Bioassays of the City of

Cocoa Beach Wastewater Treatment Plant

Cocoa Beach, Brevard County, Florida

NPDES #FL0021105

Sampled 11/28/94

February 1995

Biology Section

Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan #870346G

Bioassays of the City of

Cocoa Beach Wastewater Treatment Plant

Cocoa Beach, Brevard County, Florida

NPDES #FL0021105

Biology Section
Bureau of Laboratories
February 1995

Introduction

City of Cocoa Beach Wastewater Treatment Plant, Cocoa Beach, Brevard County, Florida, NPDES #FL0021105, tests performed on 29 November to 1 December, 1994.

This contact stabilization wastewater treatment plant is located at Minuteman Causeway in Cocoa Beach. The facility has a 6.0 MGD design capacity, with an average daily flow of 1.8 MGD. Treatment of wastewater includes screening, grit removal, secondary treatment by activated sludge, and sand filtration. Alum is available for phosphorus reduction when needed. A portion of the effluent is used for irrigation of the city golf course (0.5 MGD) and residential lawns (0.8 MGD) within the city; the remainder (0.5 MGD) flows through polishing lakes and enters the Banana River. The facility is in the final stages of an upgrade which will virtually eliminate any discharge of effluent to the Banana River as reclamation capacity will exceed the average flow (facility summary provided by Phil Kane, FDEP Orlando).

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 chlorinated effluent from this facility. Two additional 48-hour screening bioassays were performed on aliquots of the sample that were dechlorinated in the laboratory using 0.5 ml/L of 0.025N sodium thiosulfate. The test species used for these bioassays were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*.

The chlorinated test results indicated that the sample was acutely toxicity to C. leedsi, producing 100% mortality in 24 hours, but was only slightly toxic to C. dubia, producing 15% mortality in 48 hours. The dechlorinated test results showed no mortality in either test species (Table 1).

Total residual chlorine of the sample was 0.45 mg/L in the laboratory and 0.6 mg/L in the field. Total residual chlorine levels as low as 0.028 mg/L have been found to be acutely toxic to some freshwater fish and invertebrates (EPA *Quality Criteria for Water*, 1986). Total ammonia was not detected in the sample.

Further chemical analyses were performed on the sample and several metals and herbicides were identified (Table 2). The metals and herbicides do not appear to be present in concentrations known to be acutely toxic to the test species. Organics were not detected in the sample.

Conclusion

The sample of effluent collected from this facility on 28 November, 1994, showed toxicity to both test spiecies. A dechlorinated aliquot of the sample did not show toxicity. We attribute the toxicity in the sample to the total residual chlorine of the sample.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the City of Cocoa Beach WWTP, Cocoa Beach, Brevard County, Florida, NPDES# FL0021105, performed on 29 November to 1 December, 1994.

Dechlorinated Test

Facility:	**City of Cocoa Beach WWTP**	**NPDES #**	**FL0021105**	Facility Type:	**Wastewater Treatment Plant**
Location:	Minuteman Causeway, Cocoa Beach	Contact/District:	P. Kane/Central		
County:	Brevard	Test type:	static acute screen	Receiving Water:	Tributary leading to the Banana River
Sample Collection Date:	**11/28/94** Time: 1115	# tests:	2		
Test Beginning Date:	11/29/94 Time: 1430	Chlorination Type:	***Sample dechlorinated in lab with 0.5mL/L 0.025 N sodium thiosulfate**		**Page 1 of 2**
Test Ending Date:	12/1/94 Time: 1430				

Total Residual CL2	mg/L	Method
Field:	0.60	-
Lab:	0.06	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):	125	125
20% Dilute Mineral Water (cladocerans):	70	80
100% Sample:	150	255

Salinity	(ppt)
Control Water:	0
100% Sample:	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	5	8.2	-	8.2	23.7	-	22.9	8.3	-	8.1	160	175
Control B	0/20	5	5	5	-	-	8.3	-	-	23.0	-	-	8.0	-	175
Control C	0/20	5	5	5	-	-	8.3	-	-	23.1	-	-	8.0	-	175
Control D	0/20	5	5	5	-	-	8.3	-	-	23.0	-	-	8.0	-	170
100% A	20/0	5	5	5	7.4	-	8.5	24.7	-	23.0	7.6	-	8.0	1745	1800
100% B	20/0	5	5	5	-	-	8.5	-	-	23.1	-	-	8.0	-	1740
100% C	20/0	5	5	5	-	-	8.5	-	-	23.1	-	-	8.0	-	1760
100% D	20/0	5	5	5	-	-	8.5	-	-	23.0	-	-	8.0	-	1760

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	23.2	22.5	21.6	8.5	8.4	8.3	240	240
Control B	0/500	5	5	5	7.9	8.2	8.4	23.2	22.4	21.5	8.4	8.4	8.3	240	240
Control C	0/500	5	5	5	7.9	8.2	8.4	23.1	22.4	21.4	8.3	8.5	8.3	240	240
Control D	0/500	5	5	5	7.9	8.2	8.4	23.0	22.5	21.4	8.3	8.5	8.3	240	235
100% A	500/0	5	5	5	7.3	8.0	8.3	25.5	22.5	21.6	7.1	8.4	8.1	1865	1735
100% B	500/0	5	5	5	7.3	8.0	8.3	25.5	22.5	21.6	7.1	8.3	8.0	1865	1740
100% C	500/0	5	5	5	7.3	8.0	8.2	25.5	22.5	21.7	7.0	8.2	8.0	1865	1735
100% D	500/0	5	5	5	7.3	8.0	8.3	25.4	22.6	21.7	7.1	8.2	8.0	1865	1745

Table 1. Continued. Data recorded during the 48-hour acute screening bioassays of a sample of chlorinated effluent from the City of Cocoa Beach WWTP, Cocoa Beach, Brevard County, Florida, NPDES# FL0021105, performed on 29 November to 1 December, 1994.

Chlorinated Test

Facility:	**City of Cocoa Beach WWTP**			**NPDES #**	**FL0021105**	Facility Type:	**Wastewater Treatment Plant**
Location:	Minuteman Causeway, Cocoa Beach			Contact/District:	P. Kane/Central		
County:	Brevard			Test type:	static acute screen	Receiving Water:	Tributary leading to the Banana River
Sample Collection Date:	**11/28/94**	Time:	1115	# tests:	2		
Test Beginning Date:	11/29/94	Time:	1430	Chlorination Type:	**Sample collected from the chlorine contact chamber**		
Test Ending Date:	12/1/94	Time:	1430				**Page 2 of 2**

Total Residual CL2	mg/L	Method
Field:	0.60	-
Lab:	0.45	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):	125	125
20% Dilute Mineral Water (cladocerans):	70	80
100% Sample:	150	255

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

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

		SURVIVAL # Alive			pH			Temperature			Dissolved Oxygen			Conductivity Uncorrected µmhos/cm	
Concentrations	Sample/Diluent 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	8.2	-	8.3	24.0	-	22.5	8.2	-	8.1	160	185
Control B	0/20	5	5	5	-	-	8.3	-	-	22.8	-	-	8.1	-	180
Control C	0/20	5	5	5	-	-	8.3	-	-	22.8	-	-	8.1	-	180
Control D	0/20	5	5	5	-	-	8.3	-	-	22.0	-	-	8.1	-	185
100% A	20/0	5	5	5	7.1	-	8.6	24.5	-	23.6	6.6	-	8.1	1770	2030
100% B	20/0	5	5	3	-	-	8.6	-	-	23.0	-	-	7.9	-	1830
100% C	20/0	5	5	4	-	-	8.6	-	-	22.8	-	-	7.9	-	1985
100% D	20/0	5	5	5	-	-	8.6	-	-	22.4	-	-	8.0	-	2030

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

		SURVIVAL # Alive			pH			Temperature			Dissolved Oxygen			Conductivity Uncorrected µmhos/cm	
Concentrations	Sample/Diluent 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	-	7.9	8.2	-	23.4	22.8	-	8.2	8.3	-	245	240
Control B	0/500	5	5	-	7.9	8.2	-	23.3	22.8	-	8.3	8.3	-	240	245
Control C	0/500	5	5	-	7.9	8.2	-	23.2	22.8	-	8.3	8.3	-	245	240
Control D	0/500	5	5	-	7.9	8.2	-	23.3	22.9	-	8.4	8.3	-	245	245
100% A	500/0	5	0	-	7.2	7.9	-	25.4	22.8	-	6.8	7.6	-	1870	1750
100% B	500/0	5	0	-	7.2	7.9	-	25.8	22.8	-	6.8	7.6	-	1875	1745
100% C	500/0	5	0	-	7.2	7.8	-	25.8	22.7	-	6.6	7.8	-	1875	1750
100% D	500/0	5	0	-	7.2	7.8	-	25.7	22.9	-	6.5	7.7	-	1875	1765

Table 2. Results of chemical analyses on the effluent from the City of Cocoa Beach Wastewater Treatment Plant sampled on November 29, 1994.

Metals

Aluminum	180	µg/L[I]
Arsenic	5.80	µg/L
Calcium	83.3	mg/L[A]
Copper	4.8	µg/L[I]
Iron	139.9	µg/L[A]
Magnesium	31.1	mg/L[A]
Nickel	2.9	µg/L[I]
Selenium	7.8	µg/L
Silver	0.14	µg/L
Zinc	14.7	µg/L

Pesticides and Herbicides

Atrazine	0.16	µg/L[I]
Simazine	0.19	µg/L[I]

Base-Neutral & Acid Extractables

none detected

A Value reported is the mean of two or more determinations.

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: Cocoa Beach WWTP
County:
Contact / District: PKane / Central
NPDES Permit #: FL0021105
LIMS Sample #: 94421 entered 12/8/94 LIMS Job #: 94-NOV-29-05-01

Sample Collection: Date 11/28/94 Time 1115
Test Beginning: Date 11/29/94 Time 1430
Test Ending: Date 12/1/94 Time 1430
Organism Batch #: 45 Diluent Batch #: 45
Organism Age: < 24 hours
Test Organism: Ceriodaphnia dubia

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

Test Number: 1 of 4

Remarks: dechlorinated with 0.5 mL/L of 0.025N Sodium thiosulfate

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0	23.8 @ 22.9	8.5 @ 23.2C	107.9 @ 102.6
	9.0 @ 9.0			1015 @ 1047 @ 23.4 °C
24 hr	7.0 @ 7.0	23.1 @ 23.2	8.4 @ 23.5 °C	107.2 @ 1026
	9.0 @ 9.0			1015 @ 1017 @ 22.8 °C
48 hr	7.0 @ 7.0	21.2 @ 21.1	8.6 @ 21.4 °C	107 @ 102.6
	9.0 @ 9.0			980 @ 1047 @ 21.9 °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
Control	A	5	5	5	8.2		8.2	23.7		22.9	8.3		8.1	160		175
Control	B	5	5	5			8.3			23.0			8.0			175
Control	C	5	5	5			8.3			23.1			8.0			175
Control	D	5	5	5			8.3			23.0			8.0			170
100%	A	5	5	5	7.4		8.5	24.7		23.0	7.6		8.0	1745		1800
100%	B	5	5	5			8.5			23.1			8.0			1740
100%	C	5	5	5			8.5			23.1			8.0			1760
100%	D	5	5	5			8.5			23.0			8.0			1760
Recorded by:		MF	MF		MF		MF	MF		MF	MF		MF	MF		MF
Measured/Loaded by:		MF	MF		TM		JLS	TM		JLS	TM		JLS	TM		JLS

Investigators' Signatures

Marshall Faircloth
Jennifer Sparagana
Tina Mikulski

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):			0.6	—	~~PK~~ PK / Kara
Lab Total Residual Cl2 (mg/L):	—	<0.03	0.06	DR100	TM
Alkalinity (mg/L as $CaCO_3$):	—	70	150	HACH	JLS
Hardness (mg/L as $CaCO_3$):	—	80	255	HACH	JLS
Total ammonia (mg/L as N):	—	<0.017	<0.017	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -57.8 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: ____ ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

MF 11/29/94 wrote reverse sample/Time 11/5 1430

Sample Source: Cocoa Beach WWTP
County:
Contact/District: Phil Kane / Central
NPDES Permit #: FL0021105
LIMS Sample #: 94421 LIMS Job #: 94-NOV-29-05

Sample Collection: Date 11/28/94 Time ~~11/28/94~~ 1115
Test Beginning: Date 11/29/94 Time ~~11/29/94~~ 1430
Test Ending: Date 12/1/94 Time 1432
Organism Batch #: 48 Diluent Batch #: Well
Organism Age: 11 days
Test Organism: Cyprinella leedsi

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

Test Number: 2 of 4

Remarks: dechlorinated with 0.5 ml/L of 0.025N Sodium thiosulfate

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	22.8 @ 22.9	8.5 @ 23.2 °C	107.9 @ 102.6 1015 @ 1047 @ 23.4 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.1 @ 23.2	8.4 @ 23.5 °C	107.2 @ 102.6 1015 @ 1017 @ 22.8 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	21.2 @ 21.1	8.6 @ 22.4 °C	107 @ 102.6 980 @ 1047 @ 21.9 °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
Control	219	5	5	5	7.9	8.2	8.4	23.2	22.5	21.6	8.5	8.4	8.3	240	240	240
Control	65	5	5	5	7.9	8.2	8.4	23.2	22.4	21.5	8.4	8.4	8.3	240	240	240
Control	22	5	5	5	7.9	8.2	8.4	23.1	22.4	21.4	8.3	8.5	8.3	240	240	235
Control	1265	5	5	5	7.9	8.2	8.4	23.0	22.5	21.4	8.3	8.5	8.3	240	240	235
100 %	1822	5	5	5	7.3	8.0	8.3	25.5	22.5	21.6	7.1	8.4	8.1	1865	1750	1735
100%	174	5	5	5	7.3	8.0	8.3	25.5	22.5	21.6	7.1	8.3	8.0	1865	1755	1740
100 %	20	5	5	5	7.3	8.0	8.2	25.5	22.5	21.7	7.0	8.2	8.0	1865	1755	1735
100 %	102	5	5	5	7.3	8.0	8.3	25.4	22.6	21.7	7.1	8.2	8.0	1865	1765	1745
Recorded by:		TM	TM	TM	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF
Measured/Loaded by:		TR	TM	TM	TM	TM	JLS	TM	TM	JLS	TM	TM	JLS	TM	TM	JLS

Investigators' Signatures

Marshall Fairbath
Jennifer Sarappan
Tony Mikulski

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):			0.6	—	~~PF~~ Phil Kane
Lab Total Residual Cl2 (mg/L):	<0.03	—	0.06	DR100	TM
Alkalinity (mg/L as $CaCO_3$) :	125	—	150	HACH	JLS
Hardness (mg/L as $CaCO_3$) :	125	—	255	HACH	JLS
Total ammonia (mg/L as N) :	<0.017	—	<0.017	orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -57.8 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: ___ ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

mf 11/29/94 wrote reverse date/time

Sample Source: Cocoa Beach WWTP
County:
Contact / District: Phil Kane / Central
NPDES Permit #: FL0022105
LIMS Sample #: 94421 LIMS Job #: 94-NOV-24-05

Sample Collection: Date 11/28/94 Time ~~11/28/94~~ 1115
Test Beginning: Date 11/29/94 Time ~~11/29/94~~ 1430
Test Ending: Date 12/1/94 Time 1430
Organism Batch #: 45 Diluent Batch #: 45
Organism Age: < 24 hours
Test Organism: Ceriodaphnia dubia

Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Test Number: 3 of 4
Remarks: Chlorinated sample

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	22.8 @ 22.9	8.5 @ 23.2°C	107.9 @ 102.6 1015 @ 1047 @ 23.4 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.1 @ 23.2	8.4 @ 23.5°C	107.2 @ 1026 1015 @ 1017 @ 22.8 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	21.2 @ 21.1	8.6 @ 22.4°C	107 @ 1026 980 @ 1047 @ 21.9 °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		8.3	24.0		22.5	8.2		8.1	160		185
Control	B	5	5	5			8.3			23.8			8.1			180
Control	C	5	5	5			8.3			22.8			8.1			180
Control	D	5	5	5			8.3			22.0			8.1			185
100%	A	5	5	5	7.1		8.6	24.5		22.6	6.6		8.1	1770		2030 *
100%	B	5	4	3			8.6			23.0			7.9			1830
100%	C	5	5	4			8.6			22.8			7.9			1985
100%	D	5	5	5			8.6			22.4			8.0			2030
Recorded by:		MF	MF	MF	MF		MF	MF		MF	MF		MF	MF		MF
Measured/Loaded by:		MF	MF	MF	TM		JLS	TM		JLS	TM		JLS	TM		JLS

* Evaporation of sample 16 mls left in vial mf 12/08/94

Investigators' Signatures

Marshall Faircloth
Jennifer Sparagani
Tina M. Kreidler

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):			0.6	—	MF 12/08/94
Lab Total Residual Cl2 (mg/L):	—	< 0.03	0.45	DR100	TM
Alkalinity (mg/L as $CaCO_3$):	—	70	150	HACH	JLS
Hardness (mg/L as $CaCO_3$):	—	80	255	HACH	JLS
Total ammonia (mg/L as N):	—	< 0.017	< 0.017	Orion	MF

Ammonia Meter #98136 Meter Slope: 57.8 Ammonia Blank: < 0.017 Control Salinity: 0 ppt Sample Salinity: ____ ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: N. Cocoa Beach WWTP
County: Brevard
Contact/District: Phil Kane / Central
NPDES Permit #: FL0021105
LIMS Sample #: 94421 LIMS Job #: 94-NOV29-05

Sample Collection: Date 11/28/94 Time 1115
Test Beginning: Date 11/29/94 Time 1430
Test Ending: Date 11/30/94 Time 1430
Organism Batch #: 48 Diluent Batch #: well
Organism Age: 11 days
Test Organism: Cyprinella leedsi

Test Type: Screening / Definitive
Static / Static Renewal / Flow-through
Test Number: 4 of 4
Remarks: Chlorinated sample
Test Terminated @24 hrs.

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	22.8 @ 22.9	8.5 @ 23.2°C	107.9 @ 102.6 1015 @ 1047 @ 23.4°C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.1 @ 23.2	8.4 @ 23.5°C	107.2 @ 102.6 1015 @ 1047 @ 22.8°C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.0 @ 22.1	8.7 @ 22.0°C	106.0 @ 102.6 1002 @ 1047 @ 22.6 °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
Control	A 520	5	5		7.9	8.2		23.4	22.8		8.2	8.3		245	240	
Control	B 75	5	5		7.9	8.2		23.3	22.8		8.3	8.3		240	245	
Control	C 476	5	5		7.9	8.2		23.2	22.8		8.3	8.3		245	240	
Control	D 136	5	5		7.9	8.2		23.3	22.9		8.4	8.3		245	245	
100%	A 21	5	0*	—	7.2	7.9		25.4	22.8		6.8	7.6		1820	1750	
100%	B 87	5	0	—	7.2	7.9		25.8	22.8		6.8	7.6		1875	1745	
100%	C 28	5	0	—	7.2	7.8		25.8	22.7		6.6	7.8		1875	1750	
100%	D 57	5	0	—	7.2	7.8		25.7	22.9		6.5	7.7		1875	1765	
	Col'n letters instead of #'s - not corrected 11/29/94 mf															
		* wrong #'s coded in at first 11/30/94 100% had total mortality TM														
Recorded by:		TM	TM		TMF	MF		MF	MF		MF	MF		MF	MF	
Measured/Loaded by:		TM/MF	TM		TM	TM		TM	TM		TM	TM		TM	TM	

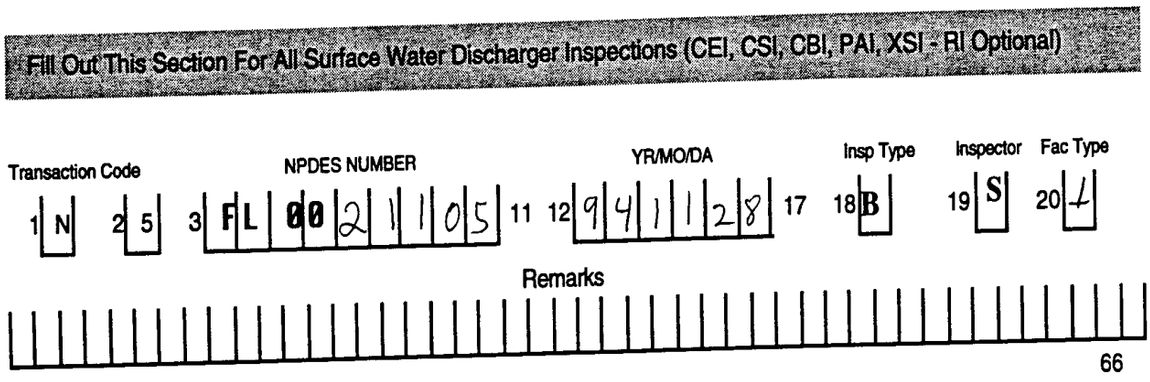
Investigators' Signatures
Jennifer Spagnuolo
Marshall Faircloth
Tina M. Kincaid
Reviewer

form updated 10/05/94

Water Quality Parameters	Salt Water: Well Water	Salt Water: 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.6	—	~~PK~~ Phil Kane
Lab Total Residual Cl2 (mg/L):	<0.03	—	0.45	DR100	TM
Alkalinity (mg/L as $CaCO_3$):	125	—	150	HACH	JBS
Hardness (mg/L as $CaCO_3$):	125	—	255	HACH	JBS
Total ammonia (mg/L as N):	<0.017	—	<0.017	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -57.8 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: ___ ppt

The Bioassay of the City of Cocoa Beach WWTP effluent sampled on November 28, 1994, NPDES #FL0021105.



The Priority Pollutants Analysis for the Bioassay of the City of Cocoa Beach WWTP effluent sampled on November 28, 1994, NPDES #FL0021105.

