



Bioassays of  
**Plant City Water Reclamation Facility**  
Plant City, Hillsborough County, Florida  
NPDES #FL0026557  
Sampled 3/12/01

November 2001

**Biology Section**  
**Division of Resource Assessment & Management**  
Comprehensive Quality Assurance Plan #870346G

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**Plant City Water Reclamation Facility**  
Plant City, Hillsborough County, Florida  
NPDES #FL0026557

**Biology Section  
Bureau of Laboratories  
November 2001**

## Introduction

Plant City Water Reclamation Facility, 705 North Alexander Street, Plant City, Hillsborough County, Florida, NPDES #FL0026557, tests performed on 13 to 15 March 2001.

This wastewater treatment plant has a design flow of 8.0 MGD and an annual average flow of 1.4 MGD. Treatment of the wastewater includes screening and degritting. The wastewater then flows through an activated-sludge treatment process and is polished in a 17-acre hyacinth pond. The effluent is then filtered and chlorinated for public-access reuse. Currently the public-access reuse system consists of irrigation of an orange grove, a nursery, a few residential lawns, and a church lawn. The facility is permitted to use more of their effluent in the public-access reuse system, but has not expanded their full potential. The portion of effluent that is not reused is aerated and dechlorinated with sulfur dioxide before being discharged into the Class III freshwaters of East Canal, Itchepackesassa creek, Blackwater Creek, the Hillsborough River, and then into Tampa Bay. The facility is investigating upgrading the aeration process in an attempt to better control the nitrification/denitrification process. This facility is also in the process of resolving intermittent toxicity concerns (facility summary provided by 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 the outfall to East Canal from this facility. The test species used for these bioassays were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*. The test results did not indicate toxicity by 48 hours (Table 1).

Total residual chlorine in the sample was not detected in the lab, and measured <0.02 mg/L when measured in the field. Total and unionized ammonia measured 4.67 mg/L and 0.199 mg/L, respectively in the bioassay sample. The sample's unionized ammonia concentration of 0.06 mg/L, calculated using the physical-chemical readings for the effluent on the day of sampling and analytical chemistry results for total ammonia, exceeded the State of Florida water quality criteria for unionized ammonia in Class III fresh waters ( $\leq 0.02$  mg/L). Further chemical analyses were performed on the sample, and several metals and pesticides were identified (Table 2).

## Conclusion

The sample of effluent collected from this facility on March 12, 2001, did not show acute toxicity to either test species within 48 hours. Based upon physical-chemistry readings taken on the effluent at the time of sampling, the unionized ammonia concentration of the effluent exceeded the State of Florida water quality criteria for unionized ammonia in Class III fresh waters.

**Table 1.** Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Plant City Water Reclamation Facility, 705 North Alexander Street, Plant City, Hillsborough County, Florida, NPDES# FL0026557, performed on 13 to 15 March 2001.

Facility: <b>Plant City Water Reclamation Facility</b>	NPDES # <b>FL0026557</b>	Facility Type: <b>Wastewater Treatment Plant</b>
Location: 705 North Alexander Street	Contact/District: Grainger/Southwest	
County: Hillsborough	Test type: static acute screen	
Sample Collection Date: 3/12/01 Time: 1100	# tests: 2	Receiving Water: East Canal
Test Beginning Date: 3/13/01 Time: 1330	Chlorination Type: Chlorinated	
Test Ending Date: 3/15/01 Time: 1305	sample collected after dechlorination	<b>Page 1 of 1</b>

Total Residual CL2	mg/L	Method
Field:	<0.02	NA
Lab:	<0.03	Hach

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:	4.67	0.199

Organism: <i>Ceriodaphnia dubia</i>		Life stage: < 24 hours												Conductivity Uncorrected	
Concentrations	Sample/Diluent	SURVIVAL # Alive			pH			Temperature <sup>A</sup>			Dissolved Oxygen			μmhos/cm	
	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	-	8.4	25.8	-	25.0	8.4	-	8.4	180	200
Control B	0/20	5	5	5	-	-	8.3	-	-	24.7	-	-	8.4	-	190
Control C	0/20	5	5	5	-	-	8.3	-	-	24.6	-	-	8.1	-	190
Control D	0/20	5	5	5	-	-	8.3	-	-	24.7	-	-	8.2	-	185
100% A	20/0	5	5	5	7.8	-	8.7	25.2	-	24.7	8.0	-	8.3	1550	1710
100% B	20/0	5	5	5	-	-	8.7	-	-	24.7	-	-	8.4	-	1690
100% C	20/0	5	5	5	-	-	8.7	-	-	24.7	-	-	8.4	-	1665
100% D	20/0	5	5	5	-	-	8.7	-	-	24.7	-	-	8.4	-	1550

<sup>A</sup> Temperatures of room and test incubator were continuously recorded on a strip chart recorder.  
Room Temperature range for the test period was 24.0-26.0°C.  
Incubator #2 temperature range for the test period was 24.5-26.0°C.

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	140	124
20% Dilute Mineral		
Water (cladocerans):	86	80
100% Sample:	253	245

Salinity <sup>C</sup>	(ppt)
Control Water:	<1
100% Sample:	<1

<sup>C</sup> Salinity based on conductivity and temperature

Organism: <i>Cyprinella leedsii</i>		Life stage: 11 days														Conductivity	
																Uncorrected	
Sample/Diluen		SURVIVAL # Alive			pH			Temperature <sup>B</sup>			Dissolved Oxygen			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	8.0	8.2	8.4	25.0	26.0	24.8	7.8	8.0	8.0	260	270		
Control B	0/500	5	5	5	8.0	8.2	8.4	24.9	24.7	24.7	7.8	7.6	7.8	260	270		
Control C	0/500	5	5	5	8.0	8.3	8.4	24.9	25.4	24.6	7.8	7.6	7.8	250	275		
Control D	0/500	5	5	5	8.0	8.3	8.4	24.8	24.6	24.7	7.8	7.6	7.9	255	265		
100% A	500/0	5	5	5	7.8	8.3	8.4	24.8	25.0	24.8	7.9	7.5	7.5	1585	1625		
100% B	500/0	5	5	5	7.8	8.3	8.4	24.8	24.6	24.7	7.9	7.3	7.2	1580	1600		
100% C	500/0	5	5	5	7.8	8.3	8.4	24.8	24.6	24.6	7.9	7.4	7.1	1580	1620		
100% D	500/0	5	5	5	7.8	8.3	8.4	24.8	24.8	24.6	8.1	7.2	7.1	1570	1600		

<sup>B</sup> Temperatures of room and test incubator were continuously recorded on a strip chart recorder.  
Room Temperature range for the test period was 24.0-26.0°C.  
Incubator #3 temperature range for the test period was 24.0-25.5°C.

**Table 2. Results of chemical analyses on the effluent from Plant City Water Reclamation Facility sampled on March 12, 2001.**

**Metals**

Cadmium	0.075	µg/L	<sup>I</sup>
Calcium	80.9	mg/L	
Chromium	1.9	µg/L	<sup>I</sup>
Copper	1.5	µg/L	<sup>I</sup>
Iron	88	µg/L	
Magnesium	10.1	mg/L	
Nickel	4.5	µg/L	<sup>I</sup>
Selenium	0.96	µg/L	<sup>I</sup>
Zinc	9.8	µg/L	<sup>I</sup>

**Pesticides and Herbicides**

Atrazine	0.18	µg/L	<sup>I</sup>
Diazinon	0.18	µg/L	<sup>I</sup>

**Base, Neutral, & Acid Extractable Organics**

None detected

**Ammonia**

Ammonia-N	4	mg N/L
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<sup>I</sup> Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit.

## The Bioassay of Plant City Water Reclamation Facility effluent sampled on March 12, 2001, NPDES #FL0026557.

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

Transaction Code		NEPDES NUMBER										YR/MO/DA				Insp Type	Inspector	Fac Type									
1	N	2	5	3	F	L	0	0	2	6	5	5	7	#	12	0	1	0	3	1	2	18	B	19	S	20	1

Remarks																											
N	O	T	O	X	I	C	I	T	Y																		

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## The Priority Pollutants Analysis for Bioassay of Plant City Water Reclamation Facility effluent sampled on March 12, 2001, NPDES #FL0026557.

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

Transaction Code		NEPDES NUMBER										YR/MO/DA				Insp Type	Inspector	Fac Type									
1	N	2	5	3	F	L	0	0	2	6	5	5	7	#	12	0	1	0	3	1	2	18	X	19	S	20	1

Remarks																											

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