

Bioassays of

Military Point Advanced Wastewater Treatment Facility

Tyndall Air Force Base, Bay County, Florida

NPDES #FL0167959

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December 2000

Biology Section

Division of Resource Assessment & Management

Comprehensive Quality Assurance Plan #870346G

Bioassays of

Military Point Advanced Wastewater Treatment Facility

Tyndall Air Force Base, Bay County, Florida

NPDES #FL0167959

Biology Section
Bureau of Laboratories
December 2000

Introduction

Military Point Advanced Wastewater Treatment Facility, Lagoon Road, Tyndall Air Force Base, Bay County, Florida, NPDES #FL0167959, tests performed on 18 to 20 July 2000.

This advanced wastewater treatment facility has a design flow of 7.0 million gallons per day. This facility consists of a five-stage biological nutrient-removal wastewater treatment system. The effluent is treated by screening and degritting, before alternately passing through two anaerobic and anoxic zones. The effluent is then treated by re-aeration, clarification, filtration, and disinfection. Intermediate disinfection is achieved using ultraviolet light (UV). High level disinfection for reuse is attained using a combination of UV and chlorine injection. After dechlorination with sulfur dioxide, the effluent is discharged into the Class III marine waters of St. Andrews Bay. Residuals are aerobically digested, dewatered by centrifugation, and applied to land. The permit for this facility is being reviewed. Under the new permit, the facility will receive the domestic wastewater that is currently permitted for Military Point Lagoon.

The zones of mixing for aluminum, copper, and iron are seven feet, 46 feet, and 18 feet, respectively. The zones are measured from the diffuser discharging the combined effluent from the proposed facility and the existing Military Point Lagoon (facility summary provided by Kenny Ferguson, FDEP, Pensacola).

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 Military Point AWF. 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 to the test organisms at 48 hours (Table 1).

Total residual chlorine and total ammonia of the effluent were less than the laboratory detection limits (which are 0.03 mg/L for chlorine, 0.017 mg/L for ammonia). Further chemical analyses were performed on the sample and several metals and a pesticide were identified (Table 2).

Conclusion

The sample of effluent collected from this facility on July 17, 2000, did not show toxicity.

Table1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Military Point AWT, Lagoon Road, Tyndall Airforce Base, Bay County, Florida, NPDES# FL0167959, performed on 18 to 20 July 2000.

Facility:	**Military Point AWT**	**NPDES #**	**FL0167959**	Facility Type:	**Advanced Wastewater**
Location:	Lagoon Road, Tyndall Airforce Base	Contact/District:	Glenn Butts/ Northwest Dist.		**Treatment Facility**
County:	Bay	Test type:	static acute screen		
Sample Collection Date:	7/17/00 Time: 1040	# tests:	2	Receiving Water:	St. Anderews Bay
Test Beginning Date:	7/18/00 Time: 1310	Chlorination Type:	Chlorinated		
Test Ending Date:	7/19/00 Time: 1315		sample collected after dechlorination		**Page 1 of 1**

Total Residual CL2	mg/L	Method
Field:	not measured	
Lab:	<0.03	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):	135	NT
20% Dilute Mineral Water (cladocerans):	67	NT
100% Sample:	79	103

NT not taken

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

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[A]			Dissolved Oxygen			Conductivity Uncorrected 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	0/20	5	5	5	8.0	-	7.9	24.7	-	23.0	7.9	-	7.6	145	195
Control B	0/20	5	5	5	-	-	8.1	-	-	22.6	-	-	7.5	-	170
Control C	0/20	5	5	5	-	-	8.1	-	-	22.5	-	-	7.5	-	165
Control D	0/20	5	5	5	-	-	8.1	-	-	22.5	-	-	7.4	-	165
100% A	20/0	5	5	5	7.8	-	8.3	24.6	-	22.4	7.3	-	7.6	470	545
100% B	20/0	5	5	5	-	-	8.3	-	-	22.4	-	-	7.7	-	540
100% C	20/0	5	5	5	-	-	8.3	-	-	22.2	-	-	7.7	-	540
100% D	20/0	5	5	5	-	-	8.3	-	-	22.3	-	-	7.7	-	535

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 25.0-25.9°C.
Incubator #2 temperature range for the test period was 25.5-26.0°C.

Organism: ***Cyprinella leedsi*** Age: 10 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[B]			Dissolved Oxygen			Conductivity Uncorrected 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	7.9	8.2	8.4	24.7	25.3	25.3	7.6	7.5	7.1	270	270
Control B	0/500	5	5	5	7.9	8.3	8.4	24.5	24.6	24.4	7.7	7.6	7.1	260	270
Control C	0/500	5	5	5	7.9	8.3	8.4	24.4	24.6	25.7	7.7	7.7	7.0	255	275
Control D	0/500	5	5	5	7.9	8.3	8.4	24.3	25.5	25.9	7.8	7.6	6.9	255	280
100% A	500/0	5	5	5	7.7	8.1	8.2	24.6	26.1	26.8	7.1	7.4	6.6	475	550
100% B	500/0	5	5	5	7.6	8.1	8.2	24.6	24.6	24.6	7.2	7.6	6.9	485	515
100% C	500/0	5	5	5	7.6	8.1	8.2	24.5	24.5	25.1	7.1	7.5	6.9	485	525
100% D	500/0	5	5	5	7.6	8.1	8.2	24.4	25.0	26.6	7.2	7.5	6.7	485	540

[B] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 25.0-25.9°C.
Incubator #3 temperature range for the test period was 25.0-26.0°C.

Table 2. Results of chemical analyses on the effluent from the Military Point AWT sampled on July 17, 2000.

Metals

Cadmium	0.055	µg/L	I
Calcium	33.7	µg/L	
Copper	1.6	µg/L	I
Iron	36	µg/L	I
Magnesium	4.6	µg/L	
Nickel	2.1	µg/L	I
Zinc	22.7	µg/L	

Pesticides and Herbicides

Diazinon	0.14	ug/L	I

Base, Neutral, & Acid Extractable Organics

None detected

Oils and Grease

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: Military Point
County: Escambia
Contact / District: Glenn Butts / NW-DIST
NPDES Permit #: FL0001679 59
LIMS Sample #: 466960 LIMS Job #: TLH2000-07-18-39-01
sample log
Test Type: ~~Screening~~ | Definitive
(Static) | Static Renewal | Flow-through
Test Number: 1 of 2

Remarks:

Sample Collection: Date 7/17/00 Time 1040
Test Beginning: Date 7/18/00 Time 1310
Test Ending: Date 7/20/00 Time 1315
Organism Batch #: 36 Diluent Batch #: DMW # 21
Organism Age: 24 hrs. SRT toxicant batch #: —
Test organism: C. dubia

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	24 h	48 h
CNTR.	A	5	5	5	8.0	—	7.9	24.7	—	23.0	7.9	—	7.6	145	—	195
	B	5	5	5	—	—	8.1	—	—	22.6	—	—	7.5	—	—	170
	C	5	5	5	—	—	8.1	—	—	22.5	—	—	7.5	—	—	165
	D	5	5	5	—	—	8.1	—	—	22.5	—	—	7.4	—	—	165
100%	A	5	5	5	7.8	—	8.3	24.6	—	22.4	7.3	—	7.6	470	—	545
	B	5	5	5	—	—	8.3	—	—	22.4	—	—	7.7	—	—	540
	C	5	5	5	—	—	8.3	—	—	22.2	—	—	7.7	—	—	540
	D	5	5	5	—	—	8.3	—	—	22.3	—	—	7.7	—	—	555
measured by:		MF	SG	SG	MF	—	SG	MF	—	SG	MF	—	SG	MF	—	SG
recorded by:		SG	SG	JA	SG	—	JA	SG	—	JA	SG	—	JA	SG	—	JA

Investigators' Signatures

Shannon Gerardi
Josh Lynn
K Robb
Dillon Mathis Hanna
Marshall Fairbith

A Wolfe
reviewer

form updated 3/3/99

Temperature Range °C
Incubator # 2 25.5°-26.0°C
Room B246 25.0°-25.9°C

Salt Water
Well Water

Water Quality Parameters	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):		—	—	—	SG
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	~~DR/850~~ Denver	KL/DPH	SG
Alkalinity (mg/L as $CaCO_3$):	67	79	Hach	JA/DPH	SG
Hardness (mg/L as $CaCO_3$):	N/A	103	Hach	JA/DPH	SG
Total ammonia (mg/L as N):	<0.017	<0.017	Denver	KL/DPH	SG
Salinity:	0	0	YSI	JA	SG

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Military Point
County: Escambia
Contact / District: Glenn Butts / NW-DIST
NPDES Permit #: FL0001679 59
LIMS Sample #: 466960 **LIMS Job #:** TLH-2000-07-18-39-01

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

Remarks:

Sample Collection: Date 7/17/00 Time 1040
Test Beginning: Date 7/18/00 Time 1310
Test Ending: Date 7/20/00 Time 1395
Organism Batch #: 55 **Diluent Batch #:** Well
Organism Age: 10 days SRT toxicant batch #: —
Test organism: C. leedsi

(SG) *F.O. 7.9 7/18/00

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) (µmhos/cm) 0 hr	UNCORRECTED Cond. (µmhos/cm) 24 h	UNCORRECTED Cond. (µmhos/cm) 48 h
CNTL. A	F 17	5	5	5	7.6	8.2	8.4	24.7	25.3	25.3	7.6	7.5	7.1	270	290	270
B	F 18	5	5	5	7.9	8.3	8.4	24.5	24.6	24.4	7.7	7.6	7.1	260	265	270
C	F 19	5	5	5	7.9	8.3	8.4	24.4	24.6	25.7	7.7	7.7	7.0	255	260	275
D	F 20	5	5	5	7.9	8.3	8.4	24.3	25.5	25.9	7.8	7.6	6.9	255	270	280
100% A	F 21	5	5	5	7.7	8.1	8.2	24.6	26.1	26.8	7.1	7.4	6.6	475	500	550
B	F 22	5	5	5	7.6	8.1	8.2	24.6	24.6	24.6	7.2	7.6	6.9	485	495	515
C	F 23	5	5	5	7.6	8.1	8.2	24.5	24.5	25.1	7.1	7.5	6.9	485	490	505
D	F 24	5	5	5	7.6	8.1	8.2	24.4	25.0	26.6	7.2	7.5	6.7	485	500	540
measured by:		AW	SG	SG	JA	JA	SG	JA	JA	SG	JA	JA	SG	JA	JA	SG
recorded by:		SG	SG	SG	SG	SG	SG	SG	SG	SG	SG	SG	SG	SG	SG	JA

FO = further observation

Investigators' Signatures
Shannon Gerard
John Cyrus
Gel Parker Thomas
Marshall Faircloth
A H Wolfe
reviewer

form updated 3/3/99

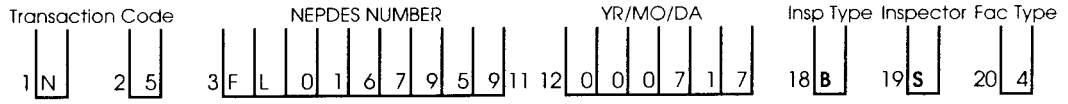
Temperature Range °C
Incubator # 3 25.0° - 26.0°C
Room B246 25.0° - 25.9°C

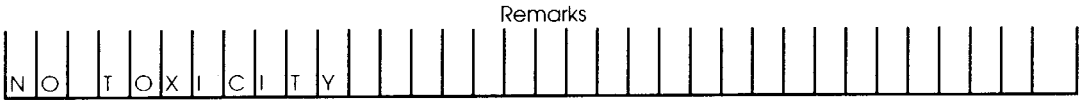
Salt Water: (Well Water) | 20% Min Water

Water Quality Parameters	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):	—	—	—	SG
Lab Total Residual Cl2 (mg/L): <0.03	<0.03	DR100	KL/DPH	SG
Alkalinity (mg/L as $CaCO_3$): 135	79*	Hach	JA/DPH	SG
Hardness (mg/L as $CaCO_3$): N/A	103*	Hach	JA/DPH	SG
Total ammonia (mg/L as N): <0.017	<0.017	Denver	KL/DPH	SG
Salinity: 0	0	Ysi	JA	SG

The Bioassay of the Military Point AWF, Inc. effluent sampled on July 17, 2000, NPDES #FL0167959.

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

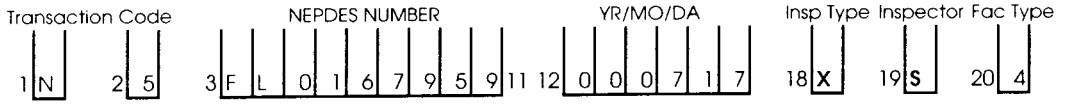


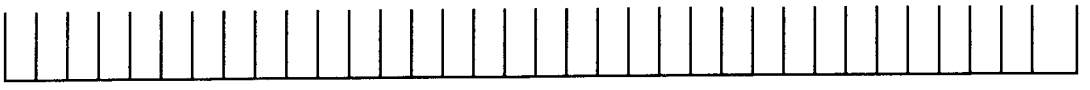


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The Priority Pollutants Analysis for Bioassay of the Military Point AWT effluent sampled on July 17, 2000, NPDES #FL0167959.

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





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