TM

Investigators' Signatures

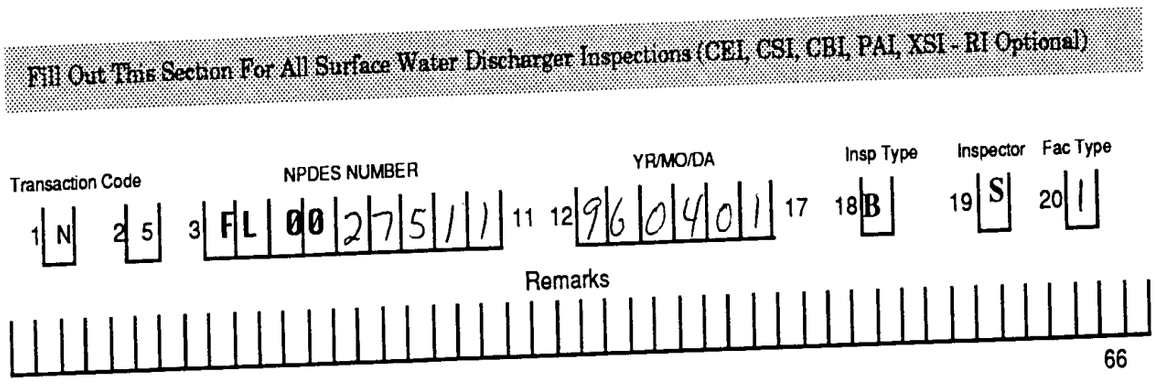
Tobin C. Rader
Tina Mikulski
Marshall Faircloth
Jennifer Sparapani
[illegible]
[illegible]
[illegible]
reviewer

form updated 5/05/95

Water Quality Parameters	Salt Water: Well Water / 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):		0.01	—	Andrea Grainger
Lab Total Residual Cl2 (mg/L):	<0.03 / —	<0.03	DF=100	JLS
Alkalinity (mg/L as $CaCO_3$):	120 / —	150	HACH	JLS
Hardness (mg/L as $CaCO_3$):	125 / —	130	HACH	JLS
Total ammonia (mg/L as N):	<0.017 / —	0.81	Orion	TM

Ammonia Meter #98136 Ammonia Meter Slope: -58.2 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

The Bioassay of the City of Arcadia WWTP effluent sampled on April 1, 1996, NPDES #FL0027511.



The Priority Pollutants Analysis for the Bioassay of the City of Arcadia WWTP effluent sampled on April 1, 1996, NPDES #FL0027511.

