

Bioassays of

Study Estates Mobile Home Park Wastewater Treatment Plant

Jacksonville, Duval County, Florida

NPDES #FL0043419

Sampled 7/29/96

September 1996

Biology Section
Division of Administrative and Technical Services
Comprehensive Quality Assurance Plan #870346G

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Study Estates Mobile Home Park Wastewater Treatment Plant

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Bureau of Laboratories
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Introduction

Study Estates Mobile Home Park WWTP, 8164 Old Kings Road, Jacksonville, Duval County, Florida, NPDES #FL0043419, tests performed on 30 July to 1 August, 1996.

This wastewater treatment plant has a design flow of 17,500 gallons per day and an average annual flow of 2,500 gallons per day. Wastewater receives secondary biological treatment via the activated sludge process. The treatment process includes chlorination for disinfection. Effluent is dechlorinated with sodium bisulfate tablets prior to discharge via a ditch to Nine Mile Creek (facility summary provided by Jon Dinges, 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 organisms used for these tests were the waterflea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*. The test results showed the sample to be acutely toxic to *Ceriodaphnia dubia*, producing 55% mortality in 48 hours. No mortality occurred in the *Cyprinella leedsi* test (Table 1).

Total residual chlorine and total ammonia were not detected in the sample. Further chemical analyses were performed on the sample and several metals and the pesticide, diazinon, were identified (Table 2). A diazinon concentration of 0.35 µg/L has been shown to be acutely toxic to *Ceriodaphnia dubia* (Anderson-Carnahan, Linda, USEPA, verbal communication), and diazinon concentrations as low as 0.2 µg/L have produced mortality in the waterflea, *Daphnia magna* (EPA *AQUIRE* toxicity database).

Conclusion

The sample of effluent collected from this facility on July 29, 1996, was acutely toxic to the waterflea, *Ceriodaphnia dubia*, but not to the bannerfin shiner, *Cyprinella leedsi*. We attribute a portion of the toxicity to the diazinon concentration of the sample and part to an unidentified constituent(s) of the sample.

Table 1. Data recorded during the 48-hour acute toxicity screening bioassays of a sample of effluent from the Study Estates WWTP, Jacksonville, Duval County, Florida, NPDES#FL0043419, performed on 30 July to August 1, 1996.

Facility:	**Study Estates Mobile Home Park WWTP**		NPDES #	FL0043419	Facility Type: **Wastewater**
Location:	Jacksonville		Contact/District:	T. McKelvey/Northeast	**Treatment Plant**
County:	Duval		Test type:	static acute screen	
Sample Collection Date:	7/29/96	Time: 1445	# tests:	2	Receiving Water: St. Johns River
Test Beginning Date:	7/30/96	Time: 1330	Chlorination Type:	chlorinated*	
Test Ending Date:	8/1/96	Time: 1400			**Page 1 of 1**

*Sample collected after dechlorination

Total Residual CL2	mg/L	Method
Field:	1.44	-
Lab:	<0.03	DR-100

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

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	130	130
20% Dilute Mineral Water (cladocerans):	80	90
100% Sample:	200	240

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	23.8	-	23.9	8.0	-	8.0	160	180
Control B	0/20	5	5	5	-	-	8.3	-	-	23.9	-	-	8.0	-	180
Control C	0/20	5	5	5	-	-	8.3	-	-	23.8	-	-	8.1	-	180
Control D	0/20	5	5	5	-	-	8.3	-	-	23.9	-	-	8.1	-	185
100% A	20/0	5	5	0	8.2	-	8.7	24.1	-	24.0	7.8	-	7.9	630	690
100% B	20/0	5	5	2	-	-	8.7	-	-	24.0	-	-	8.0	-	700
100% C	20/0	5	5	5	-	-	8.7	-	-	24.0	-	-	7.9	-	730
100% D	20/0	5	5	2	-	-	8.7	-	-	23.9	-	-	8.0	-	755

[A] Temperature of test incubator was continously recorded on a strip chart recorder.
Incubator temperature range for the test period was 24.4-25.0°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	24 hour
Control A	0/500	5	5	5	7.8	8.3	8.4	24.5	23.6	23.5	7.7	7.8	8.2	245	250
Control B	0/500	5	5	5	8.0	8.3	8.4	24.5	23.6	23.5	7.7	7.8	8.1	250	250
Control C	0/500	5	5	5	8.0	8.3	8.4	24.5	23.6	23.5	7.8	7.9	8.0	250	250
Control D	0/500	5	5	5	8.0	8.3	8.4	24.5	23.7	23.5	7.8	7.9	8.0	250	250
100% A	500/0	5	5	5	8.1	8.4	8.5	24.3	23.7	23.5	7.3	7.9	8.1	695	690
100% B	500/0	5	5	5	8.2	8.4	8.5	24.2	23.7	23.6	7.5	7.8	8.2	695	690
100% C	500/0	5	5	5	8.2	8.4	8.5	24.2	23.7	23.6	7.3	7.9	8.4	695	690
100% D	500/0	5	5	5	8.2	8.4	8.5	24.1	23.7	23.6	7.3	7.7	8.0	695	690

[B] Temperature of test room was continously recorded on a strip chart recorder.
Room temperature range for the test period was 21.0-24.0°C.

Table 2. Results of chemical analyses on the effluent from the Study Estates Mobile Home Park WWTP, sampled on July 29, 1996.

Metals

Aluminum	149	µg/L
Cadmium	0.1	µg/L[I]
Calcium	75	mg/L
Copper	5	µg/ L[I]
Iron	58	µg/L
Magnesium	12.3	mg/L
Zinc	32	µg/L

Base, Neutral, & Acid Extractable Organics

none detected

Pesticides and Herbicides

Diazinon	0.20	µg/L[I]

[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: Study Estates
County: Duval
Contact / District: Tim McKelvey / NE
NPDES Permit #: FL00 43419
LIMS Sample #: 147065 LIMS Job #: 96-JUL-30-12
sample log 8-2-96 MF

Sample Collection: Date 7/29/96 Time 1445
Test Beginning: Date 7/30/96 Time 1330
Test Ending: Date 8-1-96 Time 1400
Organism Batch #: 32 Diluent Batch #: 32
Organism Age: < 24 hours

Test Organism: C. 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	23.8 @ 23.9	8.3 @ 24.3 °C	101.5 ↔ @ 109.0 1006 ↔ @ 1008 @ 24.9 °C 9985 9880
24 hr	7.0 @ 7.0 9.0 @ 9.0	25.1 @ 25.1	8.2 @ 24.8 °C	102.7 @ 101.5 1011 @ 1006 @ 25.1 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.3 @ 24.4	8.4 @ 23.8 °C	103.4 @ 101.5 1004 @ 1006 @ 24.7 °C 9850 @ 9989

↔ standards first received 8/2/96 MF

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	24 h	48 h
Ctrl A	A	5	5	5	8.2		8.3	23.8		23.9	8.0		8.0	160		180
Ctrl B	B	5	5	5			8.3			23.9			8.0			180
Ctrl C	C	5	5	5			8.3			23.8			8.1			180
Ctrl D	D	5	5	5			8.3			23.9			8.1			185
100%	A	5	5	0	8.2		8.7	24.1		24.0	7.8		7.9	630		690
100%	B	5	5	2			8.7			24.0			8.0			700
100%	C	5	5	5			8.7			24.0			7.9			730
100%	D	5	5	2			8.7			23.9			8.0			755
Measured/Loaded by:		MF	TM	MF	DB		ND	DB		ND	DB		ND	DB		ND
Recorded by:		MF	TM	MF	LM		DN	LM		DN	LM		DN	LM		DN

Investigators' Signatures

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)			1.44	—	Ruth Bowman
Lab Total Residual Cl2 (mg/L)	—	<0.03	<0.03	DR-100	TM / DN
Alkalinity (mg/L as $CaCO_3$)	—	80	200	HACH	DN / DB
Hardness (mg/L as $CaCO_3$)	—	90	240	HACH	DN / DB
Total ammonia (mg/L as N)	—	<.017	<.017	Orion	LM / ND

Ammonia Meter #98136 Ammonia Meter Slope: -57.7 Ammonia Blank: <.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Study Estates
County: Duval
Contact / District: Tim McKelvey
NPDES Permit #: FL0043419
LIMS Sample #: 147065 LIMS Job #: 96-JUL-30-12
sample log 8-2-96 MF

Sample Collection: Date 7/29/96 Time 1445
Test Beginning: Date 7/30/96 Time 1400
Test Ending: Date 8-2-96 Time 1430
Organism Batch #: 56 Diluent Batch #: well
Organism Age: 11 days
Test Organism: Cyprinella leedsi

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

Test Number: 2 of 2

Remarks: B. 24 hour Conductivity Calibration 102.7 @ 101.5 1011 @ 1006 @ 25.1

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	23.8 @ 23.9	8.3 @ 24.3 °C	101.5 @ 107.0 ↔ 1006 @ 1008 @ 24.7 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	25.1 @ 25.1	8.2 @ 24.8 °C	102.7 @ 101.5 ↔ 9850 @ 9984 @ ___ °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.3 @ 24.4	8.4 @ 23.8 °C	103.4 @ 101.5 ↔ 1004 @ 1006 @ 24.7 °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	24 h	48 h
ctrl A	B17	5	5	5	7.8	8.3	8.4	24.5	23.6	23.5	7.7	7.8	8.2	245	250	250
ctrl B	B18	5	5	5	8.0	8.3	8.4	24.5	23.6	23.5	7.7	7.8	8.1	250	250	250
ctrl C	B19	5	5	5	8.0	8.3	8.4	24.5	23.6	23.5	7.8	7.9	8.0	250	240	250
ctrl D	B20	5	5	5	8.0	8.3	8.4	24.5	23.7	23.5	7.8	7.9	8.0	250	250	250
100% A	B21	5	5	5	8.1	8.4	8.5	24.3	23.7	23.5	7.3	7.9	8.1	Note	690	690
100% B	B22	5	5	5	8.2	8.4	8.5	24.2	23.7	23.6	7.5	7.8	8.2	695	685	690
100% C	B23	5	5	5	8.2	8.4	8.5	24.2	23.7	23.6	7.3	7.9	8.4	695	690	690
100% D	B24	5	5	5	8.2	8.4	8.5	24.1	23.8	23.6	7.3	7.7	8.0	695	690	690
Measured/Loaded by:		MF	TM	TM	DB	DN	DN	DB	DN	DN	DB	DN	DN	DB	DN	DN
Recorded by:		TM	DN	TM	LM	LM	ND	LM	LM	ND	LM	LM	ND	LM	LM	ND

3.1 wrong # ND

Note: 685 incorrect, 690 LM 7-30-96

690 LM 7-30-96

Investigators' Signatures: Donna Nicholson

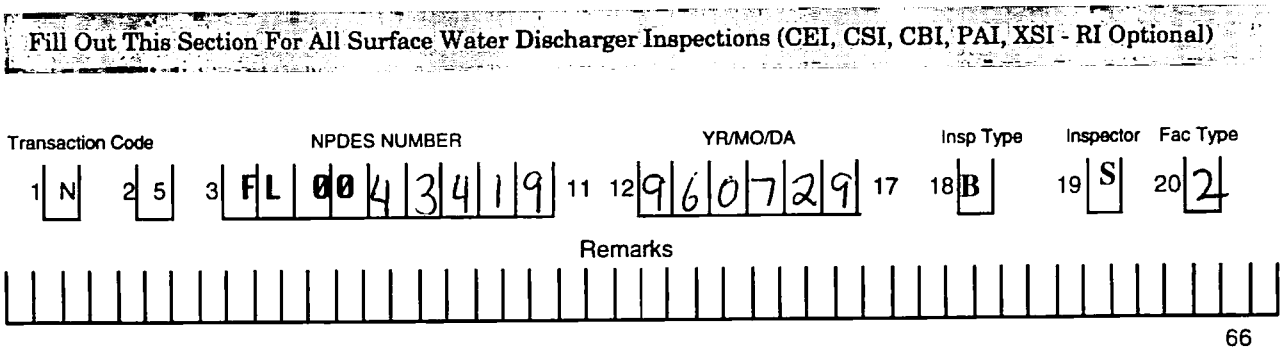
reviewer

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):			1.44	—	Ruth Bowman
Lab Total Residual Cl2 (mg/L):	<0.03	—	<0.03	DR-400	TM/DN
Alkalinity (mg/L as $CaCO_3$):	130	—	200	HACH	DN/DB
Hardness (mg/L as $CaCO_3$):	130	—	240	HACH	DN/DB
Total ammonia (mg/L as N):	<.017	—	<.017	Orion	LM/ND

Ammonia Meter #98136 Ammonia Meter Slope: -57.7 Ammonia Blank: <.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

The Bioassay of the Study Estates Mobile Home Park WWTP effluent sampled on July 29, 1996, NPDES #FL0043419.



The Priority Pollutants Analysis for the Bioassay of the Study Estates Mobile Home Park WWTP effluent sampled on July 29, 1996, NPDES #FL0043419.

