Bioassays of

Florida Keys Community College Wastewater Treatment Plant

Stock Island, Monroe County, Florida

NPDES #FL0033928

Sampled 4/26/94

August 1994

Biology Section
Division of Administrative and Technical Services

Bioassays of

Florida Keys Community College Wastewater Treatment Plant

Stock Island, Monroe County, Florida

NPDES #FL0033928

Biology Section
Bureau of Laboratories
August 1994

Introduction

Florida Keys Community College WWTP, Stock Island, Monroe County, Florida, NPDES #FL0033928, tests performed on 27 to 29 April, 1994.

This wastewater treatment facility is located at 5901 Junior College Road West on Stock Island and has a capacity of 15,000 GPD. Treatment of wastewater consists of extended aeration with clarification, chlorination to meet basic disinfection requirements, and dechlorination. Treated effluent is discharged to the Gulf of Mexico (facility summary provided by Gus Rios and Nancy Brooking, FDEP Marathon). At the time of sampling, the facility operated without a valid DEP permit. The previous permit expired on 1/11/94.

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 definitive 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*. Only one death occurred in the *Ceriodaphnia dubia* test. No deaths occurred in the *Cyprinella leedsi* tests.

Total residual chlorine of the sample was < 0.03 mg/L in the laboratory and 0.15 mg/L in the field. Total and unionized ammonia concentrations were 5.73 mg/L and 0.08 mg/L, respectively. Further chemical analyses were performed on the sample and several of the metals that were identified exceeded their respective Class III marine surface water criterion (Table 2). Samples for organics analyses were not collected.

Conclusion

The sample of effluent collected from this facility on 26 April, 1994, did not show toxicity to *Cyprinella leedsi*. The cause of the one death in the *Ceriodaphnia dubia* test was not determined.

Table 1. Concentration series and volumes used for the 48-hour static acute screening toxicity bioassays of the Florida Keys Community College WWTP effluent performed on 27 to 29 April, 1994.

Ceriodaphnia dubia (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	20 mL	0 mL	20 mL
30%	14 mL	6 mL	20 mL
50%	10 mL	10 mL	20 mL
70%	6 mL	14 mL	20 mL
85%	3 mL	17 mL	20 mL
100 %	0 mL	20 mL	20 mL

Cyprinella leedsi (bannerfin shiner)

Concentration	Dilution Water	Sample	Total Volume
Control	500 mL	0 mL	500 mL
50%	250 mL	250 mL	500 mL
75%	125 mL	375 mL	500 mL
100 %	0 mL	500 mL	500 mL

Table 2. Results of chemical analyses on the effluent and influent from Florida Keys Community College WWTP sampled on 26 April, 1994.

Metals

	Effluent	Field Duplicate	Class III marine standards
Cadmium	0.51 µg/L A	0.37 µg/L I	
Calcium	54.9 mg/L A	56.2 mg/L	
Copper	30 µg/L A *	25 µg/L *	≤2.9 µg/L
Iron	312 µg/L A *	261 µg/L	≤300 µg/L
Magnesium	15.4 mg/L A	15.7 mg/L	
Silver	5.4 µg/L A *	3.7 µg/L *	≤0.05 µg/L
Zinc	40 µg/L A	36 µg/L	

A The 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.

* Value exceeded Class III marine surface water quality criterion, 17-302.530 FAC.

Table 3. Data recorded during the 48-hour acute definitive bioassays of a sample of effluent from the Florida Keys Community College WWTP, Stock Island, Key West, Monroe County, Florida, NPDES# FL0033928, performed on 27 to 29 April, 1994.

Facility:	**Florida Keys Community College**			**NPDES #**	**FL0033928**	Facility Type:	**Wastewater**
Location:	Stock Island, Key West			Contact/District:	Nancy Brooking / Marathon		**Treatment Plant**
County:	Monroe			Test type:	static acute definitive		
Sample Collection Date:	**4/26/94**	Time:	1230	# tests:	2	Receiving Water:	Gulf of Mexico
Test Beginning Date:	4/27/94	Time:	1400	Chlorination Type:	**Sample collected**		
Test Ending Date:	4/29/94	Time:	1400		**after dechlorination**	**Page 1 of 1**	

Total Residual CL2	mg/L	Method
Field:	0.15	-
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:	5.73	0.08

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	125	120
20% Dilute Mineral Water (cladocerans):	70	80
100% Sample:	90	205

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

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 A	5	5	5	8.2	-	8.2	23.4	-	23.3	8.4	-	8.3	155	160
Control B	5	5	5	-	-	8.2	-	-	23.4	-	-	8.3	-	160
Control C	5	5	5	-	-	8.2	-	-	23.4	-	-	8.2	-	160
Control D	5	5	5	-	-	8.2	-	-	23.4	-	-	8.3	-	170
30% A	5	5	5	7.9	-	8.2	23.4	-	23.3	8.5	-	8.4	500	500
30% B	5	5	5	-	-	8.2	-	-	23.4	-	-	8.3	-	495
30% C	5	5	5	-	-	8.2	-	-	23.2	-	-	8.2	-	520
30% D	5	5	5	-	-	8.2	-	-	23.2	-	-	8.2	-	525
50% A	5	5	5	7.7	-	8.2	23.3	-	23.2	8.4	-	8.3	755	785
50% B	5	5	5	-	-	8.2	-	-	23.3	-	-	8.3	-	780
50% C	5	5	5	-	-	8.2	-	-	23.3	-	-	8.3	-	775
50% D	5	5	5	-	-	8.2	-	-	23.2	-	-	8.2	-	780
70% A	5	5	5	7.6	-	8.2	23.3	-	23.2	8.3	-	8.2	965	975
70% B	5	5	5	-	-	8.2	-	-	23.3	-	-	8.3	-	975
70% C	5	5	5	-	-	8.2	-	-	23.3	-	-	8.2	-	960
70% D	5	5	5	-	-	8.2	-	-	23.2	-	-	8.1	-	965
85% A	5	5	5	7.6	-	8.2	23.0	-	23.2	8.0	-	8.2	1125	1120
85% B	5	5	5	-	-	8.2	-	-	23.2	-	-	8.2	-	1120
85% C	5	5	5	-	-	8.2	-	-	23.2	-	-	8.1	-	1140
85% D	5	5	5	-		8.2	-	-	23.2	-	-	8.1	-	1280
100% A	5	5	5	7.5		8.2	23.0	-	23.2	7.9	-	8.3	1295	1275
100% B	5	5	5	-		8.2	-	-	23.3	-	-	8.2	-	1270
100% C	5	5	5	-		8.2	-	-	23.3	-	-	8.1	-	1275
100% D	5	5	4	-	-	8.2	-	-	23.1	-	-	8.2	-	1290

Organism: ***Cyprinella leedsi*** Age: 12 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 A	5	5	5	7.8	8.1	8.3	23.3	23.3	23.2	8.4	8.3	8.2	240	245
Control B	5	5	5	7.8	8.1	8.3	-	-	23.2	8.4	8.4	8.3	240	245
50% A	5	5	5	7.5	7.9	8.1	22.5	23.2	23.2	7.7	8.0	8.1	790	780
50% B	5	5	5	7.5	7.9	8.1	-	-	23.1	7.7	8.0	8.1	790	800
75% A	5	5	5	7.5	7.8	8.0	22.0	23.1	23.1	7.0	7.5	8.2	1045	1055
75% B	5	5	5	7.5	7.8	8.0	-	-	23.1	7.0	7.4	8.2	1045	1065
100% A	5	5	5	7.4	7.7	7.9	21.8	23.2	23.1	6.8	7.3	7.3	1305	1330
100% B	5	5	5	7.4	7.7	7.9	-	-	23.2	6.8	7.3	7.5	1305	1350

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Florida Keys Community College
Location: Stock Island, Key West
County: Monroe
Contact/District: N. Backings/G. Rios South Marathon
NPDES Permit #: FL00 33728
Lims# 94-APR-27-06 75582
Outfall #:

Sample Collection: Date 4/26/94 Time 1230
Test Beginning: Date 4/27/94 Time 1400
Test Ending: Date 4/29/94 Time 1400
Organism Batch #: 14 Diluent Batch #: 15
Organism Age: <24hr
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	24.1 @ 24.2	8.3 @ 24.3	980 @ 1,000 9780 @ 10,000 @ 23.9 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.3 @ 23.9	8.3 @ 24.1	975 @ 1,000 9730 @ 10,000 @ 24.0 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.9	8.3 @ 24.0	980 @ 1,000 9750 @ 10,000 @ 24.0 °C

Conc.	Chamber #	Number Live 0 hr	24 h	48 h	pH 0 hr	24 h	48 h	Temperature (°C) 0 hr	24 h	48 h	D.O. (mg/L) 0 hr	24 h	48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control	A	5	5	5	8.2		8.2	23.4		23.3	8.4		8.3	155		160
Control	B	5	5	5			8.2			23.4			8.3			160
Control	C	5	5	5			8.2			23.4			8.2			160
Control	D	5	5	5			8.2			23.4			8.3			170
30%	A	5	5	5	7.9		8.2	23.4		23.3	8.5		8.4	500		500
30%	B	5	5	5			8.2			23.4			8.3			495
30%	C	5	5	5			8.2			23.2			8.2			520
30%	D	5	5	5			8.2			23.2			8.2			525
50%	A	5	5	5	7.7		8.2	23.3		23.2	8.4		8.3	755		785
50%	B	5	5	5			8.2			23.3			8.3			780
50%	C	5	5	5			8.2			23.3			8.3			775
56%	D	5	5	5			8.2			23.2			8.2			780
70%	A	5	5	5	7.6		8.2	23.3		23.2	8.3		8.2	965		975
70%	B	5	5	5			8.2			23.3			8.3			975
70%	C	5	5	5			8.2			23.3			8.2			960
70%	D	5	5	5			8.2			23.2			8.1			965
85%	A	5	5	5	7.6		8.2	23.0		23.2	8.0		8.2	1125		1120
85%	B	5	5	5			8.2			23.2			8.2			1120
85%	C	5	5	5			8.2			23.2			8.1			1140
85%	D	5	5	5			8.2			23.2			8.1			1280
Measured/Loaded by:		TR	MF	TM	TM		TM	TM		TM	TM		TM	TM		TM
Recorded by:		TR	MF	TM	TR		TR	TR		TR	TR		TR	TR		TR

Investigators' Signatures

Robin G. Rader
Marshall Faircloth
Tina Mikulidis
Reviewer

Water Quality Parameters	Salt Water/ (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0.15	—	GR
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-100	TR
Alkalinity:	125	70	90	Hach	TR
Hardness:	120	80	205	Hach	TR
Total Ammonia:	<0.017	<0.017	5.73	Orion	MF

Ammonia Ammonia Ammonia Meter #98136 Meter Slope: -57.4 Blank: Control 0.08 (0.0174) Sample

form updated 7/8/93

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Florida Keys Community College
Location: Stock Island, Key West
County: Monroe
Contact/District: N Brooking / G Rios Marathon South
NPDES Permit #: FL0033928 Outfall #:
Lims # 94-APR-27-06 78382

Sample Collection: Date 4/26/94 Time 1230
Test Beginning: Date 4/27/94 Time 1400
Test Ending: Date 4/29/94 Time 1400
Organism Batch #: 14 Diluent Batch #: 15
Organism Age: <24 hrs
Test Organism: Ceriodaphnia dubia

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

Test Number: 1 of 2

Remarks: Continued from previous page

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 @ 24.3	980 @ 1,000 9780 @ 10,000 @ 23.9 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.9	8.3 @ 24.1	975 @ 1,000 9730 @ 10,000 @ 24.0 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.9	8.3 @ 24.0	980 @ 1,000 9750 @ 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
100%	A	5	5	5	7.5		8.2	23.0		23.2	7.9		8.3	1295		1275
100%	B	5	5	5			8.2			23.3			8.2			1270
100%	C	5	5	5			8.2			23.3			8.1			1275
100%	D	5	5	4			8.2			23.1			8.2			1290
Measured/Loaded by:		TR	MF	TM	TM		TM	TM		TM	TM		TM	TM		TM
Recorded by:		TR	MF	TM	TR		TR	TR		TR	TR		TR	TR		TR

Investigators' Signatures

Robin A. Rader
Marshall Faircloth
Tina Mikelosky
Reviewer

Water Quality Parameters	Salt Water/ Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0.15	—	GR
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-100	TR
Alkalinity:	125	70	90	Hach	TR
Hardness:	120	80	205	Hach	TR
Total Ammonia:	<0.017	<0.017	5.73	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -57.4 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

form updated 7/8/93

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Florida Keys Community College
Location: Stock Island, Key West
County: Monroe
Contact/District: N Brocking / G Rios South Marathon
NPDES Permit #: FL0033928 Outfall #: 78582
Lims # 94-APR-27-06

Sample Collection: Date 4/26/94 Time 1230
Test Beginning: Date 4/27/94 Time 1400
Test Ending: Date 4/29/94 Time 1400
Organism Batch #: 16 Diluent Batch #: Well
Organism Age: 12 days
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	24.1 @ 24.2	8.3 @ 24.3	980 @ 1,000
	9.0 @ 9.0			9780 @ 10,000 @ 23.9 °C
24 hr	7.0 @ 7.0	23.8 @ 23.9	8.3 @ 24.1	975 @ 1,000
	9.0 @ 9.0			9730 @ 10,000 @ 24.2 °C
48 hr	7.0 @ 7.0	23.8 @ 23.9	8.3 @ 24.0	980 @ 1,000
	9.0 @ 9.0			9750 @ 10,000 @ 24.0 °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
Control A	76	5	5	5	7.8	8.1	8.3	23.3	23.3	23.2	8.4	8.3	8.2	240	245	245
Control B	19	5	5	5	7.8	8.1	8.3			23.2	8.4	8.1	8.3	240	245	245
50% A	263	5	5	5	7.5	7.9	8.1	22.5	23.2	23.2	7.7	8.0	8.1	790	780	780
50% B	44	5	5	5	7.5	7.9	8.1			23.1	7.7	8.0	8.1	790	800	800
75% A	22	5	5	5	7.5	7.8	8.0	22.0	23.1	23.1	7.0	7.7	8.2	1045	1050	1055
75% B	219	5	5	5	7.5	7.8	8.0			23.1	7.0	7.7	8.2	1045	1060	1065
100% A	165	5	5	5	7.4	7.7	7.9	21.9	23.2	23.1	6.8	7.3	7.3	1305	1320	1330
100% B	149	5	5	5	7.4	7.7	7.9			23.2	6.8	7.3	7.5	1305	1340	1350
Measured/Loaded by:		TM	MF	TM	TM	MF	TM	TM	MF	TM	TM	MF	TM	TM	MF	TM
Recorded by:		TR	DW	TR	TR	DW	TR	TR	DW	TR	TR	DW	TR	TR	DW	TR

Investigators' Signatures

Tobin C. Rade

Frank H. Faircloth

Tim Mikulsky

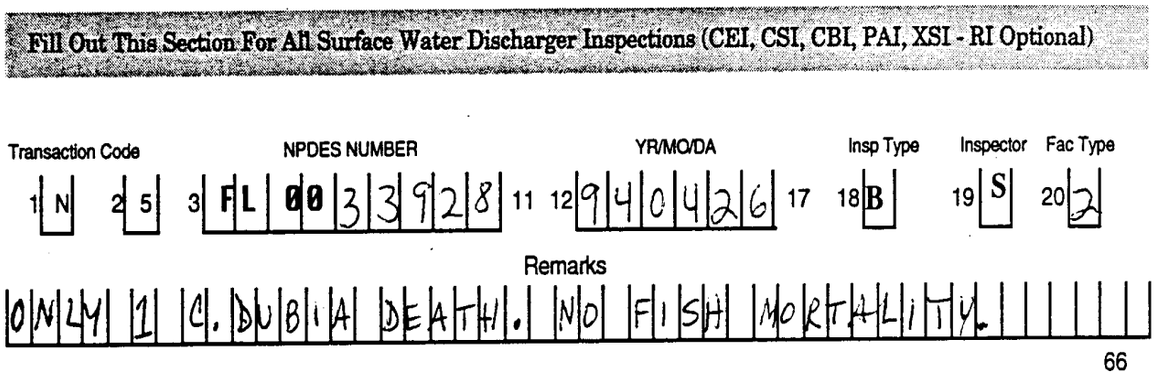
Reviewer

form updated 7/8/93

	Salt Water/ Well Water	Water Quality Parameters: 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0.15	–	GR
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-100	TR
Alkalinity:	125	70	90	Hach	TR
Hardness:	120	80	205	Hach	TR
Total Ammonia:	<0.017	<0.017	5.73	ann	mf

Ammonia Meter #98136 Ammonia Meter Slope: -57.4 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

The Bioassay of the Florida Keys Community College WWTP effluent sampled on April 26, 1994, NPDES# FL0033928.



The Priority Pollutants Analysis for the Bioassay of the Florida Keys Community College WWTP effluent sampled on April 26, 1994, NPDES# FL0033928.

