Bioassays of

Panama City Beach Wastewater Treatment Plant

Panama City Beach, Bay County, Florida

NPDES #FL0021512

Sampled 5/22/89

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October 13, 1989

Biology Section

Division of Administrative and Technical Services

Bioassays of

Panama City Beach Wastewater Treatment Plant

Panama City Beach, Bay County, Florida

NPDES #FL0021512

Biology Section
Bureau of Laboratories
October 13, 1989

Introduction

Panama City Beach Wastewater Treatment Plant, Panama City Beach, Bay County, NPDES #FL0021512, on 23 to 25 May, 1989.

This facility is located at 110 South Arnold Road. According to the NPDES permit, it has a design flow capacity of 1.1 MGD, although peak flows of 2.0 MGD have occurred. The facility treats domestic waste from a population which fluctuates seasonally from 6,000 to 10,000 due to tourism. Treatment consists of contact stabilization, activated sludge aeration, and post-chlorination. The final recovered water is dechlorinated prior to discharge to an unnamed creek which flows to West Bay (Gulf of Mexico).

The toxicity tests discussed in this report were performed in accordance with methods described by Peltier and Weber, 1985, *Methods for Measuring the Acute Toxicity of Effluents to Aquatic Organisms*, 3rd Edition, and by the FDER Biology Section, 1989, *Quality Assurance Manual for Performing Acute Toxicity Tests*, 2nd Edition.

Results and Discussion

The sample discharge from this facility was not toxic to the bioassay test organisms, *Ceriodaphnia dubia, Daphnia pulex*, and *Notropis leedsi*. The sample was also not toxic to the Microtox® assay test organism, *Photobacterium phosphoreum*. The total ammonia concentration in the sample was 0.03 mg/l. No further chemical analyses were performed on the sample

Conclusion

The sample from this facility was not toxic on 22 May, 1989.

Table 1. Concentration Series and Volumes Used for These Static Bioassays.

Ceriodaphnia dubia (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	15.0 ml	0.0 ml	15 ml
10.0%	13.5 ml	1.5 ml	15 ml
30.0%	10.5 ml	4.5 ml	15 ml
50.0%	7.5 ml	7.5 ml	15 ml
70.0%	4.5 ml	10.5 ml	15 ml
85.0%	2.25 ml	12.75 ml	15 ml
100.0%	0.0 ml	15.0 ml	15 ml

Daphnia pulex (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	15.0 ml	0.0ml	15 ml
100.0%	0.0 ml	15.0 ml	15 ml

Notropis leedsi (bannerfin shiner)

Concentration	Dilution Water	Sample	Total Volume
Control	500 ml	0 ml	500 ml
10.0%	450 ml	50 ml	500 ml
30.0%	350 ml	150 ml	500 ml
50.0%	250 ml	250 ml	500 ml
70.0%	150 ml	350 ml	500 ml
85.0%	75 ml	425 ml	500 ml
100.0%	0 ml	500 ml	500 ml

Table 2. Data recorded during the 48 hour static definitive bioassay of a sample of discharge from the Panama City Beach WWTP, Panama City Beach, Bay County, Florida, NPDES #FL0023512, on 23 to 25 May, 1989.

Facility: **Panama City Beach WWTP** NPDES # **FL0021512** Facility Type: **Sewage Treatment**
Location: 110 S. Arnold Rd., Panama City Beach Contact/District: M. Clayton / NW
County: Bay Test type: static definitive
Sample Collection Date: **5/22/89** Time: 1630 # tests: 3 Receiving Water: West Bay (Gulf of Mexico)
Test Beginning Date: 5/23/89 Time: 1100 Chlorination Type: **dechlorinated**
Test Ending Date: 5/25/89 Time: 1100 Dechlor Method : plant, dechlorination unit **Page 1 of 2**

Organism: ***Ceriodaphnia dubia*** Life stage: neonate
LC50: - Binomial: - Moving Average: - Probit: -

	SURVIVAL			Dissolved Oxygen			pH			Temperature			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	-	8.4	8.1	-	8.0	20.0	-	22.8	-	-
Control	5	5	5	8.4	-	8.4	8.1	-	8.1	-	-	-	-	-
Control	5	5	5	8.4	-	8.4	8.1	-	8.4	-	-	-	-	-
Control	5	5	5	8.4	-	8.4	8.1	-	8.4	-	-	-	495	540
10%	5	5	5	8.4	-	8.3	8.1	-	8.0	20.0	-	22.8	-	-
10%	5	5	5	8.4	-	8.3	8.1	-	8.0	-	-	-	-	-
10%	5	5	5	8.4	-	8.4	8.1	-	8.4	-	-	-	-	-
10%	5	5	5	8.4	-	8.4	8.1	-	8.0	-	-	-	520	540
30%	5	5	5	8.4	-	8.4	8.0	-	8.1	20.3	-	22.7	-	-
30%	5	5	5	8.4	-	8.4	8.0	-	8.1	-	-	-	-	-
30%	5	5	5	8.4	-	8.4	8.0	-	8.1	-	-	-	-	-
30%	5	5	5	8.4	-	8.4	8.0	-	8.1	-	-	-	570	595
50%	5	5	5	8.4	-	8.5	7.9	-	8.1	20.3	-	22.7	-	-
50%	5	5	5	8.4	-	8.5	7.9	-	8.1	-	-	-	-	-
50%	5	5	5	8.4	-	8.5	7.9	-	8.1	-	-	-	-	-
50%	5	5	5	8.4	-	8.5	7.9	-	8.1	-	-	-	620	670
70%	5	5	5	8.4	-	8.6	7.8	-	8.1	20.2	-	22.4	-	-
70%	5	5	5	8.4	-	8.6	7.8	-	8.1	-	-	-	-	-
70%	5	5	4	8.4	-	8.6	7.8	-	8.1	-	-	-	-	-
70%	5	5	5	8.4	-	8.6	7.8	-	8.1	-	-	-	665	745
85%	5	5	5	8.4	-	8.7	7.7	-	8.1	20.2	-	22.4	-	-
85%	5	5	5	8.4	-	8.6	7.7	-	8.1	-	-	-	-	-
85%	5	5	5	8.4	-	8.7	7.7	-	8.1	-	-	-	-	-
85%	5	5	5	8.4	-	8.7	7.7	-	8.1	-	-	-	700	770
100%	5	5	5	8.4	-	8.7	7.6	-	8.1	20.2	-	22.4	-	-
100%	5	5	5	8.4	-	8.7	7.6	-	8.1	-	-	-	-	-
100%	5	5	5	8.4	-	8.7	7.6	-	8.1	-	-	-	-	-
100%	5	5	5	8.4	-	8.7	7.6	-	8.1	-	-	-	740	820

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

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.04	0.00
Cond. Control Water (daphnids):	0.11	0.01
100% Sample:	0.03	0.00

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	122	114
Cond. Control Water (daphnids):	114	116
100% Sample:	121	165

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

Table 2. Continued.

Facility:	**Panama City Beach WWTP**		**NPDES #**	**FL0021512**	Facility Type: **Sewage Treatment**
Location:	110 S. Arnold Rd., Panama City Beach		Contact/District:	M. Clayton / NW	
County:	Bay		Test type:	static definitive	
Sample Collection Date:	**5/22/89**	Time: 1630	# tests:	3	Receiving Water: West Bay (Gulf of Mexico)
Test Beginning Date:	5/23/89	Time: 1100	Chlorination Type:	**dechlorinated**	
Test Ending Date:	5/25/89	Time: 1100	Dechlor Method :	Plant, dechlorination unit	**Page 2 of 2**

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

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.04	0.00
Cond. Control Water (daphnids):	0.11	0.01
100% Sample:	0.03	0.00

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	122	114
Cond. Control Water (daphnids):	114	116
100% Sample:	121	165

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

Organism: ***Daphnia pulex*** Life stage: neonate
LC50: - Binomial: - Moving Average: - Probit: -

	SURVIVAL			Dissolved Oxygen			pH			Temperature			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	8.3	-	8.5	8.0	-	8.0	20.3	-	22.5	-	-
Control	5	5	5	8.3	-	8.5	8.0	-	8.0	-	-	-	-	-
Control	5	5	5	8.3	-	8.6	8.0	-	8.0	-	-	-	-	-
Control	5	4	4	8.3	-	8.6	8.0	-	8.0	-	-	-	505	505
100.0%	5	5	5	8.3	-	8.5	7.6	-	8.1	20.6	-	22.9	-	-
100.0%	5	5	5	8.3	-	8.5	7.6	-	8.1	-	-	-	-	-
100.0%	5	5	5	8.3	-	8.5	7.6	-	8.1	-	-	-	-	-
100.0%	5	5	5	8.3	-	8.5	7.6	-	8.1	-	-	-	740	795

Organism: ***Notropis leedsi*** Age: 24 days
LC50: - Binomial: - Moving Average: - Probit: -

	SURVIVAL			Dissolved Oxygen			pH			Temperature			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	8.1	8.5	8.6	7.7	7.8	7.9	21.7	20.4	20.8	-	-
Control	5	5	5	8.1	8.5	8.6	7.7	7.8	7.9	-	-	-	230	230
10%	5	5	5	8.1	8.6	8.6	7.6	7.8	7.9	21.6	20.2	20.4	-	-
10%	5	5	5	8.1	8.6	8.6	7.6	7.8	7.9	-	-	-	310	310
30%	5	5	5	8.1	8.4	8.4	7.6	7.8	7.9	21.3	20.1	20.2	-	-
30%	5	5	5	8.1	8.4	8.4	7.6	7.8	7.9	-	-	-	395	395
50%	5	5	5	8.0	8.4	8.3	7.5	7.8	7.8	21.0	20.1	20.2	-	-
50%	5	5	5	8.0	8.4	8.3	7.5	7.8	7.8	-	-	-	505	500
70%	5	5	5	8.0	8.5	8.3	7.4	7.8	7.8	20.8	20.1	20.2	-	-
70%	5	5	5	8.0	8.4	8.3	7.4	78.0	7.8	-	-	-	610	610
85%	5	5	5	8.0	8.3	8.3	7.3	7.7	7.8	20.6	20.0	20.0	-	-
85%	5	5	5	8.0	8.3	8.3	7.3	7.7	7.8	-	-	-	685	690
100%	5	5	5	8.0	8.3	8.3	7.3	7.7	7.8	20.6	20.2	20.1	-	-
100%	5	5	5	8.0	8.3	8.3	7.3	7.7	7.8	-	-	-	765	775

Table 3. Microtox test results, Panama City WWTP, Bay County, NPDES #FL0021512, on 23 May, 1989.

Microtox Test

% Sample	Final Reclaimed Water nonchlorinated	
	5-min	15-min
0	42	20
0	42	19
0	41	20
12.38	42	19
12.38	40	19
12.38	37	18
24.75	45	21
24.75	41	19
24.75	42	20
49.5	40	19
49.5	42	18
49.5	41	19
99	41	19
99	42	18
99	41	19

EC_{50} Nonchlorinated (15 minute, 15 °C) = not toxic

EC_{50} (15 minute, 15 °C) is calculated using the Data Reduction Computer Program developed by Microbics Corporation for the Sharp Model EL-5100 calculator. (*Microbics Systems Operating Manual,* 1982, Microbics Corporation, Carlsbad, California).

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: Panama City Beach WWTP
Address/City: Panama City Beach, FL
County: Bay
Contact/District: Mike Clayton / NW
NPDES Permit #: FL0041512 Outfall #: 001

Sample Collection: Date 5/22/97 Time 1630
Test Beginning: Date 5/23/97 Time 1100
Test Ending: Date 5/28/97 Time 1100
Test Organism: ~~Arbacia punctulata~~ Cyprinodon variegatus
Life Stage/Age: 2 weeks

Test Number: 1 of 3 Test Type: Screening (Definitive)
(Static) | Static Renewal | Flow-through

Remarks: decided at plant

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7.0, 7.9	S.R. 22°C	1330, 2480, 1381	22.2°C
24 hr	7.0, 7.9	S.R. 22°C		20.5°C
48 hr	7.0, 7.9	S.R. 22°C	1330, 2480, 1382	20.1°C

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (umhos/cm) 0	24	48
Control	1	5	5	5	8.4		8.4	8.1		8.0	20.0		22.8			
"	2	5	5	5	8.4		8.4	8.1		8.1						
"	3	5	5	5	8.4		8.4	8.1		8.1						
"	4	5	5	5	8.4		8.4	8.1		8.1				495		510
10%	5	5	5	5	8.4		8.3	8.1		8.0	20.0		22.8			
"	6	5	5	5	8.4		8.3	8.1		8.0						
"	7	5	5	5	8.4		8.4	8.1		8.1						
"	8	5	5	5	8.4		8.4	8.1		8.0				540		540
30%	9	5	5	5	8.4		8.4	8.0		8.1	20.3		22.7			
"	10	5	5	5	8.4		8.4	8.0		8.1						
"	11	5	5	5	8.4		8.4	8.0		8.1						
"	12	5	5	5	8.4		8.4	8.0		8.1				570		575
50%	13	5	5	5	8.4		8.5	7.9		8.1	20.3		22.7			
"	14	5	5	5	8.4		8.5	7.9		8.1						
"	15	5	5	5	8.4		8.5	7.9		8.1						
"	16	5	5	5	8.4		8.5	7.9		8.1				600		610
70%	17	5	5	5	8.4		8.6	7.8		8.1	20.2		22.4			
"	18	5	5	5	8.4		8.6	7.8		8.1						
"	19	5	5	4	8.4		8.6	7.8		8.1						
"	20	5	5	5	8.4		8.6	7.8		8.1				665		745
85%	21	5	5	5	8.4		8.7	7.7		8.1	20.2		22.4			
"	22	5	5	5	8.4		8.6	7.7		8.1						
"	23	5	5	5	8.4		8.7	7.7		8.1						
"	24	5	5	5	8.4		8.7	7.7		8.1				700		780
100%	25	5	5	5	8.4		8.7	7.6		8.1	20.2		22.4			
"	26	5	5	5	8.4		8.7	7.6		8.1						
"	27	5	5	5	8.4		8.7	7.6		8.1						
"	28	5	5	5	8.4		8.7	7.6		8.1				740		820
Measured by:		SHW	MF	MF	SHW		MF	SHW		MF	SHW		MF	SHW		MF
Recorded by:		MF	MF	MF	MF		MF	MF		MF	MF		MF	MF		MF

Investigators' Signatures

Steven H Woelfle

Marshall Frisbie

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl:			0.0		MF
Lab Tot. Resid. Cl:			0.0	Hach	MF
Alkalinity:	122	124	121	Hach	
Hardness:	114	116	165	Hach	SHW
Total Ammonia:	0.035	0.106	0.035		MF

slope = -52.0

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: Lakeland City Beach WWTP
Address/City: _____
County: _____
Contact/District: _____
NPDES Permit #: _____ Outfall #: _____

Sample Collection: Date 5/22/17 Time 1630
Test Beginning: Date 5/23/17 Time 1100
Test Ending: Date 5/25/17 Time 1100
Test Organism: Daphnia pulex
Life Stage/Age: neonate

Test Number: 2 of 3 Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through

Remarks: dechlor at plant

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr				
24 hr				
48 hr				

		Number Live			DO (mg/l)			pH			Temp. (°C)			Cond. (umhos/cm)		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control	29	5	5	5	8.3		8.5	8.0		8.0	20.3		22.6		475	
"	30	5	5	5	8.3		8.5	8.0		8.0						
"	31	5	5	5	8.3		8.6	8.0		8.0						
"	32	4	4	4	8.3		8.6	8.0		8.0				505		505
100%	33	5	5	5	8.3		8.5	7.6		8.1	20.6		22.7			
"	34	5	5	5	8.3		8.5	7.6		8.1						
"	35	5	5	5	8.3		8.5	7.6		8.1						
"	36	5	5	5	8.3		8.5	7.6		8.1				540		795
Measured by:		AJ	AT	BA	SH		BA	SH		AT	SH		AT	SH		BA
Recorded by:		AT	AT	AT	SH		BA	AT		AT	AT		AT	SH		BA

Investigators' Signatures

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:					
Alkalinity:					
Hardness:					
Total Ammonia:					

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: Panama City Beach WWTP
Address/City: _____
County: _____
Contact/District: _____
NPDES Permit #: _____ Outfall #: _____

Sample Collection: Date 5/22/89 Time 1030
Test Beginning: Date 5/23/89 Time 1120
Test Ending: Date 5/25/89 Time 1100
Test Organism: Mysids (acute)
Life Stage/Age: 24 days

Test Number: 2 of 3
Test Type: Screening (Definitive)
Static | Static Renewal | Flow-through

Remarks: Decided at float

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr				
24 hr				
48 hr				

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (umhos/cm) 0	24	48
Control	39	5	5	5	8.1	8.5	8.6	7.7	7.8	7.9	21.7	20.4	20.5			
"	14	5	5	5	8.1	8.5	8.6	7.7	7.8	7.9				330		325
10%	104	5	5	5	8.1	8.6	8.6	7.6	7.8	7.9	21.6	20.4	20.4			
"	31	5	5	5	8.1	8.6	8.6	7.6	7.8	7.9				310		320
30%	99	5	5	5	8.1	8.4	8.4	7.6	7.8	7.9	21.3	20.1	20.2			
"	19	5	5	5	8.1	8.4	8.4	7.6	7.8	7.9				315		325
50%	79	5	5	5	8.0	8.4	8.2	7.5	7.8	7.8	21.0	20.1	20.2			
"	57	5	5	5	8.0	8.4	8.2	7.5	7.8	7.8				505		500
70%	6	5	5	5	8.0	8.5	8.3	7.4	7.8	7.8	20.8	20.1	20.2			
"	65	5	5	5	8.0	8.4	8.3	7.4	7.8	7.8				610		600
85%	183	5	5	5	8.0	8.3	8.3	7.3	7.7	7.8	20.6	20.6	20.0			
"	37	5	5	5	8.0	8.3	8.3	7.3	7.7	7.8				685		680
100%	251	5	5	5	8.0	8.3	8.3	7.3	7.7	7.8	20.6	20.2	20.1			
"	19	5	5	5	8.0	8.4	8.3	7.3	7.7	7.8				765		775
Measured by:		MT	MT	MT	SHW	MT	MF	SHW	MT	MF	SHW	MT	MT	SHW		MT
Recorded by:		MT	MT	AL	MT	MT	MF	MF	MT	MW	MT	MT	MT	MT		MT

Investigators' Signatures:

Witness

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:					
Alkalinity:					
Hardness:					
Total Ammonia:					

MICROTOX™ Data Reduction Sheet

SOURCE: Panama City STP

GRAPH CALC EC 50 (5 MIN, 15 °C) = 34.8 %SAMPLE mg/L

SAMPLE DATA:

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.): Effluent (Acute)

DATE ASSAYED: 5/23/89 TIME: 1740

VISUAL COLOR: clear CORRECTION REQUIRED: YES (NO)

VISUAL TURBIDITY: none SEPARATION REQUIRED: YES (NO)

INITIAL pH: pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH: MOAS (DRY NaCl) OTHER

PRIMARY DILUTION OF SAMPLE:

OPERATOR: M. Sandell REAGENT VIAL LOT NO. M- WLN

REMARKS:

MICROTOX™ TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	T5	T15	NOTES
A1	0	42	20	X	X	
B1		42	19			
C1		41	20			
A2	12.38	42	19	.05	0.05	
B2		40	19			
C2		39	18			
A3	24.75	45	21	-.02	-.02	
B3		41	19			
C3		42	20			
A4	49.5	40	19	0.02	.05	
B4		41	18			
C4		41	19			
A5	99	41	18	0.02	.05	
B5		39	18			
C5		39	19			
EC_{50} (MIN, °C)				34.65	34.65	Not Toxic

REVIEWED BY:

DATE: 10/16/89