

Bioassays of

Avondale Sewage Treatment Plant

Avondale, Escambia County, Florida

NPDES #FL0031801

Sampled 10/24/94

January 1995

Biology Section
Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan #870346G

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Avondale, Escambia County, Florida

NPDES #FL0031801

Biology Section
Bureau of Laboratories
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Introduction

Avondale STP, Pensacola, Escambia County, Florida, NPDES #FL0031801, tests performed on 25 to 27 October, 1994.

This facility is located west of the intersection of Blue Angel Parkway and Muldoon Road in Pensacola. The facility has a design capacity of 7.1 MGD. Treatment includes screening, biological BOD removal, nitrification, denitrification, clarification, filtration, disinfection by chlorination, and dechlorination prior to discharge. Effluent is discharged to Bayou Marcus Creek, then to Perdido Bay (facility summary provided by G. 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 with 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 indicated that the sample was toxic to the waterflea, producing 35% mortality in the 100% sample concentration. No deaths occurred in the fish test (Table 1).

Total residual chlorine of the sample was < 0.03 mg/L in the laboratory and in the field. Total ammonia was not detected in the sample. Further chemical analyses were performed on the sample and several metals were detected (Table 2). The zinc concentration in the sample (99 µg/L) exceeded the zinc concentration (95 µg/L) reported to be acutely toxic to *Ceriodaphnia dubia* (US EPA, *AQUIRE* data base, January 1995). Pesticides and organics were not detected.

Conclusion

The sample of effluent collected from this facility on 24 October, 1994, was toxic to the waterflea, *Ceriodaphnia dubia*, producing 35% mortality in the 100% sample test. The sample did not show toxicity to the fish, *Cyprinella leedsi*. We attribute at least part of the toxicity in the sample to the zinc concentration.

Table 2. Results of chemical analyses on the effluent from the Avondale Sewage Treatment Plant sampled on October 24, 1994.

Metals

Calcium	46.7	mg/L
Copper	2	µg/L [I]
Iron	40	µg/L
Magnesium	2.22	mg/L
Nickel	2	µg/L [I]
Zinc	99	µg/L

Pesticides and Herbicides

none detected

Base-Neutral & Acid Extractables

none detected

[I] Value reported is less than the minimum quantitation limit and greater than or equal to the minimum detection limit.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Avondale Sewage Treatment Plant, Pensacola, Escambia County, Florida, NPDES# FL0031801, performed on 25 to 27 October, 1994.

Facility:	**Avondale Sewage Treatment plant**			**NPDES #**	**FL0031801**	Facility Type:	**Sewage Treatment Plant**
Location:	Pensacola			Contact/District:	G. Butts/NW		
County:	Escambia			Test type:	static acute screen		
Sample Collection Date:	**10/24/94**	Time:	1020	# tests:	2	Receiving Water:	Marcus Creek
Test Beginning Date:	10/25/94	Time:	1530	Chlorination Type:	**Sample collected after dechlorination**		
Test Ending Date:	10/27/94	Time:	1530			**Page 1 of 1**	

Organism: ***Ceriodaphnia dubia*** Life stage: < 24 hours old

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature			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	4	8.2	-	8.2	23.7	-	23.4	8.0	-	8.0	165	175
Control B	0/20	5	5	5	-	-	8.3	-	-	23.4	-	-	8.0	-	180
Control C	0/20	5	5	5	-	-	8.3	-	-	23.4	-	-	8.1	-	180
Control D	0/20	5	5	5	-	-	8.3	-	-	23.3	-	-	8.1	-	185
100% A	20/0	5	4	2	7.7	-	8.4	23.6	-	23.5	7.6	-	7.9	455	460
100% B	20/0	5	5	4	-	-	8.4	-	-	23.5	-	-	8.0	-	470
100% C	20/0	5	5	5	-	-	8.4	-	-	23.4	-	-	8.0	-	475
100% D	20/0	5	5	2	-	-	8.4	-	-	23.4	-	-	8.1	-	470

Organism: ***Cyprinella leedsi*** Age: 11 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature			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	7.9	8.2	8.4	23.7	23.8	23.3	8.2	8.5	8.2	250	255
Control B	0/500	5	5	5	7.9	8.2	8.4	-	-	23.2	8.1	8.5	8.2	250	250
Control C	0/500	5	5	5	7.9	8.2	8.4	-	-	23.2	8.1	8.5	8.3	250	250
Control D	0/500	5	5	5	7.9	8.2	8.4	-	-	23.2	8.2	8.5	8.3	250	250
100% A	500/0	5	5	5	7.5	7.9	8.2	24.4	23.8	23.3	6.7	8.4	8.1	475	475
100% B	500/0	5	5	5	7.5	7.9	8.2	-	-	23.2	6.7	8.3	8.0	475	470
100% C	500/0	5	5	5	7.5	7.9	8.2	-	-	23.3	6.7	8.3	7.9	475	470
100% D	500/0	5	5	5	7.5	7.9	8.2	-	-	23.3	6.7	8.2	7.9	475	470

Total Residual CL2	mg/L	Method
Field:	<0.001	-
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:	<0.017	<0.017

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	125	125
20% Dilute Mineral Water (cladocerans):	75	80
100% Sample:	105	130

Salinity	(ppt)
Control Water:	0
100% Sample:	0

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Avondale
County: Escambia
Contact / District: Glenn Butts / Northwest
NPDES Permit #: FL0031801
LIMS Sample #: 92381 LIMS Job #: 94-OCT-25-15

Sample Collection: Date 10/24/94 Time 1020
Test Beginning: Date 10/25/94 Time 1530
Test Ending: Date 10/27/94 Time 1530
Organism Batch #: 41 Diluent Batch #: 41
Organism Age: <24 hrs old
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	21.5 @ 21.6	8.4 @ 23.6 °C	100.7 @ 98.6 1024 @ 1047 @ 23.5 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.1 @ 24.3	8.4 @ 23.7 °C	103.3 @ 98.6 1043 @ 1047 @ 24.2 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.1 @ 23.1	8.3 @ 24.2 °C	1037 @ 23.9 (MF) 1047 109.4 @ 100.6 @ 23.9 °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
Control	A	5	5	4	8.2		8.2	23.7		23.4	8.0		8.0	165		175
Control	B	5	5	5			8.3			23.4			8.0			180
Control	C	5	5	5			8.3			23.4			8.1			180
Control	D	5	5	5			8.3			23.3			8.1			185
100%	A	5	4	2	7.7		8.4	23.6		23.5	7.6		7.9	455		460
100%	B	5	5	4			8.4			23.5			8.0			470
100%	C	5	5	5			8.4			23.4			8.0			475
100%	D	5	5	2			8.4			23.4			8.1			470
Recorded by:		TM	TM	MF	J&S		MF	J&S		DW	J&S		DW	J&S		DW
Measured/Loaded by:		TM	TM	MF	TM		DW	TM		ME	TM		MF	TM		MF

Investigators' Signatures

Tina M. Kubsh
Jennifer Sparacino
Marshall Faircloth
Reviewer

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			<0.001	—	GB
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	<0.03	DR-100	TM
Alkalinity (mg/L as $CaCO_3$):	125	75	105	HACH	J&S
Hardness (mg/L as $CaCO_3$):	125	80	130	HACH	J&S
Total ammonia (mg/L as N):	<0.017	<0.017	<0.017	Orion	TM

Ammonia Meter #98136 Meter Slope: -57.2 Ammonia Blank: <0.017 Ammonia Control Salinity: ◯ ppt Sample Salinity: ◯ ppt

form updated 10/05/94

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Avondale
County: Escambia
Contact / District: Glenn Batts / Northwest
NPDES Permit #: FL0031801
LIMS Sample #: 92381 LIMS Job #: 94-Oct-25-15

Sample Collection: Date 10/24/94 Time 1020
Test Beginning: Date 10/25/94 Time 1530
Test Ending: Date 10/27/94 Time 1530
Organism Batch #: 43 Diluent Batch #: well
Organism Age: 11 days Old
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	21.5 @ 21.6	8.4 @ 23.6 °C	100.7 @ 98.6
	9.0 @ 9.0			1024 @ 1047 @ 23.5 °C
24 hr	7.0 @ 7.0	24.1 @ 24.3	8.4 @ 23.7 °C	1033 @ 98.6
	9.0 @ 9.0			1043 @ 1047 @ 24.2 °C
48 hr	7.0 @ 7.0	23.1 @ 23.1	8.3 @ 24.2 °C	1037 @ 1047
	9.0 @ 9.0			109.4 @ 102.6 @ 23.9 °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
Control A	287	5	5	5	7.9	8.2	8.4	23.7	23.8	23.3	8.2	8.5	8.2	250	255	255
Control B	114	5	5	5	7.9	8.2	8.4			23.2	8.1	8.5	8.2	250	250	250
Control C	28	5	5	5	7.9	8.2	8.4			23.2	8.1	8.5	8.3	250	250	250
Control D	27	5	5	5	7.9	8.2	8.4			23.2	8.2	8.5	8.3	250	250	250
100% A	11	5	5	5	7.5	7.9	8.2	24.4	23.8	23.3	6.7	8.4	8.1	475	475	475
100% B	43	5	5	5	7.5	7.9	8.2			23.2	6.7	8.3	8.0	475	475	470
100% C	19	5	5	5	7.5	7.9	8.2			23.3	6.7	8.3	7.9	475	475	470
100% D	198	5	5	5	7.5	7.9	8.2			23.3	6.7	8.2	7.9	475	475	470
Recorded by:		TM	TM	MF	JAS	MF	DW	JAS	MF	DW	JAS	MF	DW	JAS	MF	DW
Measured/Loaded by:		TR	TM	MF	TM	TM	MF	TM	TM	MF	TM	TM	MF	TM	TM	MF

Investigators' Signatures

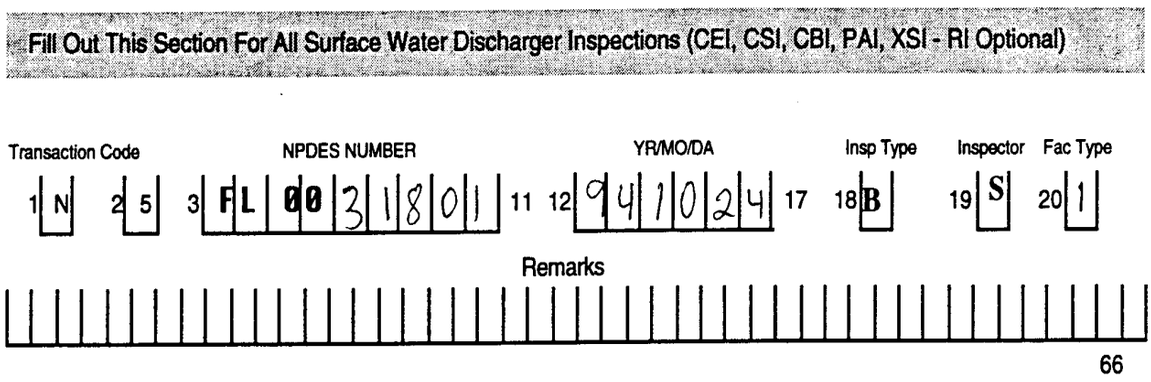
Tina M. Kuklahs
Jennifer Sparacino
Randall Faircloth
Reviewer

form updated 10/05/94

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			<0.001	—	GB
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	<0.03	DR-100	TM
Alkalinity (mg/L as $CaCO_3$):	125	75	105	HACH	JAS
Hardness (mg/L as $CaCO_3$):	125	80	130	HACH	JAS
Total ammonia (mg/L as N):	<0.017	<0.017	<0.017	Orion	TM

Ammonia Meter #98136 Ammonia Meter Slope: -57.2 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

The Bioassay of the Avondale STP effluent sampled on October 24, 1994, NPDES #FL0031801.



The Priority Pollutants Analysis for the Bioassay of the Avondale STP effluent sampled on October 24, 1994, NPDES #FL0031801.

