

Bioassays of

Piney Point Phosphates, Inc.

Manatee County

NPDES #FL0000124

Sampled December 8, 2003

April 2004

Biology Section
Bureau of Laboratories
Division of Resource Assessment and Management

Quality Manual No. 870346G
NELAC Certification No. E31780

Piney Point Phosphates, Inc., 13300 Highway 41 North, Palmeto, Manatee County, Florida, NPDES #FL0000124. Effluent samples for this facility were collected on December 8, 2003.

Introduction

Piney Point Phosphates previously operated a phosphate fertilizer manufacturing complex in Manatee County Florida. After Piney Point Phosphates declared bankruptcy, a Receiver was appointed to maintain the phosphogypsum stack system to prevent a release of untreated wastewater. In an effort to close the stack system, the FDEP has authorized discharge of wastewater after RO treatment. In order to expedite the closing of the stack system, alternative treatments of wastewater for discharge to surface waters are being explored at the site. These toxicity tests were used to determine whether effluent treated with a two-stage liming process, followed by break-point chlorination, then dechlorination would be adequate for discharge. Wastewater treated in this manner is not currently being discharged pending the results of further testing.

Methods

Samples were collected from the NPDES sampling point by Jack Lowell (FDEP Phosphate Management, Tampa) following DEP-SOP-001/01 FS 2400 Wastewater Sampling. All DEP SOP's are available on the web at: http://www.floridadep.org/labs/qa/sops.htm

The toxicity and algal growth potential tests discussed in this report were performed following internal DEP SOP's TA07_01,TA07_02, and TA08_01 through TA08_06. All internal DEP SOP's are available on the web at: http://www.floridadep.org/labs/cgi-bin/sop/biosop.asp

Toxicity Test Results

Tests were performed December 9 - 11, 2003.

Americamysis bahia 48-hr acute screening bioassay – Toxic; NOEC < 100%, 70% mortality in 100% sample at 48 hours

Menidia beryllina 48-hr acute screening bioassay – Not Toxic; NOEC > 100%, 5% mortality in 100% sample at 48 hours

These results showed that the *A. bahia* tested in the Piney Point Phosphates effluent was not in compliance with the facility's NPDES permit requirement of a No Observed Effect Concentration (NOEC) of not less than 100%, whereas the acute test for *M. beryllina* was in compliance with the facility's NPDES permit requirement of a NOEC of not less than 100%.

See Table 1 for bioassay bench sheets.

Algal Growth Potential

Samples for the algal growth potential bioassay were not collected.

Chemistry Results

Samples for chemistry were not collected.

Conclusion

The effluent samples collected for this facility on December 8, 2003, did not show acute toxicity to the *M. beryllina* test organisms; however, the sample was acutely toxic to *A. bahia,* during the 48-

hour bioassay tests. The cause of the observed mortality in the *A. bahia* test was not determined; however previous tests for this facility suggest that ion-imbalance may have attributed to the *A. bahia* mortality. The seawater ion-imbalance toxicity testing protocol would need to be performed to confirm ion-imbalance as the sole cause of the toxicity. Samples for chemical analyses were not collected in conjunction with the bioassay samples; therefore, unidentified constituents in the sample cannot be ruled out as contributing to the observed mortality.

Literature Cited

Miller, W. E., T. E. Maloney, and J. C. Greene. 1978. The *Selenastrum capricornutum* Printz algal assay bottle test. EPA-600/9-78-018. U. S. EPA, Cincinnati, Ohio. 126 p.

Miller et al. 1990. *The Acute and Chronic Toxicity of Ammonia to Marine Fish and Invertebrates*, Archives of Environmental Contamination and Toxicology 19:40-48.

Raschke, R. L. and D. A. Schultz. 1987. The use of the algal growth potential test for data assessment. J. Wat. Poll. Cont. Fed. 59(4): 222-227.

Weber, C. I. 1993. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 4th edition. EPA/600/4-90/027. U. S. EPA, Cincinnati, Ohio. 216 pp.

USEPA. 2000. Nutrient Criteria Technical Guidance Manual – River and Streams. EPA-822-B-00-002.

USEPA. 2002. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms. 4th Edition. EPA-821-R-02-013

Wolfe, *et al*. 1995. *Protocols for determining Major-Seawater-Ion Toxicity in Membrane-Technology Water-Treatment Concentrate*. Florida Department of Environmental Protection, Bureau of Laboratories. 96pp.

Table 1. continued

Data recorded during the 48-hour acute bioassays of a sample of effluent from Piney Point Phosphates, Inc., 13300 Highway 41 N., Palmetto, Manatee County, Florida, NPDES# FL0000124, performed from 9 to 11 December, 2003.

Facility:	**Piney Point Phosphates, Inc.**	**NPDES#:**	**FL0000124**	Facility Type:	**Phosphate**	**Analysts:**	Christa Pierini
Location:	13300 Highway 41 North, Palmetto	Contact/District:	Jacki Champion/SW		**Plant**		Sarah Prichard
County:	Manatee	Test type:	acute definitive renewal				Scott Andree
Sample Collection Date:	12/8/2003 Time: 1620	# tests:	2	Receiving Water:	Class III fresh		Josh Ayres
Test Beginning Date:	12/9/2003 Time: 1430	Chlorination Type:	dechlorinated		Buckeye Road Ditch to Bishops Harbor		James Daniels
Test Ending Date:	12/11/2003 Time: 1200	FDEP SOP#:	TA07_03		**Page 1 of 2**	**Reviewer:**	Julie Espy

Sample salinity adjusted with 40 fathoms artificial sea salts to an apparent salinity of approximately 20 ppt.

Organism: ***Americamysis bahia*** Life stage: days 4 [A]Feeding: Artemia

Chamber size: 1000 ml Food Batch #: 0194025G

	Sample/Diluen	SURVIVAL # Alive			pH (standard units)			Temperature °C[B]			Diss. Oxygen mg/L			Conductivity Uncorrected mmhos/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	8.5	8.5	8.3	24.5	24.8	24.3	6.6	6.1	6.4	30.5	32.1
Control B	0/500	5	5	5	8.5	8.5	8.3	24.5	24.1	24.0	6.9	6.2	6.3	31.7	32.2
Control C	0/500	5	5	5	8.5	8.5	8.3	24.6	24.0	24.0	6.9	5.9	6.0	31.9	31.9
Control D	0/500	5	5	5	8.5	8.5	8.3	24.5	24.0	24.0	6.9	5.9	6.0	31.7	31.6
Salt Cont. A	0/500	5	5	5	8.3	8.3	8.2	24.3	24.4	24.0	7.0	5.9	5.5	31.1	31.5
Salt Cont. B	0/500	5	5	5	8.3	8.3	8.2	24.3	24.0	24.0	7.1	5.9	5.5	31.5	31.8
Salt Cont. C	0/500	5	5	5	8.3	8.3	8.2	24.3	24.0	24.0	7.1	5.9	5.3	31.4	31.9
Salt Cont. D	0/500	5	5	5	8.3	8.3	8.2	24.2	24.0	24.1	7.1	5.9	5.4	31.4	31.8
100% A	500/0	5	2	2	8.2	8.2	8.2	24.4	24.3	24.0	7.1	5.4	5.7	31.1	31.5
100% B	500/0	5	1	1	8.2	8.2	8.2	24.4	24.0	24.0	7.2	5.3	5.7	30.2	31.4
100% C	500/0	5	2	0	8.2	8.2	8.2	24.5	24.0	24.0	7.2	5.5	5.9	31.4	32.7
100% D	500/0	5	4	3	8.2	8.2	8.2	24.5	24.0	24.0	7.3	5.6	5.9	30.9	31.5

[A]Organisms fed daily.

[B]Temperatures of room and test incubator were continuously recorded on a strip chart recorder.

Room Temperature range for the test period was 24.0 - 25.5°C.

Incubator #3 temperature range for the test period was 23.0 - 24.0°C.

Light Intensity during the test was 50-100 foot candles.

Photoperiod during the test was 16 hours of light : 8 hours of dark.

LIMS	
Job number:	TLH-2003-12-09-47
sample number:	722009

Data Transcription Verification
date: 2/6/04
by: James Daniels/Josh Ayres

Total Residual CL2	mg/L	Method
Field:	not measured	-
Lab: 100% sample:	0.01	Hach
Control water:	0.01	Hach

Ammonia	Total (mg/L)	Unionized (mg/L)
Control water:	<0.034	<0.034
100% Sample:	0.773	0.065

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control water:	252	-
100% Sample:	115	1161

Salinity[C]	ppt
Control water:	20
100% sample:	6.5
Salt adjusted sample:	20

[C] Salinity based on conductivity and temperature.

Table 1. concluded. Data recorded during the 48-hour acute bioassays of a sample of effluent from Piney Point Phosphates, Inc., 13300 Highway 41 N., Palmetto, Manatee County, Florida, NPDES# FL0000124, performed from 9 to 11 December, 2003.

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100% C	500/0	5	5	5	8.2	8.3	8.2	24.5	24.0	24.0	7.4	6.1	6.1	31.6	31.1
100% D	500/0	5	5	5	8.2	8.3	8.2	24.5	24.0	24.0	7.4	6.0	6.1	31.7	31.7

[A]Organisms fed prior to testing.

[B]Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 24.0 - 25.5°C.
Incubator #3 temperature range for the test period was 23.0 - 24.0°C.
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Ammonia	Total (mg/L)	Unionized (mg/L)
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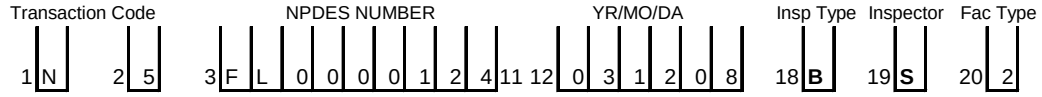
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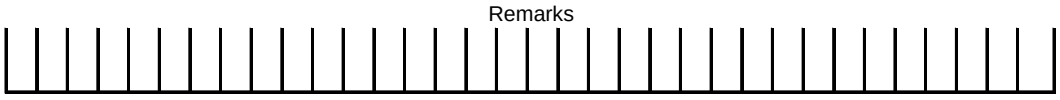
Salinity[C]	ppt
Control water:	20
100% sample:	6.5
Salt adjusted sample:	20

[C] Salinity based on conductivity and temperature.

The Bioassay of Piney Point Phosphates, Inc. effluent sampled on December 8, 2003, NPDES #FL0000124.

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





The Priority Pollutants Analysis for Bioassay of Piney Point Phosphates, Inc. effluent sampled on December 8, 2003, NPDES #FL0000124.

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

