

Bioassays of

Airport Motor Inn Wastewater Treatment Plant

Jacksonville, Duval County, Florida

NPDES #FL0032221

Sampled 12/7/98

March 1999

Biology Section

Division of Administrative & Technical Services

Comprehensive Quality Assurance Plan #870346G

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Bureau of Laboratories
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Introduction

Airport Motor Inn WWTP, 1500 Airport Road, Jacksonville, Duval County, Florida, NPDES #FL0032221, tests performed on 8 to 10 December, 1998.

This privately owned domestic wastewater treatment system has a design flow of 10,000 GPD and an annual average flow of 3,000 GPD. Wastewater is treated by extended aeration, chlorination for disinfection, and dechlorination with sodium sulfide tablets prior to being discharged into Little Cedar Creek. Sludge is removed by a private firm and is disposed of at the City of Jacksonville's Buckman Street WWTP Incinerator (facility summary provided by Jason Sparks, 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. Two additional bioassays were performed on an aliquot of sample that had been dechlorinated in the laboratory by the addition of 0.9 mL of 0.025 N 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*. The chlorinated sample proved toxic, producing 100% mortality in both test species within 24 hours. The dechlorinated test did not show toxicity (Table 1).

Total residual chlorine (TRC) of the 100% whole effluent sample was measured at 0.5 mg/L in the laboratory and 0.02 mg/L in the field. TRC of the dechlorinated aliquot of sample was < 0.03 mg/L. Total residual chlorine levels as low as 0.028 mg/L have been found to be acutely toxic to some freshwater fish and invertebrates (USEPA, 1986. Quality Criteria for Water. EPA 440/15-86-001). Total ammonia was not detected in the bioassay sample but was 0.063 mg/L in the sample that was submitted for chemical analyses. Further chemical analyses were performed on the sample and several metals were identified (Table 2).

Conclusion

The sample of effluent collected from this facility on December 7, 1998, showed toxicity to both test species, producing 100% mortality within 24-hours of test initiation. The dechlorinated aliquot of sample did not show toxicity to either test species. We attribute the toxicity of the sample to the total residual chlorine constituent of the sample.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Airport Motor Inn WWTP, Jacksonville, Duval County, Florida, NPDES Permit #FL0032221, performed on 8 to 10 December, 1998.

Facility:	Airport Motor Inn WWTP		NPDES #	FL0032221	Facility Type:	Wastewater Treatment Plant	
Location:	1500 Airport Road, Jacksonville		Contact/District:	Jason Sparks/Northeast			
County:	Duval		Test type:	static acute screen			
Sample Collection Date:	12/7/98	Time: 1112	# tests:	2	Receiving Water:	Little Cedar Creek	
Test Beginning Date:	12/8/98	Time: 1725	Chlorination Type:	Chlorinated			
Test Ending Date:	12/10/98	Time: 1630					Page 1 of 1

Total Residual CL2	mg/L	Method
100% sample Field:	0.02	-
100% sample Lab:	5.75	DR-100
Dechlorinated sample:	<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:	<0.017	<0.017

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	133	125
Control Water (20% DMW) (cladocerans):	85	86
100% Sample:	169	255

Salinity*	(ppt)
Control Water (fish):	0
Control Water (20% DMW) (cladocerans):	0
100% Sample:	<1

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	7.6	-	8.2	24.3	-	23.8	6.8	-	8.2	170	255
Control B	0/20	5	5	5	-	-	8.2	-	-	23.7	-	-	8.2	-	260
Control C	0/20	5	5	5	-	-	8.2	-	-	23.6	-	-	8.1	-	255
Control D	0/20	5	5	5	-	-	8.2	-	-	23.5	-	-	8.2	-	255
100% A	20/0	5	0	-	7.2	8.3	-	24.6	24.2	-	7.3	7.5	-	785	780[B]
100% B	20/0	5	0	-	-	8.4	-	-	23.8	-	-	7.5	-	-	790[B]
100% C	20/0	5	0	-	-	8.4	-	-	23.7	-	-	7.8	-	-	770[B]
100% D	20/0	5	0	-	-	8.4	-	-	23.6	-	-	7.8	-	-	765[B]
Decl100% A	20/0	5	5	5	7.2	-	8.3	24.7	-	23.6	7.2	-	8.1	825	910
Decl100% B	20/0	5	5	5	-	-	8.4	-	-	23.6	-	-	8.2	-	1010
Decl100% C	20/0	5	5	5	-	-	8.4	-	-	23.6	-	-	8.3	-	1010
Decl100% D	20/0	5	5	5	-	-	8.4	-	-	23.5	-	-	8.2	-	1030

Decl = Dechlorinated sample

[A] Temperature of test incubator # 1 and test room were continuously recorded on strip chart recorders. Incubator #1 temperature range for the test period was 23.4-24.4°C. Test room temperature range for the test period was 25.2-25.8°C.

*Salinity based on conductivity and temperature measurements.

[B] Twenty-four hour measurement.

Organism: *Cyprinella leedsi* Age: 12 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[C]			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	7.5	8.2	8.3	24.6	24.0	24.8	7.6	7.1	7.9	230	260
Control B	0/500	5	5	5	7.5	8.2	8.2	24.7	24.0	24.7	7.7	7.1	7.7	240	255
Control C	0/500	5	5	5	7.5	8.2	8.3	24.7	24.0	24.7	7.7	7.2	7.8	250	255
Control D	0/500	5	5	5	7.5	8.2	8.3	24.8	23.8	24.5	7.7	7.1	7.8	250	255
100% A	500/0	5	0	-	7.3	8.1	-	24.8	23.7	-	7.6	7.0	-	765	715[D]
100% B	500/0	5	0	-	7.3	8.2	-	24.7	23.8	-	7.6	7.0	-	795	795[D]
100% C	500/0	5	0	-	7.4	8.2	-	24.7	23.9	-	7.5	7.2	-	815	800[D]
100% D	500/0	5	0	-	7.4	8.2	-	24.8	23.9	-	7.5	7.4	-	820	800[D]
Decl 100% A	500/0	5	5	5	7.5	8.3	8.2	24.9	24.0	24.5	7.5	7.4	7.8	825	835
Decl 100% B	500/0	5	5	5	7.5	8.3	8.2	24.9	23.9	24.6	7.6	7.4	7.6	830	840
Decl 100% C	500/0	5	5	5	7.5	8.2	8.2	25.0	23.8	24.6	7.4	7.4	7.6	830	840
Decl 100% D	500/0	5	5	5	7.5	8.2	8.2	25.0	23.7	24.7	7.4	7.3	7.5	830	845

Decl = Dechlorinated sample

[C] Temperature of test incubator # 3 and test room were continuously recorded on strip chart recorders. Incubator #3 temperature range for the test period was 25.0-25.8°C. Test room temperature range for the test period was 25.2-25.8°C.

[D] Twenty-four hour measurement.

Table 2. Results of chemical analyses on the sample of effluent from the Airport Motor Inn WWTP sampled on December 7, 1998.

Metals

Calcium	58.2	mg/L
Copper	3.4	µg/L
Iron	51	µg/L[I]
Lead	0.35	µg/L[I]
Magnesium	24.5	mg/L
Zinc	27	µg/L

Base, Neutral, & Acid Extractable Organics

None Detected

Pesticides

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: Airport Motor Inn
County: Duval
Contact / District: Sparks / NED
NPDES Permit #: FL0032221
LIMS Sample #: 359298 LIMS Job #: TLH-1998-12-05-23
sample log 12/11/98 OW

Test Type: Screening / Definitive
Static / Static Renewal / Flow-through
Test Number: 1 of 2

Sample Collection: Date 12/7/98 Time 11:12
Test Beginning: Date 12/8/98 Time 17:25
Test Ending: Date 12/10/98 Time 1630
Organism Batch #: Mass Culture Diluent Batch #: 60
Organism Age: < 24 hr SRT toxicant batch #: —
Test organism: Ceriodaphnia dubia

Remarks: Aliquot of sample for dechlorinated Test was dechlorinated with 0.025N Sodium thiosulfate added at the rate of 0.9ml/L of sample.

Incubator #1 Temperature Range = (23.4-24.4)°C
Room temperature Range = (25.2-25.5)°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	Cond. 24 h	Cond. 48 h
Ctr	A	5	5	5	7.6		8.2	24.3		23.9	6.8		8.2	170		255
Ctr	B	5	5	5			8.2			23.7			8.2			260
Ctr	C	5	5	5			8.2			23.6			8.1			255
Ctr	D	5	5	5			8.2			23.5			8.2			255
100%	A	5	0	—	7.2	8.3		24.6	24.2		7.3	7.5		785	780	
100%	B	5	0	—		8.4			23.8			7.5			790	
100%	C	5	0	—		8.4			23.7			7.8			770	
100%	D	5	0	—		8.4			23.6			7.8			765	
DeCl 100%	A	5	5	5	7.2		8.3	24.7		23.6	7.2		8.1	825		910
DeCl 100%	B	5	5	5			8.4			23.6			8.2			1010
DeCl 100%	C	5	5	5			8.4			23.6			8.3			1010
DeCl 100%	D	5	5	5			8.4			23.5			8.2			1030
measured by:		DAW	DW	FW	FW	OW	DAW	FW	OW	DAW	FW	OW	DAW	FW	OW	DAW
recorded by:		OW	DW	FW	CH	OW	CH	CH	OW	CH	CH	OW	CH	CH	OW	CH

Investigators' Signatures

Courtney Head

(OW)

(DAW)

reviewer

form updated 5/22/98

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			0.02	—	Instrument Blank Check	MF
Lab Total Residual Cl2 (mg/L):		<0.03	0.60	DR-100	CH	MF
Alkalinity (mg/L as $CaCO_3$):		85	169	Hach	CH	MF
Hardness (mg/L as $CaCO_3$):		86	255	Hach	CH	MF
Total ammonia (mg/L as N):		<0.017	<0.017	Orion	MF	MF
Salinity:		0	<1	YCTmeter	DW/MF	MF

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Aliquot Main FNN
County: Duval
Contact / District: Sparks / NED
NPDES Permit #: FL0032221
LIMS Sample #: 359298 LIMS Job #: TLH-1998-12-08-23
sample log 12/11/98 ow

Sample Collection: Date 12/7/98 Time 11:12
Test Beginning: Date 12/8/98 Time 12:00
Test Ending: Date 12/10/98 Time 1445 / 1615
Organism Batch #: 94 Diluent Batch #: W-11
Organism Age: 12 days SRT toxicant batch #: —

Test organism: Cyprinella leedsi

Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Test Number: 2 of 2

Remarks: Aliquot of sample for dechlorinated test was dechlorinated with 0.025 N Sodium thiosulfate added at the rate of 0.9 mL/L of sample.

Incubator #3 Temperature Range = (25.0 - 25.8) °C
Room temperature range = (25.2 - 25.8) °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
CtlA	A17	5	5	5	7.5	8.2	8.3	24.6	24.0	24.8	7.6	7.1	7.9	230	240	260
Ctl B	A18	5	5	5	7.5	8.2	8.3	24.7	24.0	24.7	7.7	7.1	7.7	240	240	255
Ctl C	A19	5	5	5	7.5	8.2	8.3	24.7	24.0	24.7	7.7	7.2	7.8	250	245	255
Ctl D	A20	5	5	5	7.5	8.2	8.3	24.8	23.9	24.5	7.7	7.1	7.8	250	245	255
12.5% A	A21	5	0[50]	—	7.3	8.1	—	24.8	23.7	—	7.6	7.0	—	765	715	—
100% B	A22	5	0[50]	—	7.3	8.2	—	24.7	23.9	—	7.6	7.0	—	795	795	—
12.5% C	A23	5	0[50]	—	7.4	8.2	—	24.7	23.9	—	7.5	7.2	—	815	800	—
100% D	A24	5	0[50]	—	7.4	8.2	—	24.8	23.9	—	7.5	7.4	—	820	800	—
DCl 12.5% A	D21	5	5	5	7.5	8.3	8.2	24.9	24.0	24.5	7.5	7.4	7.8	825	770	885
DCl 12.5% B	D22	5	5	5	7.5	8.3	8.2	24.9	23.9	24.6	7.6	7.4	7.6	830	800	840
DCl 12.5% C	D23	5	5	5	7.5	8.2	8.2	25.0	23.8	24.6	7.4	7.4	7.6	830	810	840
DCl 100% D	D24	5	5	5	7.5	8.2	8.2	25.0	23.7	24.7	7.4	7.3	7.5	830	790	845
measured by:		DCW	FW	DAW	FW	CH	DAW	FW	CH	DAW	FW	CH	DAW	FW	CH	DAW
recorded by:		DW	FW	DAW	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH	CH

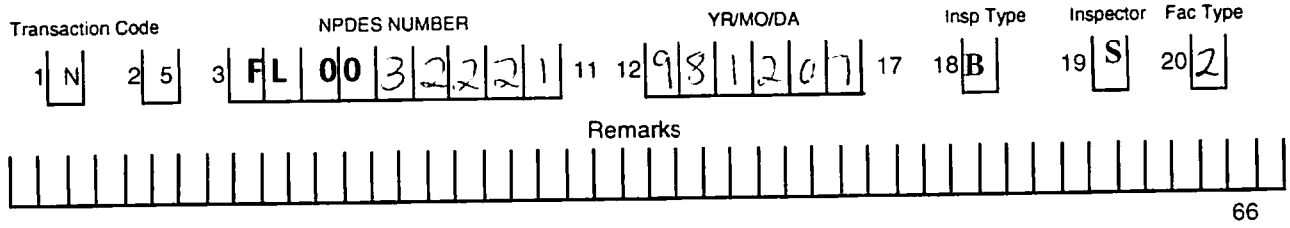
Investigators' Signatures
Courtney Head
(DCW)
Marshall Faircloth
(DAW)

Water Quality Parameters	Salt Water: Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			0.02	—	Jason Sparks / BH	MF
Lab Total Residual Cl2 (mg/L):	<0.03		0.50	DR-100	CH	MF
Alkalinity (mg/L as $CaCO_3$):	133		169	Hach	CH	MF
Hardness (mg/L as $CaCO_3$):	125		255	Hach	CH	MF
Total ammonia (mg/L as N):	<0.117		<0.117	Orion	MF	MF
Salinity:	0	0	<1	YCTemp	DW/MF	MF

reviewer form updated 5/22/98

The Bioassay of the Airport Motor Inn WWTP effluent sampled on December 7, 1998, NPDES #FL0032221.

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



The Priority Pollutants Analysis for Bioassay of the Airport Motor Inn WWTP effluent sampled on December 7, 1998, NPDES #FL0032221.

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

