Florida

Department of Environmental Protection

Bioassays of

St. Andrews Wastewater Treatment Plant

Panama City, Bay County, Florida

NPDES #FL0020451

Sampled 9/27/93

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December 1993

Biology Section
Division of Technical Services

Bioassays of

St. Andrews Wastewater Treatment Plant

Panama City, Bay County, Florida

NPDES #FL0020451

Biology Section
Bureau of Laboratories
December 1993

Introduction

St. Andrews WWTP, Panama City, Bay County, Florida, NDPES #FL0020451, tests performed on 28 to 30 September, 1993.

This facility is located at 3501 West 23rd Street in Panama City and has a design flow of 5 MGD. It utilizes advanced wastewater treatment by the Bardenpho process to treat an average flow of 2.58 MGD which is discharged to St. Andrew Bay. The plant received a warning notice in January, 1993, due to a recurring toxicity problem which seems to have been addressed. Prior inspections noted permit violations which included excursions from the minimum/maximum chlorine residuals from November, 1992, to August, 1993 (NPDES file and facility summary prepared by Dawn Gorres, DEP NW District).

The toxicity tests discussed in this report were performed in accordance with methods described by Weber, 1991, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, 4th Edition (EPA/600/4-90/027).

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* (formerly *Notropis leedsi*). The test results did not indicate toxicity.

Total residual chlorine was < 0.03 mg/L in the laboratory and 0.5 mg/L in the field. Total ammonia was not detected. Further chemical analyses were performed on the sample and several metals were present (Table 2). Pesticides and organics were not detected.

Conclusion

The sample of effluent collected from this facility on 27 September, 1993, did not show toxicity.

Table 1. Concentration series and volumes used for the 48-hour static acute screening toxicity bioassays of the St. Andrews WWTP effluent performed on 28 to 30 September, 1993.

Ceriodaphnia dubia (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	20 mL	0 mL	20 mL
100 %	0 mL	20 mL	20 mL

Cyprinella leedsi (bannerfin shiner, formerly *Notropis leedsi*)

Concentration	Dilution Water	Sample	Total Volume
Control	500 mL	0 mL	500 mL
100 %	0 mL	500 mL	500 mL

Table 2. Results of chemical analyses on the effluent from St. Andrews WWTP, sampled on 27 September, 1993.

Metals

Aluminum	177	µg/L [I]
Calcium	34.1	mg/L [I]
Iron	109	µg/L
Magnesium	24.1	mg/L
Zinc	21	µg/L [J]

Pesticides & Herbicides

None Detected

Base-Neutral & Acid Extractables

None Detected

[I] Value reported is between the laboratory method detection limit and the laboratory practical quantitation limit.
[J] Value reported is the estimated value.

Table 3. Data recorded during the 48-hour static acute screening bioassays of a sample of effluent from the St. Andrews WWTP, Panama City, Bay County, Florida, NPDES# FL0020451, performed on 28 to 30 September, 1993

Facility:	**St. Andrews WWTP**		**NPDES #**	**FL0020451**	Facility Type: **WWTP**
Location:	Panama City		Contact/District:	Glenn Butts/C	
County:	Bay		Test type:	static acute screen	
Sample Collection Date:	**9/27/93**	Time: 1045	# tests:	2	Receiving Water: St. Andrew Bay
Test Beginning Date:	9/28/93	Time: 1300	Chlorination Type:	**Sample collected**	
Test Ending Date:	9/30/93	Time: 1300		**after dechlorination**	**Page 1 of 1**

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

	SURVIVAL			pH			Temperature			Dissolved Oxygen			Conductivity	
Concentrations	# at 0 hr	Live at 24 hr	Live at 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	5	5	5	8.2	-	8.1	23.5	-	23.8	8.1	-	8.2	160	160
Control	5	5	5	-	-	8.2	-	-	23.8	-	-	7.9	-	165
Control	5	5	5	-	-	8.2	-	-	23.9	-	-	7.9	-	165
Control	5	5	5	-	-	8.2	-	-	24.0	-	-	7.9	-	165
100%	5	5	5	7.5	-	8.1	24.2	-	23.9	8.1	-	8.0	1290	1340
100%	5	5	5	-	-	8.2	-	-	24.0	-	-	7.9	-	1360
100%	5	5	5	-	-	8.2	-	-	23.9	-	-	7.9	-	1355
100%	5	5	5	-	-	8.2	-	-	24.0	-	-	7.8	-	1380

Organism: ***Cyprinella leedsi*** Age: 10 days

	SURVIVAL			pH			Temperature			Dissolved Oxygen			Conductivity	
Concentrations	# at 0 hr	Live at 24 hr	Live at 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	5	5	5	7.8	8.1	8.2	23.5	23.5	23.4	8.0	8.1	7.8	240	245
Control	5	5	5	7.8	8.1	8.2	-	-	23.4	8.0	8.0	7.8	240	245
100%	5	5	5	7.5	7.8	7.9	25.0	23.5	23.3	7.8	7.9	7.7	1535	1475
100%	5	5	5	7.5	7.8	7.9	-	-	23.3	7.8	7.9	7.7	1540	1485

Total Residual Cl2	mg/L	Method
Field:	0.50	-
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	0.00

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	120	120
20% Dilute Mineral Water (cladocerans):	70	75
100% Sample:	85	180

Salinity	(ppt) *
Control Water:	0
100% Sample:	1

* Salinity converted from conductivity readings (µmhos/cm).

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: St. Andrews STP
Location:
County: BAY
Contact/District: GLENN BUTTS NW
NPDES Permit #: FL0020451 **Outfall #:**

Sample Collection: Date 9-27-93 Time 1045
Test Beginning: Date 9-28-93 Time 1300
Test Ending: Date 9-30-93 Time 1300
Organism Batch #: 111 **Diluent Batch #:** 25
Organism Age: <24 hrs
Test Organism: Ceriodaphnia dubia

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

Test Number: 1 of 2

Remarks: 62748
93SEP-28-12

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	24.1 @ 24.2	8.3 @ 24.4	1006 @ 1,000 9660 @ 10,000 @ 24.2 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.2 @ 24.3	8.4 @ 24.1	1000 @ 1,000 9600 @ 10,000 @ 24.1 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.9	8.3 @ 23.8	1000 @ 1,000 9600 @ 10,000 @ 24.0 °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	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 48 h
Control	A	5	5	5	8.2		8.1	23.5		23.8	~~7.8~~		8.2	160		160
Control	B	5	5	5			8.2			23.8	8.1		7.9			165
Control	C	5	5	5			8.2			23.9			7.9			165
Control	D	5	5	5			8.2			24.0			7.9			165
100%	A	5	5	5	7.5		8.1	24.2		23.9	~~7.4~~		8.0	1290		1340
100%	B	5	5	5			8.2			24.0	8.1		7.9			1360
100%	C	5	5	5			8.2			23.9			7.9			1355
100%	D	5	5	5			8.2			24.0			7.8			1380
Measured/Loaded by:		TR	TM	TM	TM		TM	TM		TM	TM		TM	TM		TM
Recorded by:		TR	TM	TM	TR		TR	TR		TM	TR		TM	TR		TR

* changed DO. membrane 9/28/93 TM

Investigators' Signatures
Tobin C. Rader
Tina Mikulski
Kim Pearce

Reviewer

	Salt Water/ Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0.5	—	GB
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-100	TM
Alkalinity:	120	70	85	Hach	TM
Hardness:	120	75	180	Hach	TM
Total Ammonia:	<0.017	<0.017	<0.017	Orion	SNW

Ammonia Meter #98136 Ammonia Meter Slope: -56.9 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: / ppt

form updated 7/8/93

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: St. Andrews STP
Location:
County: BAY
Contact/District: GLENN BUTTS NW
NPDES Permit #: FL0020451 **Outfall #:**

Sample Collection: Date 9-27-93 Time 1045
Test Beginning: Date 9-28-93 Time 1300
Test Ending: Date 9-30-93 Time 1300
Organism Batch #: 40 **Diluent Batch #:** Well
Organism Age: 10 days
Test Organism: Cyprinella leedsi

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

Test Number: 2 of 2

Remarks: 627748
93-SEP-28-12

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	24.1 @ 24.2	8.3 @ 24.4	1006 @ 1,000 9660 @ 10,000 @ 24.2 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.2 @ 24.3	8.4 @ 24.1	1000 @ 1,000 9600 @ 10,000 @ 24.1 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.9	8.3 @ 23.8	1000 @ 1,000 9600 @ 10,000 @ 24.0 °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	15	5	5	5	7.8	8.1	8.2	23.5	23.5	23.4	~~9.9~~	8.1	7.8	240	245	245
Control B	28	5	5	5	7.8	8.1	8.2			23.4	~~9.9~~	8.0	7.8	240	245	245
100% A	120	5	5	5	7.5	7.8	7.9	25.0	23.5	23.3	~~9.6~~	7.9	7.7	1535	1475	1475
100% B	65	5	5	5	7.5	7.8	7.9			23.3	~~9.6~~	7.9	7.7	1540	1475	1485
											8.0					
											8.0					
											7.8					
											7.8					
											TM					
											*changed					
											D.O. membrane					
											9/28/93					
Measured/Loaded by:		TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM	TM
Recorded by:		TR	TM	TM	TR	KP	TR	TR	KP	TR	TR	KP	TR	TR	KP	TR

Investigators' Signatures

Robin G. Rader
Tina Mikulski
Kim Pearce

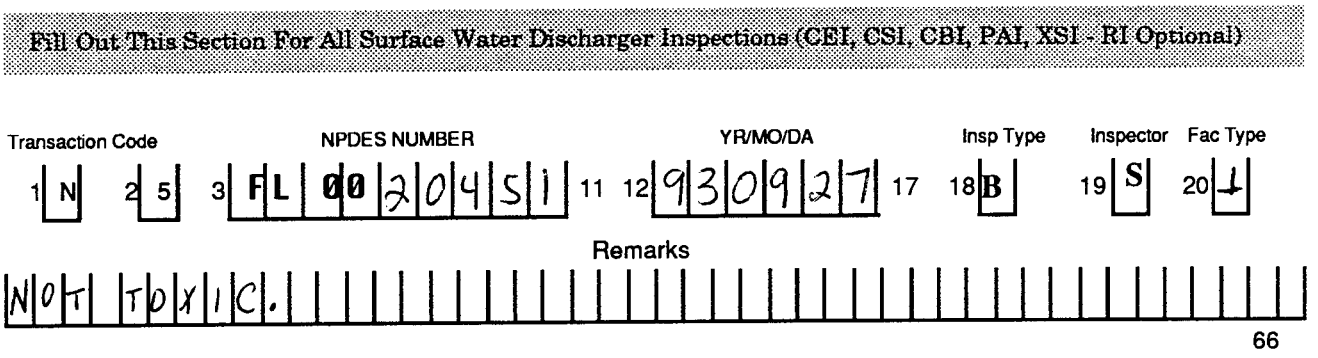
Reviewer

form updated 7/8/93

	Salt Water/ Well Water	20% Min Water	Sample	Method	Measured by
	Water Quality Parameters				
Field Total Residual Cl2:			0.5	—	GB
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-700	TM
Alkalinity:	120	70	85	Hach	TM
Hardness:	120	75	180	Hach	TM
Total Ammonia:	<0.017	<0.017	<0.017	ORION	SHW

Ammonia Meter #98136 Ammonia Meter Slope: -56.9 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 1 ppt

The Bioassay of the St. Andrews WWTP effluent sampled on September 27, 1993, NPDES# FL0020451.



The Priority Pollutants Analysis for the Bioassay of the St. Andrews WWTP effluent sampled on September 27, 1993, NPDES# FL0020451.

