

Bioassays of the City of

New Port Richey Wastewater Treatment Plant

New Port Richey, Pasco County, Florida

NPDES #FL0020931

Sampled 5/23/00

April 2001

Biology Section

Division of Resource Assessment & Management

Comprehensive Quality Assurance Plan #870346G

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New Port Richey Wastewater Treatment Plant

New Port Richey, Pasco County, Florida

NPDES #FL0020931

Biology Section
Bureau of Laboratories
April 2001

Introduction

City of New Port Richey Wastewater Treatment Plant, 4730 West Main Street, New Port Richey, Pasco County, Florida, NPDES #FL0020931, tests performed on 24 to 26 May 2000.

This domestic wastewater treatment facility, having a design flow of 7.5 MGD, had a flow of 4.5 MGD during the survey. The treatment of wastewater consists of screening and grit removal, an extended aeration process, clarification, filtration, and disinfection. Chlorine is used for the disinfection. Reclaimed water is sent to a public-access irrigation system. The effluent for discharge is dechlorinated using sulfur dioxide and aerated before being continuously discharged into the Class III marine waters of Cross Bayou.

This facility has consistently failed chronic bioassays for *Ceriodaphnia dubia*, and has intermittently exceeded the copper criteria of 2.9 µg/L for State of Florida Class III marine waters. A draft consent order is being negotiated for copper and toxicity exceedances (facility summary provided by Eddie Hughes and Joe Squitieri, 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. Two additional bioassays were performed on an aliquot of sample that was dechlorinated by the addition of sodium thiosulfate. The test species used for these bioassays were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*. The test results indicated that the 100% sample was toxic to both the *C. leedsi* and the *C. dubia*, producing 100% mortality within one hour of test initiation. The dechlorinated sample tests did not show toxicity to either test species by 48 hours (Table 1).

The total residual chlorine concentration of the sample was 1.81 mg/L in the laboratory. Total ammonia was not detected in the sample. Further chemical analyses were performed on the sample, and several metals were identified. The copper concentration in the effluent (9.6 µg/L) exceeded the State of Florida surface water criteria for copper in Class III marine waters ($\leq$ 2.9 µg/L) (Table 2).

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, EPA 44015-86-001, 1986). We attribute the acute toxicity observed within the sample primarily to the chlorine given the lack in mortality was observed in the dechlorinated sample. However, the dechlorination process used in the lab can also remove other toxins.

Conclusion

The sample of effluent collected from this facility on August 15, 2000, showed toxicity to both test species, *C. leedsi* and *C. dubia*. The observed toxicity is attributed primarily to the chlorine in the sample, but other unidentified toxins may have contributed to the noted toxicity.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the City of New Port Richey WWTP, 4730 West Main Street, New Port Richey, Pasco County, Florida, NPDES# FL0020931, performed on 24 to 26, May 2000.

Facility:	**New Port Richey WWTP**		**NPDES #**	**FL0020931**	Facility Type:	**Wastewater**	
Location:	4730 West Main Street		Contact/District:	C. Kovach/SW District		**Treatment Facility**	
County:	Pasco		Test type:	static acute screen			
Sample Collection Date:	5/23/00	Time: 1300	# tests:	2	Receiving Water:	Cross Bayou	
Test Beginning Date:	5/24/00	Time: 1345	Chlorination Type:	Chlorinated			
Test Ending Date:	5/26/00	Time: 1510				**Page 1 of 2**	

Total Residual CL2	mg/L	Method
Field:	-	-
Lab:	1.81	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):	137	127
20% Dilute Mineral Water (cladocerans):	75	82
100% Sample:	170	274

Salinity[C]	(ppt)
Control Water:	<1
100% Sample:	~1

[C] Salinity based on conductivity and temperature measurements.

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

Concentrations	Sample/Diluent Volume(mL)	SURVIVAL # Alive 0 hr	24 hr	48 hr	pH 0 hour	24 hour	48 hour	Temperature[A] 0 hour	24 hour	48 hour	Dissolved Oxygen 0 hour	24 hour	48 hour	Conductivity Uncorrected µmhos/cm 0 hour	48 hour
Control A	0/20	5	5	5	8.5	-	8.4	24.9	-	23.3	7.9	-	8.1	180	290
Control B	0/20	5	5	5	-	-	8.4	-	-	23.3	-	-	8.0	-	260
Control C	0/20	5	5	5	-	-	8.5	-	-	23.4	-	-	7.9	-	245
Control D	0/20	5	5	5	-	-	8.4	-	-	23.7	-	-	8.0	-	230
100% A	20/0	5	0	0	7.7	-	-	- 24.9	-	-	- 7.6	-	-	- 1370	-
100% B	20/0	5	0	0	-	-	-	- -	-	-	- -	-	-	- -	-
100% C	20/0	5	0	0	-	-	-	- -	-	-	- -	-	-	- -	-
100% D	20/0	5	0	0	-	-	-	- -	-	-	- -	-	-	- -	-
Dechlorinated 100% A	20/0	5	5	5	7.6	-	8.6	24.8	-	23.6	7.4	-	7.6	1380	1750
Dechlorinated 100% B	20/0	5	5	5	-	-	8.6	-	-	23.5	-	-	7.7	-	1920
Dechlorinated 100% C	20/0	5	5	5	-	-	8.6	-	-	23.7	-	-	7.9	-	1785
Dechlorinated 100% D	20/0	5	5	5	-	-	8.6	-	-	23.8	-	-	7.6	-	1770

[B] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 25.0-27.5°C.
Incubator #2 temperature range for the test period was 20.5-29.0°C.

Continued

Table 1. concluded

Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the City of New Port Richey WWTP, 4730 West Main Street, New Port Richey, Pasco County, Florida, NPDES# FL0020931, performed on 24 to 26, May 2000.

Facility:	**New Port Richey WWTP**			**NPDES #**	**FL0020931**	Facility Type:	**Wastewater**
Location:	4730 West Main Street			Contact/District:	C. Kovack/ SW District		**Treatment Facility**
County:	Pasco			Test type:	static acute screen		
Sample Collection Date:	5/23/00	Time:	1300	# tests:	2	Receiving Water:	Cross Bayou
Test Beginning Date:	5/24/00	Time:	1345	Chlorination Type:	Chlorinated		
Test Ending Date:	5/26/00	Time:	1510				**Page 2 of 2**

Organism: *Cyprinella leedsi* Life stage: 11 days

Concentrations	Sample/Diluent Volume(mL)	SURVIVAL # Alive 0 hr	24 hr	48 hr	pH 0 hour	24 hour	48 hour	Temperature[A] 0 hour	24 hour	48 hour	Dissolved Oxygen 0 hour	24 hour	48 hour	Conductivity Uncorrected µmhos/cm 0 hour	48 hour
Control A	0/500	5	5	5	7.9	8.4	8.5	24.8	24.5	23.9	7.7	7.4	7.8	260	265
Control B	0/500	5	5	5	7.9	8.4	8.5	24.8	24.2	23.7	7.7	7.4	8.0	260	265
Control C	0/500	5	5	5	7.9	8.4	8.5	24.8	24.2	24.0	7.7	7.5	7.7	255	265
Control D	0/500	5	5	5	7.9	8.4	8.5	24.8	24.0	23.8	7.6	7.6	7.8	260	260
100% A	500/0	5	0	0	7.5	-	-	25.3	-	-	8.1	-	-	1400	-
100% B	500/0	5	0	0	7.5	-	-	25.4	-	-	8.1	-	-	1395	-
100% C	500/0	5	0	0	7.5	-	-	25.3	-	-	8.2	-	-	1395	-
100% D	500/0	5	0	0	7.5	-	-	25.3	-	-	8.2	-	-	1390	-
Dechlorinated 100% A	500/0	5	5	5	7.7	8.2	8.2	24.9	24.2	24.7	7.6	7.2	6.4	1400	1440
Dechlorinated 100% B	500/0	5	5	5	7.7	8.2	8.2	25.0	24.2	24.5	7.5	7.2	6.8	1420	1445
Dechlorinated 100% C	500/0	5	5	5	7.7	8.2	8.2	25.0	24.2	24.2	7.5	7.3	6.6	1415	1460
Dechlorinated 100% D	500/0	5	5	5	7.7	8.2	8.2	25.0	24.2	24.0	7.6	7.3	6.8	1415	1450

[B] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 25.0-27.5°C.
Incubator #3 temperature range for the test period was 25.0-26.0°C.

Total Residual CL2	mg/L	Method
Field:	-	-
Lab:	1.81	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):	137	127
20% Dilute Mineral Water (cladocerans):	75	82
100% Sample:	170	274

Salinity[C]	(ppt)
Control Water:	<1
100% Sample:	~1

[C] Salinity based on conductivity and temperature measurements.

Table 2. Results of chemical analyses on the effluent from City of New Port Richey WWTP sampled on May 23, 2000.

Metals

Cadmium	0.3	µg/L	
Calcium	83.7	mg/L	
Chromium	1.1	µg/L	I
Copper	9.6	µg/L	
Iron	32	µg/L	I
Magnesium	14.5	mg/L	
Nickel	2	µg/L	I
Silver	0.083	µg/L	I
Zinc	42.1	µg/L	

Pesticides and Herbicides

None detected

Base, Neutral, & Acid Extractable Organics

None detected

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: New Port Richey WWTP
County: Pasco
Contact / District: Charles Kovach / SW-DIST
NPDES Permit #: FL0020931
LIMS Sample #: 457674 LIMS Job #: TLH2000-05-24-43-01

Sample Collection: Date 5/23/00 Time 1300
Test Beginning: Date 5/24/00 Time 1345
Test Ending: Date 5/26/00 Time 1510
Organism Batch #: 39 Diluent Batch #: Well
Organism Age: 11 days SRT toxicant batch #: —

Test organism: Cyprinella leedsi

sample log
Test Type: Screening / Definitive
(Static) / Static Renewal / Flow-through
Test Number: 2 of 2

Remarks: * All organisms in 100% pure sample were dead within one hour of loading.

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	Cond. 24 h	Cond. 48 h
Cont A	E9	5	5	5	7.9	8.4	8.5	24.8	24.5	23.9	7.7	7.4	7.8	260	250	265
Cont B	E10	5	5	5	7.9	8.4	8.5	24.8	24.2	23.7	7.7	7.4	8.0	260	260	265
Cont C	E11	5	5	5	7.9	8.4	8.5	24.8	24.2	24.0	7.7	7.5	7.7	255	260	265
Cont D	E12	5	5	5	7.9	8.4	8.5	24.8	24.0	23.8	7.6	7.6	7.8	260	255	260
100% A	E13	5	5	5	7.7	8.2	8.2	24.9	24.2	24.7	7.6	7.2	6.4	1400	1345	1440
100% B	E14	5	5	5	7.7	8.2	8.2	25.0	24.2	24.5	7.5	7.2	6.8	1420	1395	1445
100% C	E15	5	5	5	7.7	8.2	8.2	25.0	24.2	24.2	7.5	7.3	6.6	1415	1410	1460
100% D	E16	5	5	5	7.7	8.2	8.2	25.0	24.2	24.0	7.6	7.3	6.8	1415	1415	1450
100% A	E17	5	—	—	7.5	—	—	25.3	—	—	8.1	—	—	1400	—	—
100% B	E18	5	—	—	7.5	—	—	25.4	—	—	8.1	—	—	1395	—	—
100% C	E19	5	—	—	7.5	—	—	25.3	—	—	8.2	—	—	1395	—	—
100% D	E20	5	—	—	7.5	—	—	25.3	—	—	8.2	—	—	1390	—	—
measured by:		MF	SG	SG	SG	MF	KL	SG	MF	KL	SG	MF	KL	SG	MF	KL
recorded by:		SG	SG	SG	MF	SG	SG	MF	SG	SG	MF	SG	SG	MF	SG	SG

1 deionized water

Investigators' Signatures
Mandi Fawbush
Shannon Gerardo

Temperature Range °C
Incubator # 3 25.0°-26.0°C
Room B246 25.0°-27.5°C

Water Quality Parameters	Salt Water: Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			(SG) 1.91	—	—	SG
Lab Total Residual Cl2 (mg/L):	<0.03		~~0.05~~	DR100	SG	SG
Alkalinity (mg/L as $CaCO_3$):	137		170	Hach	SG	SG
Hardness (mg/L as $CaCO_3$):	127		274	Hach	SG	SG
Total ammonia (mg/L as N):	<0.017		<0.017	Denver	MF	SG
Salinity:	0		~1	YSI	SG	SG

AA Wolfe
reviewer

form updated 3/3/99

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: New Port Richey WWTP
County: Pasco
Contact / District: Charles Kovach / SW-DIST
NPDES Permit #: FL0020931
LIMS Sample #: 457674 LIMS Job #: TH2000-05-24-43-01 (24)
sample log ____
Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Test Number: 1 of 2

Sample Collection: Date 5/23/00 Time 1300
Test Beginning: Date 5/24/00 Time 1345
Test Ending: Date 5/26/00 Time 1310
Organism Batch #: 28 Diluent Batch #: Dmw# 15
Organism Age: 24 hr. SRT toxicant batch #: —
Test organism: Ceriodaphnia dubia

Remarks: *All organisms in 100% pure sample were dead with one hour of loading.

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	*pH W/P (SG) 0 hr	pH 24 h	pH 48 h	*W.P. (SG) Temperature (°C) 0 hr	Temperature 24 h	Temperature 48 h	*W.P. (SG) D.O. (mg/L) 0 hr	D.O. 24 h	D.O. 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	Cond. 24 h	Cond. 48 h	* W.P. (SG) 48hr
Control A	A	5	5	5	8.5	8.4	8.4	24.9	24.5	25.3	7.9	7.4	8.1	180	—	265	290
Cont B	B	5	5	5	—	8.4	8.4	—	24.2	23.3	—	7.4	8.0	—	—	265	260
Cont C	C	5	5	5	—	8.4	8.5	—	24.2	23.4	—	7.5	7.9	—	—	265	245
Cont D	D	5	5	5	—	8.4	8.4	—	24.0	23.7	—	7.6	8.0	—	—	260	230
100% A	A	5	5	5	7.7	8.2	8.6	24.9		23.6	7.6		7.6	1370	—	1440	1750
100% B	B	5	5	5	—	8.2	8.6	—		23.5	—		7.7	—	—	1445	1920
100% C	C	5	5	5	—	8.2	8.6	—		23.7	—		7.9	—	—	1460	1785
100% D	D	5	5	5	—	8.2	8.6	—		23.8	—		7.6	—	—	1450	1770
100% A	A	5	—	—	7.6	—	—	24.8	—	—	7.4	—	—	1380	—	—	
100% B	B	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
100% C	C	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
100% D	D	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
measured by:		SG	SG	KL	SG	MF	KL	SG	MF	KL	SG	MF	KL	SG	MF	KL	
recorded by:		MF	SG	SH	MF	SH	SH	MF	SG	SH	MF	SH	SH	MF	SG	SG	

1 dechlorinated

WP = Wrong Place

Investigators' Signatures
Marshall Faircloth
Shannon Gerardi

Temperature Range °C
Incubator # 2 20.5° - 29.0°C
Room 6244 25.0° - 27.5°C

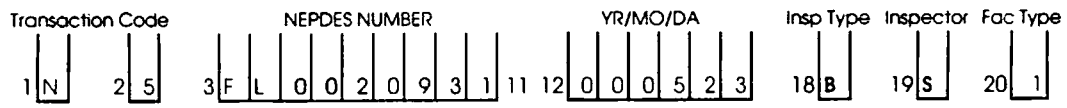
Water Quality Parameters	Salt Water / Well Water / 20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):		—	—	—	SG
Lab Total Residual Cl2 (mg/L):	<0.03	1.81	DR100	SG	SG
Alkalinity (mg/L as $CaCO_3$):	75	170	Hach	SG	SG
Hardness (mg/L as $CaCO_3$):	82	274	Hach	SG	SG
Total ammonia (mg/L as N):	<0.017	<0.017	Denver	MF	SG
Salinity:	0	≈1	Ysi	SG	SG

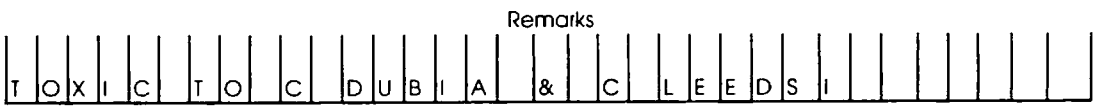
A Wolfe
reviewer

form updated 3/3/99

The Bioassay of City of New Port Richey WWTP effluent sampled on May 23, 2000, NPDES #FL0020931.

Fill Out This Section For All Surface Water Discharger Inspections(CEI, CSI, CBI, PAI, XSI-RI Optional)

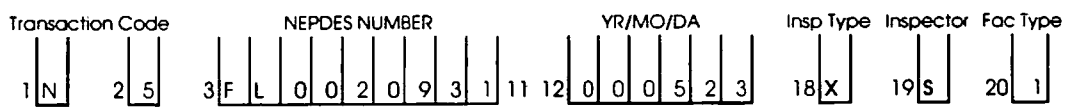


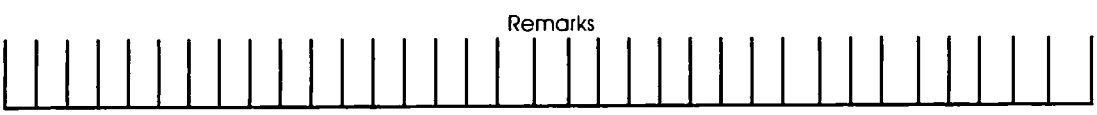


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The Priority Pollutants Analysis for Bioassay of City of New Port Richey WWTP effluent sampled on May 23, 2000, NPDES #FL0020931.

Fill Out This Section For All Surface Water Discharger Inspections(CEI, CSI, CBI, PAI, XSI-RI Optional)





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