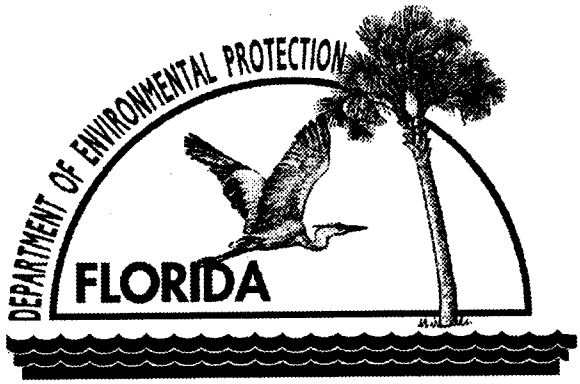


Bioassays of the City of

Dunedin Mainland Wastewater Treatment Plant

Dunedin, Pinellas County, Florida

NPDES #FL0021326

Sampled 12/16/96

June 1997

Biology Section

Division of Administrative & Technical Services

Comprehensive Quality Assurance Plan #870346G

Bioassays of the City of

Dunedin Mainland Wastewater Treatment Plant

Dunedin, Pinellas County, Florida

NPDES #FL0021326

Biology Section
Bureau of Laboratories
June 1997

Introduction

City of Dunedin Mainland WWTP, 1140 Highland Avenue, Dunedin, Pinellas County, Florida, NPDES # FL0021326, tests performed on 17 to 19 December, 1996.

This advanced-wastewater treatment plant has a design capacity of 6.0 MGD and an average flow of approximately 4.0 MGD. The WWTP receives effluent from the City of Dunedin R/O facility, which has a permitted flow of 0.95 MGD. The effluent undergoes filtration, chlorination, and dechlorination with sulfur dioxide gas, prior to discharge to St. Joseph Sound (facility summary provided by Brent Johnson, FDEP, Tampa).

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 test species used for these bioassays were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*. There was no mortality observed in the *Ceriodaphnia dubia* 100% whole effluent by 48 hours. The *Cyprinella leedsi* test was invalidated at 24 hours due to excessive control mortality (15% at 24-hours; 30% at 48 hours) (Table 1).

Bioassays performed on a sample of effluent collected from this facility on March 18, 1996, and using the same test species, showed toxicity which was attributed to the total residual chlorine concentration of the sample. A dechlorinated aliquot of the sample collected on March 18, 1996, did not show toxicity.

Total residual chlorine of the sample was < 0.03 mg/L in the laboratory and 0.04 mg/L in the field. 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 December 16, 1996, did not show toxicity to *Ceriodaphnia dubia*.

Table 1. Data recorded during the 48-hour acute toxicity screening bioassays of a sample of effluent from the City of Dunedin WWTP, Dunedin, Pinellas County, Florida, NPDES#FL0021326, performed on 17 to 19, December, 1996.

Facility:	**City of Dunedin WWTP**			**NPDES #**	**FL0021326**	Facility Type:	Wastewater
Location:	1140 Highland Ave., Dunedin			Contact/District:	B. Johnson/Southwest		Treatment Plant
County:	Pinellas			Test type:	static acute screen		
Sample Collection Date:	12/16/96	Time:	1120	# tests:	4	Receiving Water:	St. Joseph Sound
Test Beginning Date:	12/17/96	Time:	1530	Chlorination Type:	Chlorinated		
Test Ending Date:	12/19/96	Time:	1530		Sample collected after plant dechlorination		Page 1 of 1

Total Residual CL2	mg/L	Method
Field:	0.04	-
Lab:	< 0.03	DR-100

Ammonia	Total (mg/L)	Unionized (mg/L)
Control Water (fish):	< 0.017	< 0.017
20% Dilute Mineral Water (cladocerans):	< 0.017	< 0.017
100% Sample:	<0.017	< 0.017

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	125	135
20% Dilute Mineral Water (cladocerans):	75	90
100% Sample:	40	55

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	4	8.2	-	8.1	24.1	-	24.5	8.0	-	7.9	175	190
Control B	0/20	5	5	4	-	-	8.1	-	-	24.5	-	-	7.9	-	190
Control C	0/20	5	5	5	-	-	8.1	-	-	24.5	-	-	8.0	-	190
Control D	0/20	5	5	5	-	-	8.1	-	-	24.5	-	-	7.9	-	190
100% A	20/0	5	5	5	7.1	-	8.2	24.3	-	24.5	8.0	-	8.0	1350	1410
100% B	20/0	5	5	5	-	-	8.2	-	-	24.6	-	-	7.9	-	1450
100% C	20/0	5	5	5	-	-	8.2	-	-	24.6	-	-	7.9	-	1475
100% D	20/0	5	5	5	-	-	8.2	-	-	24.6	-	-	7.9	-	1480

[A] Temperature of test incubator was continously recorded on a strip chart recorder.
Incubator temperature range for the test period was 24.4-25.4°C.

Organism: ***Cyprinella leedsi*** Age: 14 days
Test invalidated at 24 hours due to excessive control mortality.

	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	4	4	7.9	8.2	8.3	24.8	23.5	23.5	7.8	7.2	8.1	255	250
Control B	0/500	5	4	3	7.9	8.2	8.3	24.9	23.4	23.4	7.8	7.3	8.1	255	245
Control C	0/500	5	5	4	7.9	8.2	8.3	24.9	23.4	23.4	7.8	7.4	8.1	255	245
Control D	0/500	5	4	3	7.9	8.2	8.3	24.9	23.7	23.4	7.8	7.5	8.2	255	250
100% A	500/0	5	5	2	7.2	7.8	8.0	23.6	23.6	23.8	8.1	7.4	8.0	1390	1425
100% B	500/0	5	4	3	7.2	7.8	8.0	23.3	23.4	23.7	8.3	7.4	7.9	1390	1430
100% C	500/0	5	4	4	7.2	7.8	8.0	23.3	23.4	23.6	8.5	7.3	8.0	1390	1425
100% D	500/0	5	3	2	7.2	7.7	8.0	23.4	23.8	23.6	8.6	7.4	8.0	1390	1425

[B] Temperature of test room was continously recorded on a strip chart recorder.
Room temperature range for the test period was 23.5-24.8°C.

Table 2. Results of chemical analyses on effluent from the City of Dunedin Mainland WWTP sampled on December 16, 1996.

Metals

Aluminum	109	µg/L
Calcium	94.2	mg/L
Iron	45	µg/L
Magnesium	14	mg/L
Zinc	30	µg/L

Pesticides and Herbicides

Atrazine	0.044	µg/L[T]

Base, Neutral, & Acid Extractable Organics

none detected

[T] Value reported is less than the criterion of detection.

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Dunedin Mainland WWTP
County: Pinellas
Contact / District: Kent Edwards / TPA
NPDES Permit #: FL0021326
LIMS Sample #: 163497 **LIMS Job #:** 96-DEC-17-32-01
sample log 12/30 DW
Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through
Test Number: 2 of 2

Sample Collection: Date 12/16/96 Time 1120
Test Beginning: Date 12/17/96 Time 1530
Test Ending: Date 12/19/96 Time 1530
Organism Batch #: 93 **Diluent Batch #:** well
Organism Age: 14 days
Test Organism: Cyprinella leedsi

Remarks:
Test invalidated at 48hours due to excessive control mortality (30%) Cause of mortality unknown

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	24.5 @ 24.5	8.2 @ 25.2 °C	1033 @ 101.0 / 783 @ 1001 @ 25.1 °C
24 hr	7.0 @ 7.0 / 9.0 @ 9.0	21.6 @ 21.8	9.4 @ 23.6 °C	1028.5 @ 101.0 / 1000 @ 1001 @ 24.1 °C
48 hr	7.0 @ 7.0 / 9.0 @ 9.0	23.5 @ 23.5	8.5 @ 23.1 °C	1034 @ 1010 / 1000 @ 1001 @ 25.1 °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	013	5	4 (10)	4	7.9	8.2	8.3	24.8	24.4	23.5	7.8	7.2	8.1	255	245	250
Ctr B	014	5	4 (10)	3 (10)	7.9	8.2	8.3	24.9	23.4	23.4	7.8	7.3	8.1	255	245	245
Ctr C	015	5	5	4 (10)	7.9	8.2	8.3	24.9	23.4	23.4	7.8	7.4	8.1	255	245	245
Ctr D	016	5	4 (10)	3 (10)	7.9	8.2	8.3	24.9	23.7	23.4	7.8	7.5	8.2	255	245	250
100% A	017	5	5	2 (10)	7.2	7.8	8.0	23.6	23.6	23.8	8.1	7.4	8.0	1390	1405	1425
100% B	018	5	4 (10)	3 (10)	7.2	7.8	8.0	23.3	23.4	23.7	8.3	7.4	7.9	1390	1405	1430
100% C	019	5	4 (10)	4	7.2	7.8	8.0	23.3	23.4	23.6	8.5	7.3	8.0	1390	1405	1425
100% D	020	5	3 (10)	2 (10)	7.2	7.7	8.0	23.4	23.8	23.6	8.6	7.4	8.0	1390	1410	1425
									A							
									entry error: 23.3 ND	initial temperature recorded was incorrect. probe not acclimated						
Measured/Loaded by:		JS	JS	DN	ND	JS	MF	ND	JS	MF	ND	JS	MF	ND	JS	MF
Recorded by:		ND	ND	DN	JS	ND	ND	JS	ND	ND	JS	ND	ND	JS	ND	ND

Investigators' Signatures
Julie Marpe
Dawn Nicholson
Marshall Faircloth
reviewer
form updated 4/01/96

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.04	—	Brent Johnson
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	<0.03	DR-100	JS
Alkalinity (mg/L as $CaCO_3$):	125	75	40	Hach	ND
Hardness (mg/L as $CaCO_3$):	135	90	55	Hach	ND
Total ammonia (mg/L as N):	<0.017	<0.017	<0.017	ORION	DN

Ammonia Meter #98136 Ammonia Meter Slope: -59.6 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Ouned'in Mainland WWTP
County: Pinellas
Contact / District: Kent Edwards / TPA
NPDES Permit #: FL00 21326
LIMS Sample #: 163497 LIMS Job #: 96- Dec17-32-01
sample log 12/30 OW

Sample Collection: Date 12/16/96 Time 1120
Test Beginning: Date 12/17/96 Time 1530
Test Ending: Date 12-19-96 Time 1550
Organism Batch #: 54 Diluent Batch #: 51
Organism Age: <24hours
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	24.5 @ 24.5	8.2 @ 25.2 °C	103.3 @ 101.0 983 @ 1001 @ 25.1 °C 9760 @ 9927
24 hr	7.0 @ 7.0 9.0 @ 9.0	21.6 @ 21.8	8.4 @ 23.6 °C	1041 @ 101.0 1000 @ 1001 @ 24.1 °C 9910 @ 9927
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.5 @ 23.5	8.5 @ 23.1 °C	103.4 @ 101.0 1000 @ 1001 @ 25.1 °C 9770 @ 9957

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 24 h	UNCORRECTED 48 h
Ctr	A	5	5	4	8.2		8.1	24.1		24.5	8.0		7.9	175		190
Ctr	B	5	5	4			8.1			24.5			7.9			190
Ctr	C	5	5	5			8.1			24.5			8.0			190
Ctr	D	5	5	5			8.1			24.5			7.9			190
100%	A	5	5	5	7.1		8.2	24.3		24.5	8.0		8.0	1350		1410
100%	B	5	5	5			8.2			24.6			7.9			1450
100%	C	5	5	5			8.2			24.6			7.9			1475
100%	D	5	5	5			8.2			24.6			7.9			1480
Measured/Loaded by:		OW	ND	MF	ND		MF	ND		MF	ND		MF	ND		MF
Recorded by:		ND	ND	MF	JS		ND	JS		ND	JS		ND	JS		ND

Investigators' Signatures

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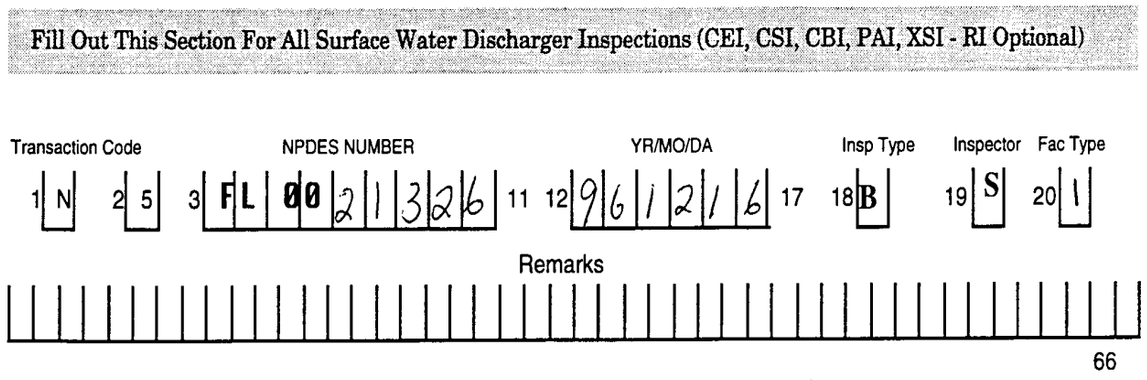
reviewer

form updated 4/01/96

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.04	—	Brent Johnson
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	<0.03	DR-100	JS
Alkalinity (mg/L as $CaCO_3$) :	125	75	40	Hach	ND
Hardness (mg/L as $CaCO_3$) :	135	90	55	Hach	ND
Total ammonia (mg/L as N) :	<0.017	<0.017	<0.017	ORION	DN

Ammonia Meter #98136 Ammonia Meter Slope: -59.6 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

The Bioassay of the City of Dunedin WWTP effluent sampled on December 16, 1996, NPDES #FL0021326.



The Priority Pollutants Analysis for the Bioassay of the City of Dunedin WWTP effluent sampled on December 16, 1996, NPDES #FL0021326.

