

Bioassays of

Cargill Fertilizer, Inc.

Riverview, Hillsborough County, Florida

NPDES #FL0000761

Sampled 3/7/94

June 1994

Biology Section
Division of Technical Services

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Biology Section
Bureau of Laboratories
June 1994

Introduction

Cargill Fertilizer, Inc., Riverview, Hillsborough County, Florida, NPDES #FL0000761, tests performed on 8 to 10 March, 1994.

This fertilizer plant is located at 8813 Highway 41 South in Riverview and produces phosphoric and sulfuric acids and phosphate fertilizer. The plant has a design flow of 2 MGD with an average discharge of 1.13 MGD of non-process wastewater, treated-process wastewater, and contact stormwater through outfall 005B to the Alafia River. During emergencies, outfall 005B is closed and the effluent is pumped to a 2-million gallon containment pond for treatment by liming and settling. Treated effluent is either discharged to the Alafia River or directed to the process wastewater recirculation system (facility summary provided by L. Carter, 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 with a sample of effluent 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.

Total residual chlorine was not detected in the sample. Total and unionized ammonia concentrations were 0.079 mg/L and 0.001 mg/L, respectively. Further chemical analyses were performed on the sample and several metals were identified (Table 2).

Conclusion

The sample of effluent collected from this facility on 7 March, 1994, did not show toxicity.

Table 1. Concentration series and volumes used for the 48-hour static acute screening toxicity bioassays of the Cargill Fertilizer, Inc., effluent performed on 8 to 10 March, 1994.

Ceriodaphnia dubia (water flea)

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

Cyprinella 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 effluent from Cargill Fertilizer, Inc., sampled on 07 March, 1994.

Oil and Grease	<5.0	mg/L

Metals

Aluminum	156	µg/L [I]
Calcium	83.3	mg/L
Copper	11	µg/L
Iron	630	µg/L
Magnesium	13.4	mg/L
Nickel	7	µg/L [I]
Zinc	11	µg/L

Volatile Organic Compounds

None Detected

Base-Neutral & Acid Extractables

None Detected

I The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Table 3. Data recorded during the 48-hour static acute screening bioassays of a sample of effluent from the Cargill Fertilizer, Inc., Riverview, Hillsborough County, Florida, NPDES# FL0000761, performed on 8 to 10 March, 1994.

Facility:	**Cargill Fertilizer, Inc.**		**NPDES #**	**FL0000761**	Facility Type: **Chemical Processing (fertilizer)**
Location:	Riverview		Contact/District:	L. Carter/SW	
County:	Hillsborough		Test type:	static acute screen	
Sample Collection Date:	**3/7/94**	Time: 1050	# tests:	2	Receiving Water: Alafia River
Test Beginning Date:	3/8/94	Time: 1530	Chlorination Type:	Non-chlorinated	
Test Ending Date:	3/10/94	Time: 1600			**Page 1 of 1**

Total Residual Cl2	mg/L	Method
Field:	0.00	-
Lab:	< 0.03	DR-100

Ammonia	Total (mg/L)	Unionized (mg/L)
Control Water (fish):	<0.017	0.00
20% Dilute Mineral Water (cladocerans):	<0.017	0.00
100% Sample:	0.079	0.00

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	125	120
20% Dilute Mineral Water (cladocerans):	70	80
100% Sample:	100	260

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

Organism: ***Ceriodaphnia dubia*** Life stage: < 24 hours old

	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	-	8.4	23.0	-	22.7	8.6	-	8.4	165	180
Control	5	5	5	-	-	8.4	-	-	22.7	-	-	8.3	-	185
Control	5	5	5	-	-	8.4	-	-	22.6	-	-	8.3	-	180
Control	5	5	5	-	-	8.4	-	-	22.6	-	-	8.3	-	180
100%	5	5	5	7.7	-	8.5	23.0	-	22.9	8.3	-	8.4	760	800
100%	5	5	5	-	-	8.5	-	-	23.0	-	-	8.4	-	820
100%	5	5	5	-	-	8.5	-	-	23.2	-	-	8.4	-	820
100%	5	5	5	-	-	8.5	-	-	23.0	-	-	8.3	-	805

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

	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	22.4	23.2	22.5	8.6	8.1	8.0	240	240
Control	5	5	5	7.9	8.3	8.4	-	-	22.5	8.6	8.1	8.2	240	240
100%	5	5	5	7.5	8.0	8.3	22.9	23.1	22.5	8.0	8.1	8.1	805	800
100%	5	5	5	7.5	8.0	8.3	-	-	22.5	8.0	8.1	8.2	805	805

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Cargill Fertilizer Inc
Location:
County: HILLSBOROUGH
Contact/District: LISA CARTER / SW
NPDES Permit #: FL00 00761 Outfall #: 0005

Sample Collection: Date 3-7-94 Time 1050
Test Beginning: Date 3-8-94 Time 1530
Test Ending: Date 3/10/94 Time 1600
Organism Batch #: 7 Diluent Batch #: 8
Organism Age: < 24 hrs
Test Organism: Ceriodaphnia dubia

94-MAR-08-32 73354

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

Test Number: 1 of 2

Remarks:

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.1 @ 23.3	8.4 @ 23.5	990 @ 1,000 9840 @ ~~10,000~~ 9845 @ 23.6 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.0 @ 24.1	8.4 @ 23.6	990 @ 1,000 9560 @ 10,000 @ 23.9 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.6 @ 22.7	8.4 @ 23.1	990 @ 1,000 9458 @ ~~10,000~~ 9855 @ 23.1 °C

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	UNCORRECTED Cond. (µmhos/cm) 24 h	UNCORRECTED Cond. (µmhos/cm) 48 h
Control	A	5	5	5	8.4		8.4	23.0		22.7	8.6		8.4	165		180
Control	B	5	5	5			8.4			22.7			8.3			185
Control	C	5	5	5			8.4			22.6			8.3			180
Control	D	5	5	5			8.4			22.6			8.3			180
100%	A	5	5	5	7.7		8.5	23.0		22.9	8.3		8.4	760		800
100%	B KP	~~5~~ 6	~~5~~ 6	6			8.5			23.0			8.4			820
100%	C	5	5	5			8.5			23.2			8.4			820
100%	D	5	5	5			8.5			23.0			8.3			805
		discovered 6th animal														
		@ 48 hours in Vial B														
		KP			3/10/94											
Measured/Loaded by:		KP	KP	KP	KP		DW	KP		DW	KP		DW	KP		DW
Recorded by:		TR	KP	OW	TR		KP	TR		KP	TR		KP	TR		KP

Investigators' Signatures

Robin Allen Rader
Kim Pearce
Tina Mikulsky
[signature]
[signature]
Reviewer

form updated 7/8/93

Water Quality Parameters	Salt Water/ (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0.0	—	LC/SS
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-100	TR
Alkalinity:	125	70	100	Hach	TR
Hardness:	120	80	260	Hach	TR
Total Ammonia:	<0.017	<0.017	0.079	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -57.9 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Cargill Fertilizer Inc. — Sample Collection: Date 3-7-94 Time 1050
Location: — Test Beginning: Date 3-8-94 Time 1530
County: HILLSBOROUGH — Test Ending: Date 3/10/94 Time 1530
Contact/District: LISA CARTER / SW — Organism Batch #: 9 Diluent Batch #: Isoli
NPDES Permit #: FL0000761 Outfall #: — Organism Age: 10 days
Test Organism: Cyprinella leedsi

Test Type: (Screening) | Definitive 94-MAR-08-32 73354
(Static) | Static Renewal | Flow-through

Test Number: 2 of 2

Remarks:

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.1 @ 23.3	8.4 @ 23.5	990 @ 1,000 9540 @ ~~10,000~~ 9895 @ 23.6 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.0 @ 24.1	8.1 @ 23.6	990 @ 1,000 9560 @ ~~10,000~~ 9895 @ 23.9 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.6 @ 22.7	8.4 @ 23.1	990 @ 1,000 9450 @ ~~10,000~~ 9895 @ 23.1 °C

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. (µmhos/cm) 0 hr	UNCORRECTED Cond. (µmhos/cm) 24 h	UNCORRECTED Cond. (µmhos/cm) 48 h
Control A	183	5	5	5	7.9	8.3	8.4	22.4	23.2	22.5	8.6	8.1	8.0	240	240	240
Control B	74	5	5	5	7.9	8.3	8.4			22.5	8.6	8.1	8.2	240	240	240
100% A	390	5	5	5	7.5	8.0	8.3	22.9	23.1	22.5	8.0	8.1	8.1	805	805	800
100% B	25	5	5	5	7.5	8.0	8.3			22.5	8.0	8.1	8.2	805	810	805
Measured/Loaded by:		TR	TM	KP	KP	TR	DW	KP	TR	DW	KP	TR	DW	KP	TR	DW
Recorded by:		TR	TM	KP	TR	TM	KP	TR	TM	KP	TR	TM	KP	TR	TM	KP

Investigators' Signatures
Tobin Allen Rader
Kim Pearce
Tina Mihuddin

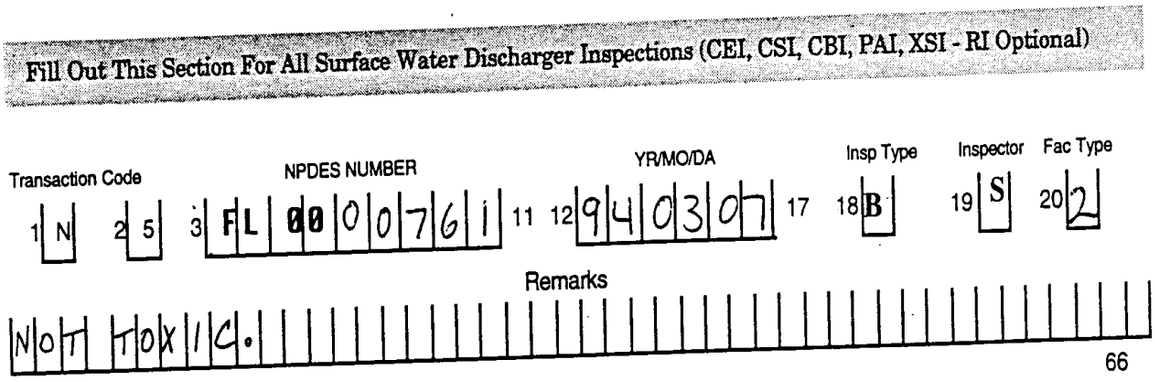
Reviewer

Water Quality Parameters	Salt Water/ (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0.0	—	LC/SS
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-100	TR
Alkalinity:	125	70	100	Hach	TR
Hardness:	120	80	260	Hach	TR
Total Ammonia:	<0.017	<0.017	0.079	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -57.9 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

form updated 7/8/93

The Bioassay of the Cargill Fertilizer, Inc., effluent sampled on March 07, 1994, NPDES# FL0000761.



The Priority Pollutants Analysis for the Bioassay of the Cargill Fertilizer, Inc., effluent sampled on March 07, 1994, NPDES# FL0000761.

