Bioassays of

Cargill Fertilizer, Inc.

Riverview, Hillsborough County, Florida

NPDES #FL0000761

Sampled 8/21/01

December 2001

Biology Section

Division of Resource Assessment & Management

Comprehensive Quality Assurance Plan #870346G

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Introduction

Cargill Fertilizer, Inc. Riverview Chemical Complex, 8813 Highway 41 South, Riverview, Hillsborough County, Florida, NPDES #FL0000761, tests performed on 23 to 25 August 2001.

This phosphate chemical plant has an average flow of approximately 0.432 MGD during the rainy season. The facility's Outfall 005B discharges a mixture of treated process wastewater, non-process wastewater, and stormwater. Process wastewater is treated using a two-stage liming and acidulation system. Non-process wastewater is treated by settling and pH adjustments when necessary. When non-process wastewater fails to meet the requirements for discharge, it is routed into the process wastewater treatment system. Stormwater is filtered and nutrients are removed in detention ponds. The treated wastewater is discharged into the Class III marine waters of the Alafia River.

This facility has mixing zones for fluoride, copper, iron, nickel, and zinc (facility summary provided by Dennis Klemm, 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 on a sample of effluent collected from this facility. Freshwater tests were scheduled for this facility. However, the sample salinity was approximately 11 ppt, so saltwater tests were conducted. The test species used for these bioassays were the mysid shrimp, *Americamysis bahia*, and the inland silverside, *Menidia beryllina*. The sample was collected August 21, 2001, and received August 22, 2001. However, because saltwater test organisms were not available, the test was set up August 23, 2001. The sample exceeded the 36-hour holding time; therefore, the test results should be used for information purposes only. Natural seawater diluted to approximately 11 ppt was used as the control. Because of the low sample volume available for testing (four liters), each replicate volume was decreased from 500 ml to 400 ml of sample or control water. The *Menidia* test was run with three, instead of four replicates. The test results did not indicate toxicity to either test species within 48 hours (Table 1).

The total residual chlorine concentration in the sample was measured at 0.05 mg/L in the laboratory. Total and unionized ammonia concentrations in the sample were 0.859 mg/L and 0.018 mg/L, respectively. Further chemical analyses were performed on the sample, and several metals, pesticides, radium 226 and radium 228 were identified (Table 2).

Conclusion

The sample of effluent collected from this facility on August 21, 2001, did not show acute toxicity to the either test species within 48 hours. However, the sample exceeded the 36-hour holding time, and the tests results should be used for informational purposes only.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Cargill Fertilizer, Inc., Riverview Chemical Complex, 8813 Highway 41 South, Riverview, Hillsborough County, Florida, NPDES# FL0000761 performed from 23 to 25 August 2001.

Facility:	**Cargill Fertilizer, Inc.**		**NPDES #**	**FL0000761**	Facility Type:	**Phosphate**	**Analysts:** Della Parker-Hanson
Location:	8813 Highway 41 South, Riverview		Contact/District:	Dennis Klemm/Southeast		**Chemical Plant**	Joshua Ayres
County:	Hillsborough		Test type:	static acute screen			Marshall Faircloth
Sample Collection Date:	8/21/01	Time: 1045	# tests:	2	Receiving Water:	Alafia River	
Test Beginning Date:	8/23/01	Time: 1330	Chlorination Type:	non-chlorinated			**Reviewer:** David Whiting
Test Ending Date:	8/25/01	Time: 1200				**Page 1 of 1**	

Organism: ***Americamysis bahia*** Life stage: 3 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[C]			Dissolved Oxygen			Conductivity Uncorrected mmhos/cm	
Concentrations	Volume(mL) [A]	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	0/400	5	5	5	7.9	8.1	8.2	25.9	24.5	24.0	7.0	7.0	7.1	18.8	19.1
Control B	0/400	5	5	5	7.9	8.1	8.2	25.8	24.0	23.5	6.8	6.9	7.0	18.9	20.9
Control C	0/400	5	5	5	7.9	8.1	8.2	25.9	23.6	23.5	6.8	7.2	7.0	19.0	21.6
Control D	0/400	5	5	5	7.9	8.1	8.2	25.8	23.9	23.5	6.9	7.2	7.0	19.1	20.2
100% A	400/0	5	5	5	7.5	7.9	7.9	25.5	24.4	23.5	8.5	6.8	7.0	19.0	19.1
100% B	400/0	5	5	5	7.5	7.9	7.9	25.5	24.0	23.3	8.5	6.7	6.8	18.8	20.4
100% C	400/0	5	5	5	7.4	7.9	7.9	25.5	24.1	23.5	8.5	7.0	6.8	17.8	20.3
100% D	400/0	5	5	5	7.4	7.9	7.9	25.5	23.8	23.8	8.6	7.0	6.6	17.8	20.4

[A] Sample volume decreased from 500 ml to 400ml because of a low sample volume.

[C] Temperatures of room and test incubator were continuously recorded on a strip chart recorder. Room Temperature range for the test period was 24.5-26.0 °C. Incubator #3 temperature range for the test period was 24.0-25.5°C.

Organism: ***Menidia beryllina*** Life stage: 12 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[D]			Dissolved Oxygen			Conductivity Uncorrected mmhos/cm	
Concentrations	Volume(mL) [B]	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	0/400	5	5	5	7.9	8.1	8.2	25.8	23.9	23.6	7.0	7.0	7.2	18.4	20.1
Control B	0/400	5	5	5	7.9	8.1	8.2	25.8	24.0	23.6	6.9	7.1	6.7	19.0	19.3
Control C	0/400	5	5	5	7.9	8.1	8.2	25.8	24.1	23.9	6.9	6.9	6.9	19.0	19.2
100% A	400/0	5	5	5	7.5	7.9	7.9	25.6	23.5	23.3	8.4	7.0	7.0	18.9	20.3
100% B	400/0	5	5	5	7.5	7.9	7.9	25.5	23.4	23.4	8.4	7.1	6.8	18.9	20.7
100% C	400/0	5	5	5	7.5	7.9	7.9	25.5	23.6	23.6	8.4	7.1	6.5	18.9	21.8

[B] Sample volume decreased from 500 ml to 400ml and replicates decreased from four to three because of a low sample volume.

[D] Temperatures of room and test incubator were continuously recorded on a strip chart recorder. Room Temperature range for the test period was 24.5-26.0°C. Incubator #3 temperature range for the test period was 24.0-25.5°C.

Data Transcription Verification	
date:	11/7/01
by:	Della Parker-Hanson Joshua Ayres

Total Residual CL2	mg/L	Method
Field:	-	-
Lab:	0.05	Hach

Ammonia	Total (mg/L)	Unionized (mg/L)
NSW	<0.051	<0.051
100% Sample:	0.859	0.018

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
NSW	124	-
100% Sample:	105	-

Salinity [E]	ppt
NSW	~11
100% Sample	~11

[E] Salinity based conductivity and temperature.

Table 2. Results of chemical analyses on the effluent from Cargill Fertilizer, Inc. Riverview Chemical Complex sampled on August 21, 2001.

Metals

Aluminum	390	µg/L	[I]
Arsenic	6.5	µg/L	[I]
Cadmium	0.11	µg/L	
Calcium	217	mg/L	
Chromium	2.5	µg/L	[I]
Copper	4.8	µg/L	[J]
Iron	1300	µg/L	
Lead	2.7	µg/L	[I]
Magnesium	290	mg/L	
Nickel	4.5	µg/L	[I]
Zinc	22	µg/L	[I]

Pesticides and Herbicides

None detected

Base, Neutral, & Acid Extractable Organics

Acenaphthene	1.2	µg/L	[I]
Di-n-octyl phthalate	1.1	µg/L	[I]

Radium 226

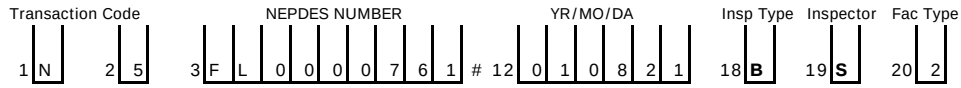
Radium 226	0.6	pCi/L

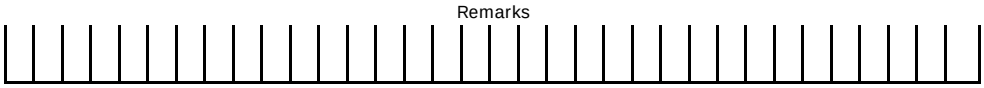
[I] Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit.

[J] Value reported is an estimated value.

The Bioassay of Cargill Fertlizier, Inc., Riverview Chemical Complex effluent sampled on August 21, 2001, NPDES #FL0000761.

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





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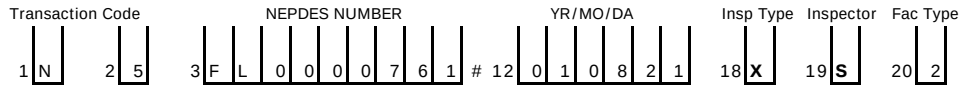
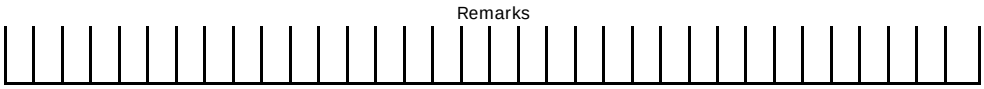
The Priority Pollutants Analysis for Bioassay of Cargill Fertlizier, Inc., Riverview Chemical Complex effluent sampled on August 21, 2001, NPDES #FL0000761.

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





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