DEPARTMENT OF ENVIRONMENTAL PROTECTION

FLORIDA

Bioassays of the City of

Clearwater East Advanced Wastewater Treatment Plant
&
Clearwater Northeast Advanced Wastewater Treatment Plant
Combined Outfalls

Clearwater, Pinellas County, Florida

NPDES #FL0021865 & FL0031607

Sampled 2/12/96

March 1996

Biology Section

Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan #870346G

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Clearwater East Advanced Wastewater Treatment Plant
&
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Biology Section
Bureau of Laboratories
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Introduction

City of Clearwater East Advanced Wastewater Treatment Facility, NPDES # FL0021865, and City of Clearwater Northeast Advanced Wastewater Treatment Facility, NPDES # FL0031607, Clearwater, Pinellas County, Florida, tests performed on 13 to 15 February, 1996.

The address for these combined facilities is 3141 Gulf-to-Bay Boulevard at Courtney Campbell Causeway in Clearwater. The design capacities of the City of Clearwater East Advanced WWTF and the City of Clearwater Northeast Advanced WWTF are 5.0 MGD and 13.5 MGD, respectively. The combined average daily discharge is approximately 10 MGD, with 3 MGD contributed by the East WWTF and 7 MGD contributed by the Northeast WWTF.

The treatment process for both the East WWTF and the Northeast WWTF consists of mechanical bar screening and grit removal, followed by a Bardenpho advanced wastewater treatment process. The Bardenpho process consists of primary anoxic tanks, aeration tanks, secondary anoxic tanks, re-aeration, and clarification. The treated effluent is passed through a sand filter and a chlorine contact chamber at each facility. The effluent from the Northeast WWTF is discharged through a pipeline to the East WWTF where the chlorinated effluents are combined, dechlorinated, and post-aerated prior to discharge into Old Tampa Bay (facility summary provided by Brent Johnson, FDEP, Tampa, and NPDES files).

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 an aliquot of the sample which was dechlorinated in the laboratory with 0.5 mL of 0.025N sodium thiosulfate per liter of sample. The test species used for these bioassays were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*.

The chlorinated sample test results showed the sample to be acutely toxic to both test species, producing 100% mortality in the *Ceriodaphnia dubia* test in 24 hours, and 85% mortality in the *Cyprinella leedsi* test in 48 hours (Table 1). No deaths occurred in the *Ceriodaphnia dubia* dechlorinated sample test, and there was only 5% mortality in the *Cyprinella leedsi* dechlorinated sample test (Table 1 concluded).

Total residual chlorine of the sample was not measured in the field, but was 0.45 mg/L in the laboratory. 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 the herbicide, Atrazine, were identified (Table 2).

Conclusion

The sample of effluent collected from this facility on February 12, 1996, showed toxicity in the chlorinated sample, but did not show significant toxicity in the aliquot of sample which was dechlorinated in the laboratory. We attribute the toxicity to the total residual chlorine content of the sample.

Table 1. Data recorded during the 48-hour acute toxicity screening bioassays of a sample of combined effluent from the City of Clearwater East and Northeast advanced WWTF's, Clearwater, Pinellas County, Florida, NPDES#FL0021865, performed on 13 to 15 February, 1996.

Chlorinated Test

Facility: **City of Clearwater East and Northeast WWTF's** (combined) **NPDES # FL0021865** Facility Type: **WWTP**
Location: 3141 Gulf-to-Bay Boulevard, Clearwater Contact/District: B. Johnson/Southwest
County: Pinellas Test type: static acute screen
Sample Collection Date: **2/12/96** Time: 1045 # tests: 4 Receiving Water: Old Tampa Bay
Test Beginning Date: 2/13/96 Time: 1430 Chlorination Type: **Chlorinated***
Test Ending Date: 2/15/96 Time: 1430

Total Residual CL2	mg/L	Method
Field:	not measured	
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	0.000

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	120	125
20% Dilute Mineral Water (cladocerans):	70	80
100% Sample:	185	200

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

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

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[A]			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	24 hour
Control A	0/20	5	5	-	7.9	7.7	-	23.2	25.0	-	7.9	7.6	-	165	175
Control B	0/20	5	5	-	-	8.0	-	-	25.0	-	-	7.6	-	-	175
Control C	0/20	5	5	-	-	8.0	-	-	25.0	-	-	7.6	-	-	175
Control D	0/20	5	5	-	-	8.0	-	-	25.1	-	-	7.6	-	-	175
100% A	20/0	5	0	-	7.5	8.5	-	23.8	24.6	-	8.1	7.6	-	910	975
100% B	20/0	5	0	-	-	8.5	-	-	24.7	-	-	7.7	-	-	935
100% C	20/0	5	0	-	-	8.5	-	-	24.7	-	-	7.6	-	-	965
100% D	20/0	5	0	-	-	8.5	-	-	24.7	-	-	7.7	-	-	960

[A] Temperature of test incubator was continously recorded on a strip chart recorder.
Incubator temperature range for the test period was 24.4-25.6°C.

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

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[B]			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	24 hour
Control A	0/500	5	5	5	7.5	8.1	8.4	24.1	23.8	24.0	7.8	7.8	7.8	250	255
Control B	0/500	5	5	5	7.6	8.1	8.4	24.1	23.6	23.9	7.8	7.8	7.7	250	255
Control C	0/500	5	5	5	7.6	8.1	8.4	24.1	23.6	23.9	7.8	7.8	7.9	250	250
Control D	0/500	5	5	5	7.6	8.1	8.4	24.1	23.8	24.0	7.8	7.8	7.9	250	250
100% A	500/0	5	0	-	7.4	8.1	-	24.6	23.8	-	8.2	7.8	-	945	-
100% B	500/0	5	0	-	7.4	8.1	-	24.6	23.8	-	8.2	7.8	-	950	-
100% C	500/0	5	1	1	7.4	8.1	8.4	24.7	23.8	24.1	8.3	7.9	7.9	950	945
100% D	500/0	5	2	2	7.4	8.1	8.4	24.8	24.1	24.1	8.3	7.9	7.8	950	940

[B] Temperature of test room was continously recorded on a strip chart recorder.
Room temperature range for the test period was 23.9-26°C.

-Continued-

Table 1. Concluded. Data recorded during the 48-hour acute toxicity screening bioassays of a sample of combined effluent from the City of Clearwater East and Northeast advanced WWTF's, Clearwater, Pinellas County, Florida, NPDES#FL0021865, performed on 13 to 15 February, 1996.

Dechlorinated Test

Facility:	City of Clearwater East and Northeast WWTF's (combined)		NPDES #	FL0021865	Facility Type: WWTP
Location:	3141 Gulf-to-Bay Boulevard, Clearwater		Contact/District:	B. Johnson/Southwest	
County:	Pinellas		Test type:	static acute screen	
Sample Collection Date:	2/12/96	Time: 1045	# tests:	4	Receiving Water: Old Tampa Bay
Test Beginning Date:	2/13/96	Time: 1430	Chlorination Type:	Chlorinated*	
Test Ending Date:	2/15/96	Time: 1430			Page 2 of 2

*Sample was dechlorinated in the laboratory with 0.5 mL/L of 0.025 N sodium thiosulfate.

Total Residual CL2	mg/L	Method
Field:	not measured	
Lab:	0.04	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	125
20% Dilute Mineral Water (cladocerans):	70	80
100% Sample:	190	200

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

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

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[A]			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	8.0	-	8.1	23.4	-	26.4	7.9	-	7.6	165	185
Control B	0/20	5	5	4	-	-	8.1	-	-	26.3	-	-	7.6	-	185
Control C	0/20	5	5	5	-	-	8.1	-	-	26.0	-	-	7.6	-	185
Control D	0/20	5	5	5	-	-	8.1	-	-	25.7	-	-	7.6	-	180
100% A	20/0	5	5	5	7.7	-	8.6	23.8	-	25.7	8.0	-	7.7	910	965
100% B	20/0	5	5	5	-	-	8.6	-	-	25.7	-	-	7.7	-	970
100% C	20/0	5	5	5	-	-	8.6	-	-	25.6	-	-	7.6	-	975
100% D	20/0	5	5	5	-	-	8.6	-	-	25.4	-	-	7.6	-	995

[A] Temperature of test incubator was continously recorded on a strip chart recorder.
Incubator temperature range for the test period was 24.4-25.6°C.

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

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[B]			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	7.5	8.1	8.3	24.2	23.7	24.0	8.0	7.8	7.8	250	250
Control B	0/500	5	5	5	7.5	8.1	8.3	24.3	23.7	23.9	8.0	7.8	7.8	250	250
Control C	0/500	5	5	5	7.5	8.1	8.3	24.3	23.6	23.9	7.9	7.9	7.9	250	255
Control D	0/500	5	5	5	7.5	8.1	8.3	24.3	23.6	23.9	8.0	7.9	8.0	250	250
100% A	500/0	5	5	5	7.6	8.2	8.4	25.2	23.6	24.0	8.0	7.8	7.9	960	940
100% B	500/0	5	5	5	7.6	8.2	8.4	25.2	23.6	23.9	8.0	7.8	7.9	965	935
100% C	500/0	5	5	4	7.6	8.2	8.4	25.2	23.6	23.9	8.0	7.8	7.8	965	940
100% D	500/0	5	5	5	7.6	8.2	8.4	25.3	23.6	24.0	8.0	7.8	7.8	965	945

[B] Temperature of test room was continously recorded on a strip chart recorder.
Room temperature range for the test period was 24-26.4°C.

Table 2. Results of chemical analyses on the combined effluent from the City of Clearwater East and Northeast WWTFs sampled on February 12, 1996.

Metals

Calcium	69.8	mg/L[A]
Copper	5	µg/L[I]
Iron	23	µg/L[A]
Magnesium	6.07	mg/L[A]
Zinc	34	µg/L[A]

Pesticides and Herbicides

Atrazine	0.083	µg/L[I]

Base, Neutral, & Acid Extractable Organics

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: City of Clearwater East
County: Pinellas
Contact / District: Brent Johnson / Southwest
NPDES Permit #: FL00 21865
LIMS Sample #: 129549 LIMS Job #: 96-Feb-13-08

Sample Collection: Date 2/12/96 Time 1015
Test Beginning: Date 2/13/96 Time 1430
Test Ending: Date 2/15/96 Time 1430
Organism Batch #: 8 Diluent Batch #: 7
Organism Age: < 24 hour
Test Organism: Ceriodaphnia dubia

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

Test Number: 1 of 4

Remarks: dechlorinated test
dechlorinated with 0.5mL of 0.25N sodium thiosulfate per Liter of 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	21.7 @ 21.7	8.1 @ 25.9 °C	107.9 @ 106.2 1431 @ 1409 @ 25.2 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	21.8 @ 21.8	8.1 @ 25.9 °C	1098 @ 106.2 1412 @ 1409 @ 25.4 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.9 @ 22.9	8.1 @ 25.8 °C	108.5 @ 106.2 1423 @ 1409 @ 25.7 °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	5	8.0		8.1	23.4		26.4	7.9		7.6	165		185
Control	B	5	5	4			8.1			26.3			7.6			185
Control	C	5	5	5			8.1			26.0			7.6			185
Control	D	5	5	5			8.1			25.7			7.6			180
100 %	A	5	5	5	7.7		8.6	23.8		25.7	8.0		7.7	910		965
100 %	B	5	5	5			8.6			25.7			7.7			970
100 %	C	5	5	5			8.6			25.6			7.6			975
100 %	D	5	5	5			8.6			25.4			7.6			995
Measured/Loaded by:		MF	MF	MF	JS		MF	JS		MF	JS		MF	JS		MF
Recorded by:		JLS	MF	MF	DW		JN	DW		JN	DW		JN	DW		JN

Investigators' Signatures

Marshall Faircloth
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Robin L. Rieder
Jennifer Monk
reviewer

form updated 5/05/95

Water Quality Parameters	Salt 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	0.04	DR-100	TM
Alkalinity (mg/L as $CaCO_3$):	—	70	190	Hach	JR
Hardness (mg/L as $CaCO_3$):	—	80	200	Hach	JR
Total ammonia (mg/L as N):	—	<0.017	<0.017	Orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: −58.9 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: City of Clearwater East
County: Pinellas
Contact / District: Brent Johnson / Southwest
NPDES Permit #: FL0021865
LIMS Sample #: 129549 LIMS Job #: 96-Feb-13-08

Sample Collection: Date 2/12/96 Time 1015
Test Beginning: Date 2/13/96 Time 1430
Test Ending: Date 2/15/96 Time 1430
Organism Batch #: 7 Diluent Batch #: well H2O
Organism Age: 11 days
Test Organism: Cyprinella leedsi

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

Test Number: 2 of 4

Remarks: dechlorinated test
dechlorinated with 0.5mL of 0.25N sodium thiosulfate per Liter of 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	21.7 @ 21.7	8.1 @ 25.9 °C	107.9 @ 106.2 1431 @ 1409 @ 25.2 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	21.8 @ 21.8	8.1 @ 25.9 °C	109.8 @ 106.2 1412 @ 1409 @ 25.4 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.9 @ 22.9	8.1 @ 25.8 °C	108.5 @ 106.2 1423 @ 1409 @ 25.7 °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	500	5	5	5	7.5	8.1	8.3	24.2	23.7	~~24.4~~	8.0	7.8	7.8	250	245	250	* 24.0 JN 2-15-96 entry error
Control B	E1	5	5	5	7.5	8.1	8.3	24.3	23.7	23.9	8.0	7.8	7.8	250	250	250	
Control C	718	5	5	5	7.5	8.1	8.3	24.3	23.6	23.9	7.9	7.9	7.9	255	250	255	
Control D	53	5	5	5	7.5	8.1	8.3	24.3	23.6	23.9	8.0	7.9	8.0	250	245	250	
100 %	75	5	5	5	7.6	8.2	8.4	25.2	23.6	24.0	8.0	7.8	7.9	960	930	940	
100 %	41	5	5	5	7.6	8.2	8.4	25.2	23.6	23.9	8.0	7.8	7.9	965	925	935	
100 %	11	5	5	4	7.6	8.2	8.4	25.2	23.6	23.9	8.0	7.8	7.8	965	930	940	
100 %	25	5	5	5	7.6	8.2	8.4	25.3	23.6	24.0	8.0	7.8	7.8	965	930	945	
Measured/Loaded by:		MF	MF	TM	JS	MF	MF	JS	MF	MF	JS	MF	MF	JS	MF	MF	
Recorded by:		MF	MF	TM	DW	DW	JN	DW	DW	JN	DW	DW	JN	DW	TM	JN	

Investigators' Signatures

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form updated 5/05/95

Water Quality Parameters	Salt 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	—	0.04	DR-100	Tm
Alkalinity (mg/L as $CaCO_3$):		120	—	196	Alk.	TR
Hardness (mg/L as $CaCO_3$):		125	—	240	Hach	TR
Total ammonia (mg/L as N):		< 0.017	—	< 0.017	Orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: -58.9 Ammonia Blank: < 0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: City of Clearwater East
County: Pinellas
Contact / District: Brent Johnson / Southwest
NPDES Permit #: FL0021865
LIMS Sample #: 129549 LIMS Job #: 96-Feb-13-08

Sample Collection: Date 2/12/96 Time 1015
Test Beginning: Date 2/13/96 Time 1430
Test Ending: Date 2-14-96 Time 1430
Organism Batch #: 8 Diluent Batch #: 7
Organism Age: < 24hours
Test Organism: Ceriodaphnia dubia

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

Test Number: 3 of 4

Remarks: Chlorinated test
Test Terminated @ 24hrs

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	21.7 @ 21.7	8.1 @ 25.9 °C	107.9 @ 106.2 1431 @ 1409 @ 25.2 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	21.8 @ 21.8	8.1 @ 25.9 °C	109.8 @ 106.2 1412 @ 1409 @ 25.4 °C
48 hr	___ @ 7.0 ___ @ ___	___ @ ___	___ @ ___ °C	___ @ ___ ___ @ ___ @ ___ °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		7.9	7.7		23.2	25.0		8.1	7.6		165	175	
Control	B	5	5			8.0			25.0			7.6			175	
Control	C	5	5			8.0			25.0			7.6			175	
Control	D	5	5			8.0			25.1			7.6			175	
100%	A	5	0		7.5	8.5		23.8	24.6		8.1	7.6		910	975	
100%	B	5	0			8.5			24.7			7.7			935	
100%	C	5	0			8.5			24.7			7.6			965	
100%	D	5	0			8.5			24.7			7.7			960	
Measured/Loaded by:		JLS	MF		JS	MF	MF	JS	MF	MF	JS	MF		JS	MF	
Recorded by:		MF	MF		OW	TM	JN	OW	TM		OW	TM		OW	TM	

Investigators' Signatures

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Robin Griffin
Joseph Mott

reviewer

form updated 5/05/95

Water Quality Parameters	Salt 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	0.45	DR-100	JLS
Alkalinity (mg/L as $CaCO_3$):	—	70	185	Hach	TR
Hardness (mg/L as $CaCO_3$):	—	80	200	Hach	TR
Total ammonia (mg/L as N):	—	<0.017	<0.017	Orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: -58.9 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: City of Clearwater EAST
County: Pinellas
Contact / District: Brent Johnson / Southwest
NPDES Permit #: FL0021865
LIMS Sample #: 129549 LIMS Job #: 96-F96-13-08

Sample Collection: Date 2-12-96 Time 1015
Test Beginning: Date 2-13-96 Time 1430
Test Ending: Date 2-15-96 Time 1435
Organism Batch #: 7 Diluent Batch #: well #20
Organism Age: 11 days
Test Organism: Cyprinella leedsi

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

Test Number: 4 of 4

Remarks: Chlorinated test

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	21.7 @ 21.7	8.1 @ 25.9 °C	107.9 @ 106.2 1431 @ 1409 @ 25.2 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	21.8 @ 21.8	8.1 @ 25.9 °C	109.8 @ 106.2 1412 @ 1409 @ 25.4 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.9 @ 22.9	8.1 @ 25.8 °C	108.5 @ 106.2 1423 @ 1409 @ 25.7 °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	601	5	5	5	7.5	8.1	8.4	24.1	23.8	24.0	7.8	7.8	7.8	250	250	255
Control B	503	5	5	5	7.6	8.1	8.4	24.1	23.6	23.9	7.8	7.8	7.7	250	250	255
Control C	502	5	5	5	7.6	8.1	8.4	24.1	23.6	23.9	7.8	7.8	7.9	250	245	250
Control D	79	5	5	5	7.6	8.1	8.4	24.1	23.8	24.0	7.8	7.8	7.9	250	250	250
100% A	26	5	0	—	7.4	8.1	—	24.6	23.8	—	8.2	7.8	—	945	935	—
100% B	58	5	0	—	7.4	8.1	—	24.6	23.8	—	8.2	7.8	—	950	930	—
100% C	174	5	1	1	7.4	8.1	8.4	24.7	23.8	24.1	8.3	7.9	7.9	950	935	945
100% D	317	5	2	2	7.4	8.1	8.4	24.8	24.1	24.1	8.3	7.9	7.8	950	935	940
Measured/Loaded by:		MF	MF	TM	JS	MF	JN	JS	MF	JN	JS	MF	JN	JS	MF	JN
Recorded by:		MF	MF	TM	DW	DW	MF	DW	DW	MF	DW	DW	MF	DW	TM	MF

Investigators' Signatures

Marshall Faircloth

Jennifer Spangler

Kristin C. Kelley

Joseph Mouth

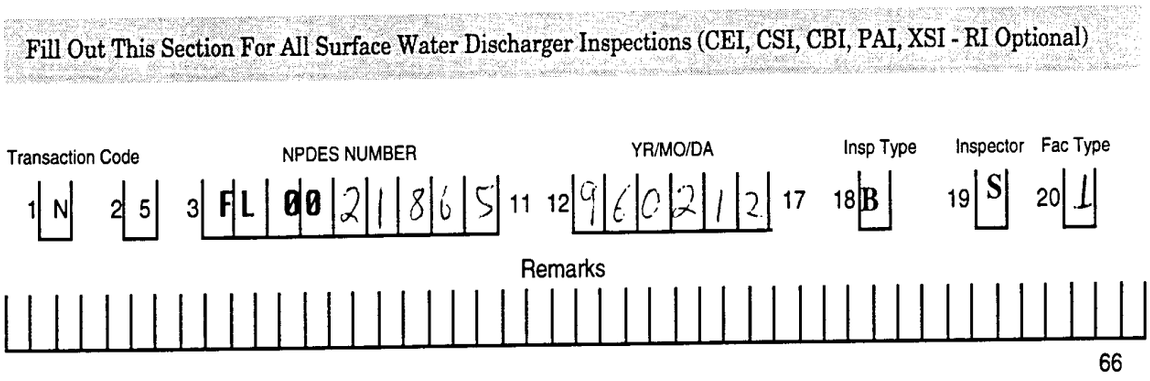
reviewer

form updated 5/05/95

Water Quality Parameters	Salt 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	—	0.45	DR-100	JLS
Alkalinity (mg/L as $CaCO_3$):	120	—	185	Hach	TR
Hardness (mg/L as $CaCO_3$):	125	—	200	Hach	TR
Total ammonia (mg/L as N):	<0.017	—	<0.017	Orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: -58.9 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

The Bioassay of the City of Clearwater East and Northeast WWTF's combined effluent sampled on February 12, 1996, NPDES #FL0021865.



The Priority Pollutants Analysis for the Bioassay of the City of Clearwater East and Northeast WWTF's combined effluent sampled on February 12, 1996, NPDES #FL0021865.

