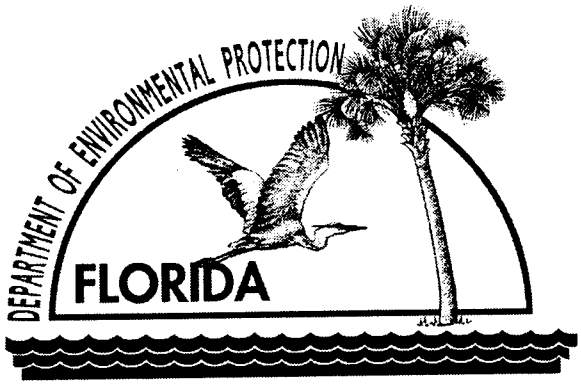


Bioassays of

Jacksonville Electric Authority
Northside Generating Station
Wastewater Treatment Plant

Jacksonville, Duval County, Florida

NPDES #FL0001031

Sampled 1/27/97

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May 1997

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

Bioassays of

Jacksonville Electric Authority
Northside Generating Station
Wastewater Treatment Plant

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NPDES #FL0001031

Biology Section
Bureau of Laboratories
May 1997

Introduction

Jacksonville Electric Authority Northside Generating Station WWTP, 4377 Heckscher Drive, Jacksonville, Duval County, Florida, NPDES #FL0001031, tests performed on 28 to 30 January, 1997.

This electric power generating plant has a wastewater treatment facility which is permitted as a 0.005 MGD extended-aeration plant with aeration basin, secondary clarifier, and chlorination. Discharge from the treatment system goes to a 1,600 gallon wet-well (holding tank). Effluent from the wet-well is mixed with industrial-waste cooling water and then discharged into the St. Johns River. The average annual flow of industrial-waste cooling water was 372 MGD (12/95 to 12/96). The bioassay sample was collected at the industrial wastewater outfall 001; therefore, the primary component of the sample was industrial-waste cooling water (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 this facility. The salinity of the sample was approximately 23.4 ppt, therefore, the test species used for these bioassays were the inland silverside minnow, *Menidia beryllina*, and the mysid shrimp, *Americamysis bahia*. To accommodate the salinity requirements of 1-32 ppt for *Menidia beryllina* and of 5-30 ppt for *Americamysis bahia*, the control water was adjusted to a salinity of 23.4 ppt using 40 Fathoms® artificial sea salts and deionized water to match the apparent salinity of the effluent as collected. The salinity of the effluent was not adjusted. The test results did not indicate toxicity (Table 1).

The total residual chlorine of the sample was not measured in the field and was < 0.03 mg/L in the laboratory. Total ammonia was not detected in the sample. Further chemical analyses were performed on the sample and several metals and the organic compound, diethyl phthalate, were identified (Table 2). The copper concentration (15 µg/L) exceeded the State of Florida Class III marine surface water criteria of ≤2.9 µg/L for copper (FAC 62-302.530).

Conclusion

The sample of effluent collected from this facility on January 27, 1997, did not show toxicity.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent (mixed with industrial-waste cooling water) from the Jacksonville Electric Authority Northside Generating Plant WWTP, Jacksonville, Duval County, Florida, NPDES# FL0001031, performed on 28 to 30 January, 1997.

Facility:	Jacksonville Electric Authority Northside Generating Station WWTP		NPDES #	FL0001031	Facility Type:	Power Plant/Wastewater Treatment Plant	
Location:	4377 Heckscher Drive, Jacksonville		Contact/District:	Tim McKelvey/Northeast			
County:	Duval		Test type:	static acute screen			
Sample Collection Date:	1/27/97	Time: 1115	# tests:	2	Receiving Water:	St. Johns River	
Test Beginning Date:	1/28/97	Time: 1530	Chlorination Type:	chlorinated			
Test Ending Date:	1/30/97	Time: 1530					Page 1 of 1

Total Residual CL2	mg/L	Method
Field:	not measured	
Lab:	<0.03	DR-100

Ammonia	Total (mg/L)	Unionized (mg/L)
Control Water:	<0.017	<0.017
100% Sample:	<0.017	<0.017

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water:	175	-
100% Sample:	110	-

Salinity	(ppt)
Control Water:	23.4
100% Sample:	23.4

Organism: ***Americamysis bahia*** Age: 3 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[A]			Dissolved Oxygen			Conductivity Uncorrected mmhos/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	8.4	8.3	8.3	24.1	23.7	23.6	7.1	7.0	8.1	36.3	36.3
Control B	0/20	5	5	5	8.4	8.3	8.3	24.1	23.7	23.5	7.1	7.0	8.0	36.3	36.5
Control C	0/20	5	5	5	8.4	8.3	8.3	24.0	23.7	23.5	7.1	6.9	8.0	36.3	36.5
Control D	0/20	5	5	5	8.4	8.3	8.3	24.0	23.8	23.5	7.1	6.9	8.0	36.3	36.6
100% A	20/0	5	5	5	8.1	8.0	8.0	23.6	23.7	23.5	7.4	6.7	8.1	36.8	37.5
100% B	20/0	5	5	5	8.1	8.0	8.0	23.4	23.6	23.5	7.4	6.8	8.1	36.7	37.3
100% C	20/0	5	5	5	8.1	8.0	8.0	22.3	23.6	23.5	7.6	6.8	8.1	36.6	37.3
100% D	20/0	5	5	5	8.1	8.0	8.0	22.3	23.8	23.6	7.6	638.0	8.1	36.6	37.4

[B] Temperature of test room was continously recorded on a strip chart recorder.
Room temperature range for the test period was 23-24°C.

Organism: ***Menidia beryllina*** Age: 13 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[B]			Dissolved Oxygen			Conductivity Uncorrected mmhos/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	8.4	8.3	8.3	24.1	23.6	23.6	7.1	7.0	6.9	36.3	36.5
Control B	0/500	5	5	5	8.4	8.3	8.3	24.1	23.6	23.5	7.1	6.9	6.9	36.3	36.4
Control C	0/500	5	5	5	8.4	8.3	8.3	24.1	23.6	23.5	7.1	6.9	7.0	36.3	36.4
Control D	0/500	5	5	5	8.4	8.3	8.3	24.1	23.7	23.5	7.1	6.9	6.9	36.4	36.5
100% A	500/0	5	5	5	8.1	8.1	8.1	23.3	23.7	23.7	7.6	7.0	7.1	36.6	37.6
100% B	500/0	5	5	5	8.1	8.1	8.1	23.3	23.6	23.6	7.6	7.0	7.0	36.6	37.5
100% C	500/0	5	5	5	8.1	8.1	8.1	23.3	23.7	23.7	7.6	7.0	7.1	36.6	37.5
100% D	500/0	5	5	5	8.1	8.1	8.1	23.3	23.8	23.7	7.6	7.0	7.1	36.7	37.6

[B] Temperature of test room was continously recorded on a strip chart recorder.
Room temperature range for the test period was 23-24°C.

Table 2. Results of chemical analyses on the effluent from the Jacksonville Electric Authority Northside Generating Station (outfall 001) sampled on January 27, 1997.

Metals

Aluminum	220 µg/L
Calcium	312 mg/L
Copper	15 µg/L
Iron	300 µg/L
Magnesium	909 mg/L

Pesticides and Herbicides

none detected

Base, Neutral, & Acid Extractable Organics

Diethyl phthalate	1.8 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: JEA
County: Duval
Contact / District: Tim McKelvey / Northeast
NPDES Permit #: FL0001031
LIMS Sample #: 166346 **LIMS Job #:** 97-JAN-28-05
sample log: 1-30-97

Sample Collection: Date 1/27/97 Time 1115
Test Beginning: Date 1/28/97 Time 1530
Test Ending: Date 1-30-97 Time 1530
Organism Batch #: 25 **Diluent Batch #:** 1
Organism Age: 3 days
Test Organism: Americamysis bahia

Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Temperature range: room 24.0°C-25.0°C
incubator NA
Test Number: 1 of 2
Remarks: D = dead, M = missing

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	24.4 @ 24.4	8.1 @ 25.5 °C	103.6 @ 101.8 1009 @ 1001 @ 25.5 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.6 @ 24.6	8.3 @ 24.8 °C	93300 @ 94971 101.8 @ 101.8 995 @ 1001 @ 24.6 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.3 @ 23.3	8.2 @ 24.9 °C	91900 @ 94971 996 @ 1001 91300 @ 94971 @ 24.8 °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
Ctr A	A1	5	5	5	8.4	8.3	8.3	24.1	23.7	23.6	7.1	7.0	6.7	36.3	36.4	36.3
Ctr B	A2	5	5	5	8.4	8.3	8.3	24.1	23.7	23.5	7.1	7.0	6.7	36.3	36.4	36.5
Ctr C	A3	5	5	5	8.4	8.3	8.3	24.0	23.7	23.5	7.1	6.9	6.8	36.3	36.4	36.5
Ctr D	A4	5	5	5	8.4	8.3	8.3	24.0	23.8	23.5	7.1	6.9	6.8	36.3	36.5	36.6
100% A	A5	5	5	5	8.1	8.0	8.0	23.6	23.7	23.5	7.4	6.7	6.6	36.8	37.2	37.5
100% B	A6	5	5	5	8.1	8.0	8.0	23.4	23.6	23.5	7.4	6.8	6.6	36.7	37.1	37.3
100% C	A7	5	5	5	8.1	8.0	8.0	23.3	23.6	23.5	7.6	6.8	6.7	36.6	37.2	37.3
100% D	A8	5	5	5	8.1	8.0	8.0	23.3	23.8	23.6	7.6	6.8	6.6	36.6	37.3	37.4
Measured/Loaded by:		MF	ND	MF	MF	ND	MF	MF	ND	MF	MF	ND	MF	MF	ND	MF
Recorded by:		MF	ND	MF	DW	JS	DW	DW	JS	DW	DW	JS	DW	DW	JS	DW

Investigators' Signatures

Marshall Faircloth
Julie Shapiro
Mike Lovell

Jeff Wolfe
reviewer

form updated 4/01/96

Water Quality Parameters

(Salt Water) Well Water | 20% Min Water

	Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			Not Measured		
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	<0.03	DR-100	JS
Alkalinity (mg/L as $CaCO_3$):	175	—	110	Hach	ND
Hardness (mg/L as $CaCO_3$):	—	—	—	—	—
Total ammonia (mg/L as N):	<0.017	—	<0.017	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -54.6 Ammonia Blank: <0.017 Control Salinity: A 23.4 ppt Sample Salinity: A 23.4 ppt

A inadvertently placed a dash before the reading number. MF 1-29-97

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: JEA
County: Duval
Contact / District: Tim McKelvey / Northeast
NPDES Permit #: FL0001031
LIMS Sample #: 166346 LIMS Job #: 97-JAN-28-05
sample log: 1-30-97
Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Temperature range: room 24.0-25.0 °C
incubator NA
Test Number: 2 of 2
Remarks: D = dead, M = missing

Sample Collection: Date 1/27/97 Time 1115
Test Beginning: Date 1/28/97 Time 1530
Test Ending: Date 1-30-97 Time 1530
Organism Batch #: 3 Diluent Batch #: 1
Organism Age: 13 days
Test Organism: Menidia beryllina

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	24.4 @ 24.4	8.1 @ 25.8 °C	103.6 @ 101.8 1005 @ 1001 @ 25.5 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.6 @ 24.6	8.3 @ 24.8 °C	93300 101.8 @ 24971 101.8 995 @ 1001 @ 24.6 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.3 @ 23.3	8.2 @ 24.9 °C	91500 @ 94971 996 @ 1001 91300 @ 94971 @ 24.8 °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) 0 hr	UNCORRECTED Cond. (mmhos/cm) 24 h	UNCORRECTED Cond. (mmhos/cm) 48 h
Ctr A	A13	5	5	5	8.4	8.3	8.3	24.1	23.6	23.6	7.1	7.0	6.9	36.3	36.3	36.5
Ctr B	A14	5	5	5	8.4	8.3	8.3	24.1	23.6	23.5	7.1	6.9	6.9	36.3	36.3	36.4
Ctr C	A15	5	5	5	8.4	8.3	8.3	24.1	23.6	23.5	7.1	6.9	7.0	36.3	36.2	36.4
Ctr D	A16	5	5	5	8.4	8.3	8.3	24.1	23.7	23.5	7.1	6.9	6.9	36.4	36.4	36.5
100% A	A17	5	5	5	8.1	8.1	8.1	23.3	23.7	23.7	7.6	7.0	7.1	36.6	37.3	37.6
100% B	A18	5	5	5	8.1	8.1	8.1	23.3	23.6	23.6	7.6	7.0	7.0	36.6	37.2	37.5
100% C	A19	5	5	5	8.1	8.1	8.1	23.3	23.7	23.7	7.6	7.0	7.1	36.6	37.2	37.5
100% D	A20	5	5	5	8.1	8.1	8.1	23.3	23.8	23.7	7.6	7.0	7.1	36.7	37.3	37.6
Measured/Loaded by:		DW	ND	ND	MF	ND	MF	MF	ND	MF	MF	ND	MF	MF	ND	MF
Recorded by:		MF	ND	ND	DW	JS	DW	DW	JS	DW	DW	JS	DW	DW	JS	DW

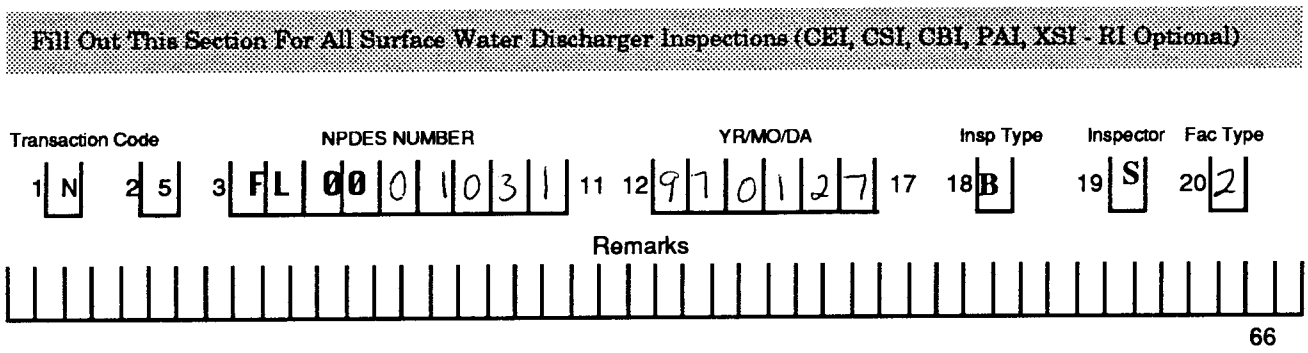
Investigators' Signatures
Marshall Fairchild
Julie Thayer
reviewer
form updated 4/01/96

Water Quality Parameters

	Salt Water: Well Water	Salt Water: 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			NOT measured		
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	<0.03	DR-100	JS
Alkalinity (mg/L as $CaCO_3$):	175	—	110	Hach	ND
Hardness (mg/L as $CaCO_3$):	—	—	—	—	—
Total ammonia (mg/L as N):	<0.017	—	<0.017	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -54.6 Ammonia Blank: <0.017
Control A Salinity: 23.4 ppt (MF 1-28-97)
Sample A Salinity: 23.4 ppt (MF 1-28-97)
Inadvertently placed a dash before the salinity numbers 1-28-97

The Bioassay of the Jacksonville Electric Authority Northside Generating Station WWTP effluent sampled on January 27, 1997, NPDES #FL0001031.



The Priority Pollutants Analysis for the Bioassay of the Jacksonville Electric Authority Northside Generating Station WWTP effluent sampled on January 27, 1997, NPDES #FL0001031.

