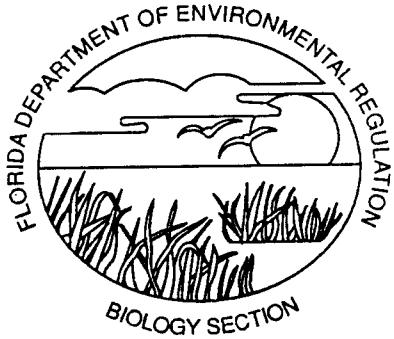


Bioassays of

Jacksonville Naval Air Station Sewage Treatment Plant

Jacksonville, Duval County, Florida

NPDES #FL0000957

Sampled 4/2/90

FILE COPY
DO NOT REMOVE

April 20, 1990

Biology Section
Division of Administrative and Technical Services

Bioassays of

Jacksonville Naval Air Station Sewage Treatment Plant

Jacksonville, Duval County, Florida

NPDES #FL0000957

Biology Section
Bureau of Laboratories
April 20, 1990

Introduction

Jacksonville Naval Air Station STP, NPDES #FL0000957, Jacksonville, Duval County, Florida, on 3 to 5 April, 1990.

This U.S. Government facility treats waste from the air station, including domestic waste, water from industrial cooling systems, boiler wash, vehicle and equipment cleaning operations, and other miscellaneous sources. The plant has a design capacity of 3.0 MGD and is currently operating near this level at 2.6 MGD. Discharge is to the St. Johns River through outfall #001. The recovered water is dechlorinated prior to discharge.

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, 1985, *Quality Assurance Manual for Performing Acute Toxicity Tests*, 2nd Edition.

Results and Discussion

The sample of discharge from outfall #001 of the Jacksonville Naval Air Station STP was not toxic to the bioassay test organisms, *Ceriodaphnia dubia* and *Notropis leedsi*. The sample was stimulatory to the Microtox® assay organism, *Photobacterium phosphoreum*.

Conclusion

The sample of discharge from the Jacksonville Naval Air Station STP was not toxic on 2 April, 1990.

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

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 Jacksonville Naval Air Station STP, Jacksonville, Duval County, Florida, NPDES #FL0000957, on 3 to 5 April, 1990.

Facility:	**Jacksonville Naval Air Station STP**		**NPDES #**	**FL0000957**	Facility Type: **sewage treatment**
Location:	Naval Air Station, Jacksonville		Contact/District:	K. Gerard / NE	
County:	Duval		Test type:	static definitive	
Sample Collection Date:	**4/2/90**	Time: 1050	# tests:	2	Receiving Water: St. John's River
Test Beginning Date:	4/3/90	Time: 1015	Chlorination Type:	**dechlorinated**	
Test Ending Date:	4/5/90	Time: 1100	Dechlor method:	facility dechlorination unit	**Page 1 of 2**

Total Residual Cl2	mg/l	Method
Field:	<0.05	Hach
Lab:	0.0	Hach
Lab:	-	-

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.00	0.00
Cond. Control		
Water (daphnids):	1.55	0.05
100% Sample:	0.00	0.00

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	125	110
Cond. Control		
Water (daphnids):	75	85
100% Sample:	64	175

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

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	7.6	-	8.5	7.8	-	8.2	21.2	-	20.2	-	-
Control	5	5	5	7.6	-	8.5	7.8	-	8.3	-	-	-	-	-
Control	5	5	5	7.6	-	8.6	7.8	-	8.3	-	-	-	-	-
Control	5	5	5	7.6	-	8.6	7.8	-	8.3	-	-	-	205	205
10%	5	5	5	7.6	-	8.6	7.7	-	8.3	21.2	-	20.1	-	-
10%	5	5	5	7.6	-	8.7	7.7	-	8.3	-	-	-	-	-
10%	5	5	5	7.6	-	8.7	7.7	-	8.3	-	-	-	-	-
10%	5	5	5	7.6	-	8.7	7.7	-	8.3	-	-	-	235	240
30%	5	5	5	7.8	-	8.7	7.7	-	8.2	21.3	-	20.0	-	-
30%	5	5	5	7.8	-	8.6	7.7	-	8.2	-	-	-	-	-
30%	5	5	5	7.8	-	8.7	7.7	-	8.3	-	-	-	-	-
30%	5	5	5	7.8	-	8.7	7.7	-	8.3	-	-	-	300	335
50%	5	5	5	8.0	-	8.6	7.6	-	8.2	21.2	-	20.1	-	-
50%	5	5	5	8.0	-	8.6	7.6	-	8.2	-	-	-	-	-
50%	5	5	5	8.0	-	8.6	7.6	-	8.2	-	-	-	-	-
50%	5	5	5	8.0	-	8.6	7.6	-	8.2	-	-	-	395	410
70%	5	5	5	8.3	-	8.6	7.5	-	8.2	21.2	-	20.0	-	-
70%	5	5	5	8.3	-	8.5	7.5	-	8.2	-	-	-	-	-
70%	5	5	5	8.3	-	8.6	7.5	-	8.2	-	-	-	-	-
70%	5	5	5	8.3	-	8.6	7.5	-	8.2	-	-	-	470	505
85%	5	5	5	8.4	-	8.5	7.5	-	8.2	21.3	-	20.2	-	-
85%	5	5	5	8.4	-	8.5	7.5	-	8.2	-	-	-	-	-
85%	5	5	5	8.4	-	8.5	7.5	-	8.2	-	-	-	-	-
85%	5	5	4	8.4	-	8.5	7.5	-	8.2	-	-	-	535	555
100%	5	5	5	8.6	-	8.5	7.4	-	8.2	21.7	-	20.3	-	-
100%	5	5	5	8.6	-	8.5	7.4	-	8.2	-	-	-	-	-
100%	5	5	5	8.6	-	8.5	7.4	-	8.2	-	-	-	-	-
100%	5	5	5	8.6	-	8.5	7.4	-	8.2	-	-	-	600	630

Table 2. Continued.

Facility:	**Jacksonville Naval Air Station STP**		**NPDES #**	**FL0000957**	Facility Type: **sewage treatment**
Location:	Naval Air Station, Jacksonville		Contact/District:	K. Gerard / NE	
County:	Duval		Test type:	static definitive	
Sample Collection Date:	**4/2/90**	Time: 1050	# tests:	2	Receiving Water: St. John's River
Test Beginning Date:	4/3/90	Time: 1015	Chlorination Type:	**dechlorinated**	
Test Ending Date:	4/5/90	Time: 1100	Dechlor method:	facility dechlorination unit	**Page 2 of 2**

Total Residual Cl2	mg/l	Method
Field:	<0.05	Hach
Lab:	0.0	Hach
Lab:	-	-

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.00	0.00
Cond. Control Water (daphnids):	1.55	0.05
100% Sample:	0.00	0.00

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	125	110
Cond. Control Water (daphnids):	75	85
100% Sample:	64	175

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

Organism: ***Notropis leedsi*** Age: 10 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	8.5	8.6	8.5	7.8	8.1	8.3	21.2	18.8	18.5	-	-
Control	5	5	5	8.5	8.6	8.5	7.8	8.1	8.3	-	-	-	230	235
10%	5	5	5	8.5	8.7	8.4	7.8	8.1	8.3	21.2	18.7	18.3	-	-
10%	5	5	5	8.5	8.7	8.4	7.8	8.1	8.3	-	-	-	270	270
30%	5	5	5	8.6	8.7	8.4	7.7	8.1	8.2	21.3	18.5	18.7	-	-
30%	5	5	5	8.6	8.7	8.3	7.7	8.1	8.2	-	-	-	345	340
50%	5	5	5	8.5	8.7	7.8	7.6	8.0	8.1	24.7	18.2	18.8	-	-
50%	5	5	5	8.6	8.7	7.9	7.6	8.0	8.1	-	-	-	425	420
70%	5	5	5	8.6	8.6	7.9	7.5	8.0	8.0	22.0	18.0	18.8	-	-
70%	5	5	5	8.6	8.6	7.9	7.5	8.0	8.0	-	-	-	505	490
85%	5	5	5	8.6	8.6	7.9	7.4	7.9	8.0	22.8	17.9	18.8	-	-
85%	5	5	5	8.6	8.6	7.9	7.4	7.9	8.0	-	-	-	565	545
100%	5	5	5	8.6	8.5	7.6	7.3	7.8	7.9	23.0	18.4	19.1	-	-
100%	5	5	5	8.6	8.5	7.6	7.3	7.8	7.9	-	-	-	625	600

Table 3. Microtox test results, Jacksonville Naval Air Station, Duval County, NPDES #FL0000957, on 3 April, 1990.

% Sample	Unchlorinated Final Reclaimed Water	
	5-min	15-min
0	111	70
0	105	73
0	106	81
12.38	105	80
12.38	100	89
12.38	103	80
24.75	99	80
24.75	100	82
24.75	101	82
49.5	98	84
49.5	108	82
49.5	99	84
99	87	91
99	90	85
99	98	86

EC_{50} Unchlorinated (15 minute, 15 °C) = stimulatory

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, CA).

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: Jacksonville NAS STP
Address/City: NAS Jacksonville
County: Duval
Contact/District: K. Sheard / NorthEast
NPDES Permit #: FL0000957 **Outfall #:** 001

Sample Collection: Date 4/2/90 Time 1050
Test Beginning: Date 4/3/90 Time 1015
Test Ending: Date 4/5/90 Time 1100
Test Organism: Ceriodaphnia dubia
Life Stage/Age: < 24 hrs

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

Remarks: Dechlor at plant

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7@7, 9@9	8.7@23°C	1369@23.5	@1368 @22.0 @22.3
24 hr	7@7, 9@9	8.7@23°C	~~1399@24.4~~	18.8@19.2
48 hr	7@7, 9@9	8.7@23°C	1379@24.4	22.9@23.3

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (µmhos/cm) 0	24	48
Control		5	5	5	7.6		8.5	7.8		8.2	21.2	~~23.8~~	20.2			
Control		5	5	5	7.6		8.5	7.8		8.3						
Control		5	5	5	7.6		8.6	7.8		8.3						
Control		5	5	5	7.6		8.6	7.8		8.3				205		205
10%		5	5	5	7.6		8.6	7.7		8.3	21.2		20.1			
10%		5	5	5	7.6		8.7	7.7		8.3						
10%		5	5	5	7.6		8.7	7.7		8.3						
10%		5	5	5	7.6		8.7	7.7		8.3				235		240
30%		5	5	5	7.8		8.7	7.7		8.2	21.3		20.0			
30%		5	5	5	7.8		8.6	7.7		8.2						
30%		5	5	5	7.8		8.7	7.7		8.3						
30%		5	5	5	7.8		8.7	7.7		8.3				300		335
50%		5	5	5	8.0		8.6	7.6		8.2	21.2		20.1			
50%		5	5	5	8.0		8.6	7.6		8.2						
50%		5	5	5	8.0		8.6	7.6		8.2						
50%		5	5	5	8.0		8.6	7.6		8.2				395		410
70%		5	5	5	8.3		8.6	7.5		8.2	21.2		20.0			
70%		5	5	5	8.3		8.5	7.5		8.2						
70%		5	5	5	8.3		8.6	7.5		8.2						
70%		5	5	5	8.3		8.6	7.5		8.2				470		505
85%		5	5	5	8.4		8.5	7.5		8.2	21.3		20.2			
85%		5	5	5	8.4		8.5	7.5		8.2						
85%		5	5	5	8.4		8.5	7.5		8.2						
85%		5	5	4	8.4		8.5	7.5		8.2				535		555
100%		5	5	5	8.6		8.5	7.4		8.2	21.7		20.3			
100%		5	5	5	8.6		8.5	7.4		8.2						
100%		5	5	5	8.6		8.5	7.4		8.2						
100%		5	5	5	8.6		8.5	7.4		8.2				600		630
Measured by:		MF	MF	MF	JHF		SW	JHF		~~SHW~~	JHF		SW	JHF		SW
Recorded by:		MF	MF	MF	SHW		MF	SHW		MF	SHW		MF	SHW		MF

Investigators' Signatures

Steven H Wolfe

Marshall Faircloth

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			2.05	DPD-Hach	
Lab Tot. Resid. Cl2:			0	Hach	SHW
Alkalinity:	125	75	64	Hach	SHW
Hardness:	110	85	175	Hach	SHW
Total Ammonia:	0.0	1.55	0.0	ion specific	SHW

slope = −55.0

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: Jacksonville NAS STP
Address/City: NAS Jacksonville
County: Duval
Contact/District: K. Gerard North East
NPDES Permit #: FL0000957 Outfall #: 001

Sample Collection: Date 4/2/90 Time 1050
Test Beginning: Date 4/3/90 Time 1105
Test Ending: Date 4/5/90 Time 1100
Test Organism: Mollopis leedsi
Life Stage/Age: 18 days

Test Number: 2 of 2 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. (µmhos/cm)		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control	17	5	5	5	8.5	8.6	8.5	7.8	8.1	8.3	21.2	18.8	18.5			
Control	118	5	5	5	8.5	8.6	8.5	7.8	8.1	8.3				230		235
10%	63	5	5	5	8.5	8.7	8.4	7.8	8.1	8.3	21.2	18.7	18.3			
10%	287	5	5	5	8.5	8.7	8.4	7.8	8.1	8.3				270		270
30%	186	5	5	5	8.6	8.7	8.4	7.7	8.1	8.2	21.3	18.5	18.7			
30%	41	5	5	5	8.6	8.7	8.3	7.7	8.1	8.2				345		340
50%	416	5	5	5	8.5	8.7	7.8	7.6	8.0	8.1	21.7	18.2	18.8			
50%	7	5	5	5	8.6	8.7	7.9	7.6	8.0	8.1				425		420
70%	43	5	5	5	8.6	8.6	7.9	7.5	8.0	8.0	22.0	18.0	18.8			
70%	142	5	5	5	8.6	8.6	7.9	7.5	8.0	8.0				505		490
85%	20	5	5	5	8.6	8.6	7.9	7.4	7.9	8.0	22.8	17.9	18.8			
85%	174	5	5	5	8.6	8.6	7.9	7.4	7.9	8.0				565		545
100%	83	5	5	5	8.6	8.5	7.6	7.3	7.8	7.9	23.0	18.4	19.1			
100%	19	5	5	5	8.6	8.5	7.6	7.3	7.8	7.9				625		600
Measured by:		MF	MF	MF	JMF	MF	SW	JMF	MF	SHW	JMF	MF	SW	JMF		SW
Recorded by:		ML	MF	MF	SHW	MF	MF	SHW	MF	MF	SHW	MF	MF	SHW		MF

Investigators' Signatures

Steven H Wolfe

Marshall Hamlett

Reviewer

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: US Naval Air Base STP

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

SAMPLE DATA:

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.):

DATE ASSAYED: 4/3/90 TIME:

VISUAL COLOR: CORRECTION REQUIRED: YES NO

VISUAL TURBIDITY: SEPARATION REQUIRED: YES NO

INITIAL pH: pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH: MOAS DRY NaCl OTHER

PRIMARY DILUTION OF SAMPLE:

OPERATOR: M.G.C. REAGENT VIAL LOT NO. M-

REMARKS:

MICROTOX™ TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	Γ5	Γ15	NOTES
A1	0	111	70			113
B1		105	73			112
C1		106	81			124
A2	12.38	105	80	.05	-.10	123
B2		100	89			135
C2		103	80			128
A3	24.75	99	80	.07	-.08	128
B3		100	82			132
C3		101	87			138
A4	49.5	98	84	.06	-.10	140
B4		108	82			131
C4		99	84			142
A5	99	87	91	.17	-.15	154
B5		90	85			148
C5		98	86			151

EC50 (MIN, °C) 1187.97 stimulatory 6624

w/ 0 Turb

I0 | I5 | 5 min

.005 .252

.062 .330

.091 .373

.127 .641

300

REVIEWED BY:

DATE: 5/15/90