

Bioassays of

Red Carpet Inn/Candyland Sewage Treatment Plant

St. Augustine, St. Johns County, Florida

NPDES #FL0031062

Sampled 9/21/92

November 1992

Biology Section
Division of Technical Services

Red Carpet Inn/Candyland Sewage Treatment Plant

St. Augustine, St. Johns County, Florida

NPDES #FL0031062

Biology Section
Bureau of Laboratories
November 1992

Introduction

Red Carpet Inn/Candyland STP, St. Augustine, St. Johns County, Florida, NPDES #FL0031062, tests performed on 22 to 24 September, 1992.

This facility, located at I-95 and SR16 in St. Augustine, is a privately-owned, extended aeration STP with a design flow of 20,000 gpd. It has two parallel treatment plants with a common chlorinated discharge to a tributary of Trestle Bay Swamp.

The toxicity tests discussed in this report were performed in accordance with methods described by Weber, 1991, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, 4th Edition (EPA/600/4-90/027).

Results and Discussion

The FDER Biology Section performed four 48-hour static acute screening toxicity bioassays on a sample of effluent from this facility. Due to the suspended solids in the sample, two of the bioassays were performed on an aliquot of sample which was filtered through filter floss. The test species used for these bioassays were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Notropis leedsi*.

The test results indicated that the unfiltered aliquot was toxic to *C. dubia*. The *C. dubia* had 100% mortality, producing a 48-hour $LC_{50} < 100\%$. The unfiltered aliquot was not toxic to *N. leedsi*. The filtered aliquot did not exhibit toxicity to either test species.

Total residual chlorine and total ammonia were not detected in the sample. Additional chemical analyses were performed on the sample. Several metals were present (Table 2). The copper concentration (84 µg/L) violated the state standard of 22 µg/L at the sample hardness of 205 mg/L as $CaCO_3$. Aliphatics and unidentified compounds were detected in both the effluent sample and field blank. The pesticide, chlorpyrifos (0.056 µg/L), was present in the sample.

The mortality of *C. dubia* may be associated with possible physical impairment by the suspended solids in the unfiltered aliquot. In addition, any toxicant(s) may have adsorbed to the floss during filtering, resulting in no mortality from the filtered aliquot. The results are inconclusive and should not be used to determine compliance with state toxicity standards. Additional testing will be needed to determine compliance.

Conclusion

The sample of effluent collected from this facility on 21 September, 1992, caused mortality to the cladoceran, *Ceriodaphnia dubia*. This mortality may be associated with possible physical impairments to *C. dubia* from the suspended solids in the sample.

Table 1. Concentration series and volumes used for the 48-hour static acute screening bioassays of the Red Carpet Inn / Candyland STP effluent on 22 to 24 September, 1992.

Ceriodaphnia dubia (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	20 mL	0 mL	20 mL
100%	0 mL	20 mL	20 mL

Notropis leedsi (bannerfin shiner)

Concentration	Dilution Water	Sample	Total Volume
Control	500 mL	0 mL	500 mL
100%	0 mL	500 mL	500 mL

Table 2. Results of chemical analyses on the sample of effluent from the Red Carpet Inn / Candyland STP, St. Johns County, on 21 September, 1992.

Metals

Aluminum	55 µg/L
Calcium	142 mg/L
Copper	84 µg/L
Magnesium	5.3 mg/L
Zinc	40 µg/L

Pesticides and Herbicides

Chlorpyrifos	0.056 µg/L [A]

Base-Neutral & Acid Extractables

Tentative Identification	*Estimated Concentrations*
Aliphatics	48 µg/L effluent, 2 µg/L field blank
Unidentified Compounds	2 µg/L effluent, 1 µg/L field blank

A Value reported is the mean of two or more determinations.

Table 3. Data recorded during the 48-hour static acute screening bioassays of a sample of effluent from the Red Carpet Inn / Candyland STP, St. Augustine, St. Johns County, Florida, NPDES# FL0031062, on 22 to 24 September, 1992.

Facility:	**Red Carpet Inn / Candyland STP**		**NPDES #**	**FL0031062**	Facility Type: **Sewage Treatment**
Location:	I-95 and SR16		Contact/District:	K. Kohn / Northeast	
County:	St. Johns		Test type:	static screening	
Sample Collection Date:	**9/21/92**	Time: 1500	# tests:	2	Receiving Water: Tributary to
Test Beginning Date:	9/22/92	Time: 1300	Chlorination Type:	**chlorinated**	Trestle Bay Swamp
Test Ending Date:	9/24/92	Time: 1300	Dechlor Method:	TRC not detected	**Page 1 of 1**

Total Residual Cl2	mg/l	Method
Field:	-	-
Lab:	0.0	DR-100

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.0	0.0
Cond. Control Water (daphnids):	0.0	0.0
100% Sample:	0.0	0.0

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	110	122
Cond. Control Water (daphnids):	70	75
100% Sample:	298	205

Organism: ***Ceriodaphnia dubia*** Life stage: < 24 hours
LC50: <100%

	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	5	5	5	8.4	-	8.2	23.0	-	23.8	8.6	-	8.2	158	168
Control	5	5	5	-	-	8.2	-	-	-	-	-	8.2	-	-
Control	5	5	5	-	-	8.2	-	-	-	-	-	8.2	-	-
Control	5	5	5	-	-	8.2	-	-	-	-	-	8.2	-	-
100%	5	5	0	7.7	-	8.6	22.0	-	23.8	6.0	-	8.1	910	931
100%	5	5	0	-	-	8.6	-	-	-	-	-	8.1	-	-
100%	5	5	0	-	-	8.6	-	-	-	-	-	8.1	-	-
100%	5	5	0	-	-	8.6	-	-	-	-	-	8.1	-	-
*100%	5	5	5	7.8	-	8.6	22.0	-	23.8	6.5	-	8.2	951	936
*100%	5	5	5	-	-	8.6	-	-	-	-	-	8.2	-	-
*100%	5	5	5	-	-	8.6	-	-	-	-	-	8.2	-	-
*100%	5	5	5	-	-	8.6	-	-	-	-	-	8.2	-	-

* Sample filtered through filter floss to remove solids.

Organism: ***Notropis leedsi*** Age: 10 days
LC50: -

	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	5	5	5	7.9	8.3	8.4	23.0	22.2	22.0	8.5	8.2	8.4	-	-
Control	5	5	5	7.9	8.3	8.4	-	-	-	8.5	8.2	8.4	241	238
100%	5	5	5	7.7	8.2	8.3	22.0	22.0	22.0	5.8	7.6	8.0	-	-
100%	5	5	5	7.7	8.2	8.3	-	-	-	5.8	7.6	8.0	949	949
*100%	5	5	5	7.7	8.3	8.4	22.0	22.0	21.9	5.7	7.7	8.2	-	-
*100%	5	5	5	7.7	8.3	8.4	-	-	-	5.7	7.8	8.2	949	948

* Sample filtered through filter floss to remove solids.

DEM Biology Section — Acute Bioassay Bench Sheet

Sample Source: RED CARPET STP
Address/City:
County:
Contact/District: KEN KOHN NE
NPDES Permit #: FL00 Outfall #:

Sample Collection: Date 9-21-92 Time 1500
Test Beginning: Date 9-22-92 Time 1300
Test Ending: Date 9-24-92 Time 1300
Test Organism: C. DUBIA
Life Stage/Age: < 24 HRS

Test Number: 1 of 2 Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through

AH805-92-SEP-22-04

Remarks: entered 9/24 KP

* filtered through floss to remove particulates + SUSPENDED SOLIDS

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7@7, 10@10	8.6@23.5	23.5@23.6	965 @ 23.5 / 9580
24 hr	7@7, 10@10	8.7@23°C	22.8@22.9	967 / 9452 @ 22.9°C
48 hr	7@7, 10@10	8.7@23.0	22.2@22.3	946 / 9330 @ 22.3

	Conc.	Chamber #	Number Live 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	DO (mg/L) 0	24	48	Cond. (µmhos/cm) 0	24	48
	control	A	5	5	5	8.4		8.2	23.0		23.8	8.6		8.2	158		168
	control	B	5	5	5			8.2						8.2			
	control	C	5	5	5			8.2						8.2			
	control	D	5	5	5			8.2						8.2			
	100%	A	5	5	0	7.7		8.6	22.0		23.8	6.0		8.1	910		931
	100%	B	5	5	0			8.6						8.1			
	100%	C	5	5	0			8.6						8.1			
	100%	D	5	5	0			8.6						8.1			
*	100%	A	5	5	5	7.8		8.6	22.0		23.8	6.5		8.2	951		936
*	100%	B	5	5	5			8.6						8.2			
*	100%	C	5	5	5			8.6						8.2			
*	100%	D	5	5	5			8.6						8.2			
	Measured/Loaded by:		MF	MF	MF	KP		MF	KP		MF	KP		MF	KP		MF
	Recorded by:		MF	MF	MF	MF		KP	MF		KP	MF		KP	MF		KP

Investigators' Signatures

Kim Pearce
Marshall Faircloth

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:			0.0	Hach	KP
Alkalinity:	110	70	298	Hach	MF/KP
Hardness:	122	75	205/22	Hach	MF/KP
Total Ammonia:	0.0	0.0	0.0	Hach	MF

Ammonia Meter Slope: _____
Ammonia Blank: 0.0
Salinity Sample: _____ ppt

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: RED CARPET STP
Address/City:
County:
Contact/District: KEN KOHN NE
NPDES Permit #: FL00 Outfall #:

Sample Collection: Date 9-21-92 Time 1500
Test Beginning: Date 9-22-92 Time 1300
Test Ending: Date 9-24-92 Time 1300
Test Organism: N. LEEDSI
Life Stage/Age: * 10 days

Test Number: 2 of 2 Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through

41805 92-SEP-22-04
entered 9/24 KP

Remarks:

* filtered through floss to remove particulates. + SUSPENDED SOLIDS

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7@7, 10@10	8.6@23.5	23.5@23.6	965 9.58@23.5
24 hr	7@7, 10@10	8.7@23°C	22.8@22.9°	967 948@22.9
48 hr	7@7, 10@10	8.7@23.0	22.2@22.3	946 9330@22.3

		Number Live			pH			Temp. (°C)			DO (mg/L)			Cond. (µmhos/cm)		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control	21	5	5	5	7.9	8.3	8.4	23.0	22.2	22.0	8.5	8.2	8.4			
Control	209	5	5	5	7.9	8.3	8.4				8.5	8.2	8.4	241	238	238
100%	43	5	5	5	7.7	8.2	8.3	22.0	22.0	22.0	5.8	7.6	8.0			
100%	67	5	5	5	7.7	8.2	8.3				5.8	7.6	8.0	949	957	949
* 100%	7	5	5	5	7.7	8.3	8.4	22.0	22.0	21.9	5.7	7.7	8.2			
* 100%	147	5	5	5	7.7	8.3	8.4				5.7	7.8	8.2	949	950	948
Measured/Loaded by:		MF	MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF
Recorded by:		MF	MF	KP	MF	KP	KP	MF	KP	KP	MF	KP	KP	MF	KP	KP

Investigators' Signatures

Kim Pearce
Marshall Faircloth

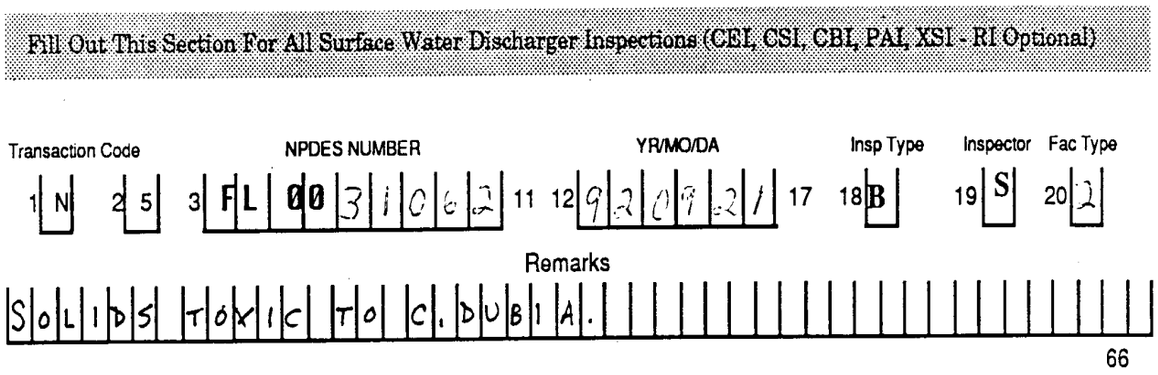
Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:			0.0	Hach	KP
Alkalinity:	110	70	298	Hach	MF/KP
Hardness:	122	75	205	Hach	MF/KP
Total Ammonia:	0.0	0.0	0.0	Hach	MF

Ammonia Meter Slope: _____ Ammonia Blank: 0.0 Salinity Sample: ppt

The Bioassay of the Red Carpet / Candyland STP, NPDES# FL0031062, effluent sampled on September 21, 1992.



The Priority Pollutants Analysis for the Bioassay of the Red Carpet / Candyland STP, NPDES# FL0031062, effluent sampled on September 21, 1992.

