

Bioassays of

Arlington East Wastewater Treatment Facility

Jacksonville, Duval County, Florida

NPDES #FL0026441

Sampled 8/7/00

February 2001

Biology Section

Division of Resource Assessment & Management

Comprehensive Quality Assurance Plan #870346G

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Bureau of Laboratories
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Introduction

Arlington East WWTF, 1555 Millcoe Road, Jacksonville, Duval County, Florida, NPDES #FL0026441, tests performed on 8 to 10 August 2000.

This wastewater treatment facility has a design flow of 15.0 MGD. The plant is a complete-mix activated-sludge WWTF utilizing bar screens, an aerated grit chamber, primary clarification, secondary clarification, chlorination, and dechlorination. The treated wastewater is discharged into the Class III marine waters of the St. Johns River. Primary and secondary residuals are collected in a holding tank and pumped to the Buckman WWTF for incineration.

The facility has a circular mixing zone for total recoverable copper having a radius of 15 feet and a surface area of 707 sq. ft. at a flow of 15 MGD. The maximum allowable total recoverable copper concentration (single sample) in the effluent is 16.8 µg/L, according to the permit.

A four-disk Aqua Disk cloth filter system and a reuse system have been constructed at the facility. Neither had been used when the facility inspection was done (August 7, 2000). The reuse system is limited to 2.0 MGD (facility summary provided by Kathleen Gerard, 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 the Arlington East WWTF. The test species used for these bioassays were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*. The test results did not indicate toxicity to the *C. dubia* or the *C. leedsi* test organisms (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 a pesticide were identified. The silver concentration in the sample (0.068 µg/L) exceeded the State of Florida Class III Marine surface water quality standards for silver (0.05 µg/L) (Table 2).

Conclusion

The sample of effluent collected from this facility on August 7, 2000, did not show toxicity.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Arlington East WWTF, 1555 Millcoe Road, Jacksonville, Duval County, Florida, NPDES# FL0026441, performed on 8 to 10 August 2000.

Facility:	Arlington East WWTF			NPDES #	FL0026441	Facility Type:	Wastewater
Location:	1555 Millcoe Road			Contact/District:	Cordova/Banks/NE-Dist		Treatment Facility
County:	Jacksonville			Test type:	static acute screen		
Sample Collection Date:	8/7/00	Time:	1100	# tests:	2	Receiving Water:	St. John's River
Test Beginning Date:	8/8/00	Time:	1415	Chlorination Type:	Chlorinated		
Test Ending Date:	8/10/00	Time:	1335		sample taken after dechlorination		Page 1 of 1

Total Residual CL2	mg/L	Method
Field:	0.01	N/A
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):	131	132
20% Dilute Mineral Water (cladocerans):	66	75
100% Sample:	111	315

Salinity[C]	(ppt)
Control Water:	<1
100% Sample:	<1

[C] Salinity based on conductivity and temperature measurements.

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	8.0	-	8.1	25.0	-	24.6	7.8	-	7.7	155	200
Control B	0/20	5	5	5	-	-	8.2	-	-	24.3	-	-	7.7	-	180
Control C	0/20	5	5	5	-	-	8.2	-	-	24.2	-	-	7.8	-	185
Control D	0/20	5	5	5	-	-	8.2	-	-	24.2	-	-	7.8	-	200
100% A	20/0	5	5	5	7.1	-	8.4	25.1	-	24.5	6.6	-	7.7	1190	1320
100% B	20/0	5	5	5	-	-	8.4	-	-	24.4	-	-	7.7	-	1320
100% C	20/0	5	5	5	-	-	8.5	-	-	24.3	-	-	7.9	-	1335
100% D	20/0	5	5	5	-	-	8.5	-	-	24.3	-	-	7.9	-	1485

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 25.0-26.3°C.
Incubator #2 temperature range for the test period was 24.5-26.5°C.

Organism: *Cyprinella leedsi* 10 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	7.8	8.1	8.4	25.2	24.6	24.1	7.4	7.5	7.7	285	270
Control B	0/500	5	5	5	7.8	8.3	8.4	25.2	24.4	24.5	7.5	7.7	7.4	260	260
Control C	0/500	5	5	5	7.9	8.3	8.4	25.2	24.3	24.7	7.6	7.7	7.6	260	270
Control D	0/500	5	5	5	7.9	8.2	8.4	25.2	24.2	24.9	7.5	7.6	7.5	255	270
100% A	500/0	5	5	5	7.1	7.9	8.2	25.3	24.2	24.3	6.5	7.4	7.5	1240	1310
100% B	500/0	5	5	5	7.1	7.7	8.2	25.4	24.6	24.1	6.5	7.1	7.6	1240	1285
100% C	500/0	5	5	5	7.0	7.8	8.2	25.4	24.1	23.8	6.5	7.3	7.7	1280	1310
100% D	500/0	5	5	5	7.0	7.7	8.2	25.4	24.5	23.9	6.5	7.1	7.6	1265	1285

[B] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 25.0-26.3°C.
Incubator #3 temperature range for the test period was 25.0-26.0°C.

Table 2. Results of chemical analyses on the effluent from Arlington East WWTF sampled on August 7, 2000.

Metals

Cadmium	0.058	µg/L	[1]
Calcium	77.8	mg/L	
Copper	1.5	µg/L	[1]
Iron	36	µg/L	[1]
Lead	0.45	µg/L	[1]
Magnesium	33	mg/L	
Nickel	2.9	µg/L	[1]
Silver	0.068	µg/L	[1]
Zinc	21.1	µg/L	

Pesticides and Herbicides

Atrazine	0.088	µg/L	[1]

Base, Neutral, & Acid Extractable Organics

None detected

[1] 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: Arlington East
County: Duval
Contact / District: Ed Cordova / Lee Banks -- NE-DIST
NPDES Permit #: FL00 26441
LIMS Sample #: 471145 LIMS Job #: RH2000-08-08-01-01
sample log 8/14/00
Test Type: (Screening) | Definitive
Static | (Static Renewal) | Flow-through
Test Number: 1 of 2

Sample Collection: Date 8/7/00 Time 1100
Test Beginning: Date 8/8/00 Time 1415
Test Ending: Date 8/10/00 Time 1350
Organism Batch #: 42 Diluent Batch #: Dmw #2324 F.O. (66)
Organism Age: 24 hrs. SRT toxicant batch #: —
Test organism: C. dubia

Remarks:

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	8.0	~	8.1	25.0	~	24.6	7.8	~	7.7	155	~	200
B	B	5	5	5	—	—	8.2	—	—	24.3	—	~	7.7	—	—	180
C	C	5	5	5	—	—	8.2	—	—	24.2	—	—	7.8	—	—	185
D	D	5	5	5	—	—	8.2	—	—	24.2	—	—	7.8	—	—	200
100% A	A	5	5	5	7.1	—	8.4	25.1	—	24.5	6.6	—	7.7	1190	—	1320
B	B	5	5	5	—	—	8.4	—	—	24.4	—	—	7.7	—	—	1320
C	C	5	5	5	—	—	8.5	—	—	24.3	—	—	7.9	—	—	1335
D	D	5	5	5	—	—	8.5	—	—	24.3	—	—	7.9	—	—	~~1505~~ *1485 8/7/00 F.O. (SG)
measured by:		AW	[illegible]	YMK	DPH	—	YMK	DPH	—	YMK	DPH	[illegible]	YMK	DPH	—	YMK
recorded by:		DPH	[illegible]	SG	SG	—	SG	SG	—	SG	SG	[illegible]	SG	SG	—	SG

F.O. - further observation

Investigators' Signatures

Temperature Range °C
Incubator # 2 24.5-26.5°C
Room B246 25.0-26.3°C

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			0.01	NA	Chris Mason	SG
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR-100	AW	SG
Alkalinity (mg/L as $CaCO_3$):		(66) HT 66 W.P.	111	Hach	DPH/SG/YK	SG
Hardness (mg/L as $CaCO_3$):		75	315	Hach	DPH/SG/YK	SG
Total ammonia (mg/L as N):		<0.017	<0.017	Denver	DPH/SG	SG
Salinity:		0	0	YSI	DPH/YK	SG

reviewer

form updated 3/3/99

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Arlington East
County: Duval
Contact / District: Ed Cordova / Lee Banks / NE-DIST
NPDES Permit #: FL00 26441
LIMS Sample #: 471145 LIMS Job #: TH2000-08-08-01-01 (56)
sample log 8/14/00
Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Test Number: 2 of 2

Sample Collection: Date 8/7/00 Time 1100
Test Beginning: Date 8/8/00 Time 1415
Test Ending: Date 8/10/00 Time 1335
Organism Batch #: 61 Diluent Batch #: Well
Organism Age: 10 days SRT toxicant batch #: —
Test organism: C. tentans

Remarks:

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
CTRL A	G1	5	5	5	7.8	8.1	8.4	25.2	24.6	24.1	7.4	7.5	7.7	285	260	270
B	G2	5	5	5	7.8	8.3	8.4	25.2	24.4	24.5	7.5	7.7	7.4	260	260	260
C	G3	5	5	5	7.9	8.3	8.4	25.2	24.3	24.7	7.6	7.7	7.6	260	260	270
D	G4	5	5	5	7.9	8.2	8.4	25.2	24.2	24.9	7.5	7.6	7.5	255	265	270
100% A	G5	5	5	5	7.1	7.9	8.2	25.3	24.2	24.3	6.5	7.4	7.5	~~450~~	1230	1310
B	G6	5	5	5	7.1	7.7	8.2	25.4	24.6	24.1	6.5	7.1	7.6	1240	1280	1285
C	G7	5	5	5	7.0	7.8	8.2	25.4	24.1	23.8	6.5	7.3	7.7	1280	1290	1310
D	G8	5	5	5	7.0	7.7	8.2	25.4	24.5	23.9	6.5	7.1	7.6	1265	1280	1285
measured by:		YK	YK	MF	DPH	YMK	YMK	DPH	YMK	YMK	DPH	YMK	YMK	DPH	YMK	YMK
recorded by:		SG	YMK	MF	SG	SG	SG	SG	SG	SG	SG	SG	SG	SG	SG	SG

8/15 (56) 1240 FC

FC further observation

Investigators' Signatures

Temperature Range °C
Incubator # 3 25.0-26.0°C
Room D246 25.0-26.3°C

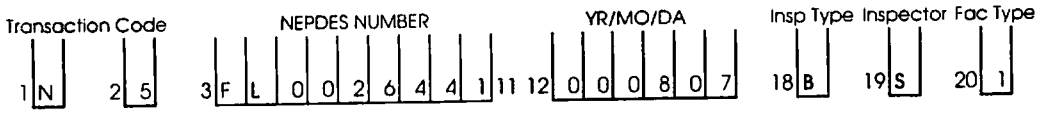
Water Quality Parameters	Salt Water: Well Water	Salt Water: 20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			0.01	NA	Chris Mason	SG
Lab Total Residual Cl2 (mg/L):	<0.03		<0.03	DR100	AW	SG
Alkalinity (mg/L as $CaCO_3$):	131		111	Hach	KL/SG DPH/YK	SG
Hardness (mg/L as $CaCO_3$):	132		315	Hach	KL/SG DPH/YK	SG
Total ammonia (mg/L as N):	<0.017		<0.017	Denver	DPH/SG	SG
Salinity:	0		0	Ysi	DPH/YK	SG

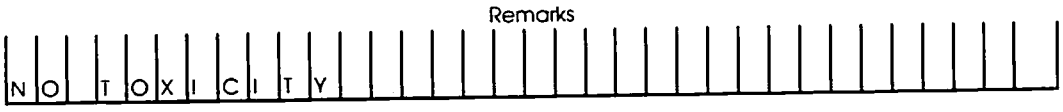
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form updated 3/3/99

The Bioassay of Arlington East WWTF effluent sampled on August 7, 2000, NPDES #FL0026441.

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

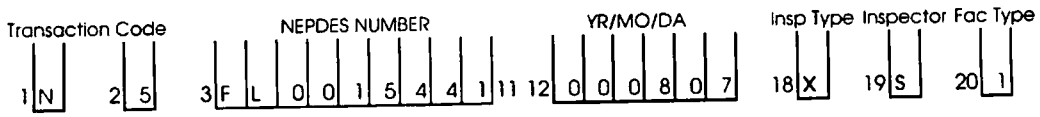


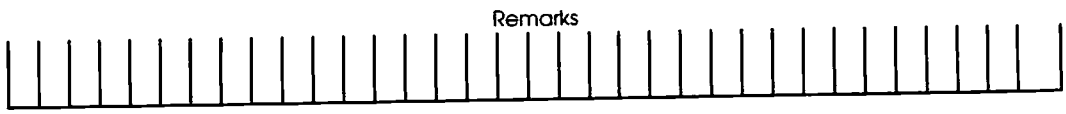


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The Priority Pollutants Analysis for Bioassay of Arlington East WWTF effluent sampled on August 7, 2000, NPDES #FL0026441.

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





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