Biological Assessment of

Mosaic Phosphates Company Nichols Plant

Polk County

NPDES #FL0030139

Sampled May 22, 2006

May 2007

Biology Section

Bureau of Laboratories

Division of Resource Assessment and Management

Quality Manual No. 870346G

NELAC Certification No. E31780

Florida Department of Environmental Protection

Fifth Year Inspection Summary

Discharger:	Mosaic Phosphates Company Nichols Plant
Physical Address:	5000 County Road 676
County:	Polk
NPDES Number:	FL0030139
Permit Expiration:	March 27, 2007

Toxics Sampling Inspection **(XSI)**

Date Sampled: May 22, 2006

Results: Iron was detected in the effluent at levels that complied with Class III Water Quality Criteria (62-302.530 F.A.C.). The metals arsenic and copper were found in the effluent at levels above the method detection limit (MDL) and below the practical quantitation limit (PQL). No organic pollutants were detected in the effluent.

Compliance Biomonitoring Inspection **(CBI)**

Date Sampled: May 22, 2006

Results: The effluent sample was not acutely toxic to the fish, *Cyprinella leedsi,* or to the water flea, *Ceriodaphnia dubia,* during 96-hour acute screening bioassays.

Water Quality Inspection **(WQI)**

Date Sampled: May 22, 2006

Results: Fecal and total coliform samples were not collected during this study. Effluent total dissolved solids were 247 mg/L. The effluent total nitrogen concentration was 0.26 mg/L. Effluent total phosphorus (0.17 mg/L), ortho-phosphate (0.067 mg/L), and nitrate+nitrite (0.043 mg/L) appeared to contribute to the levels of these nutrients in the Test Site sample. Levels of ortho-phosphate (0.72 mg/L) and total phosphorus (0.86 mg/L) in the Test Site sample were nearly twice those in the Control Site sample (0.4 and 0.54 mg/L, respectively). The nitrate+nitrite (1.2 mg/L) level was nearly four times that in the Control Site (0.33 mg/L) sample. Test Site levels of these nutrients ranked in the 90^{th} to 95^{th} percentile when compared with levels typical of Florida streams compared to the 80th percentile for Control Site levels (Appendix H). The effluent AGP value was 4.81 mg dry weight/L. The AGP values in the Control (24.4 mg dry weight/L) and Test Site samples (77.5 mg dry weight/L) were above the “problem” threshold (Table 3). These data, with the exception of AGP, indicate nutrient enrichment related to the Mosaic Phosphates - Nichols Plant discharge in this portion of Thirty Mile Creek.

Impact Bioassessment Inspection **(IBI)**

Date Sampled: May 22, 2006

Results: Quantitative measures of benthic macroinvertebrate assemblages from Hester-Dendy samplers showed little difference between the Test Site compared to the Control Site sample. Shannon-Weaver diversity, the Florida Index, number of taxa, and the percent dominant taxon were similar at both sites. Qualitative measures of benthic macroinvertebrate assemblages from dipnet samples also showed little difference between the two sites. The most notable differences between the two sites were fewer total taxa (Control Site = 31, Test Site = 24), an increase in the dominant taxon (Control Site = 16.2%, Test Site = 33.3%), and an increase in the sensitive taxa (Control Site = 2, Test Site = 4).

There was little difference in algal community composition between the Control and Test Sites (Table 4, Appendix J). Both sites had similar number of taxa, percent dominant taxon, percent blue-green algae and diatoms.

Biological assessments are prepared by FDEP staff to provide information for review of NPDES permit renewal applications. Biological assessments, in conjunction with other information concerning the subject facility and its receiving-water body, are used to determine appropriate permit conditions.

Introduction

The Mosaic Phosphates Company-Nichols Plant is located in Polk County, Florida (Appendix A) and is authorized to discharge to the Class III fresh waters of Thirty Mile Creek from Outfall D-001. The D-001 outfall pipeline is approximately 2.4 meters (8 feet) in length and the point of discharge is located approximately at latitude 27° 52'51.6" N, longitude 82° 02' 15.6" W. The facility discharges non-process wastewater, as well as treated process wastewater.

Thirty Mile Creek is located in west-central Polk County and a small part of Hillsborough County, east of Tampa, near the Town of Mulberry, in west central Florida (Figure 1.1). The headwaters of the creek are at the confluence of Guy Branch, George Allen Creek, and an unnamed tributary. Other tributaries that flow into Thirty Mile Creek include Beulah Branch and three unnamed tributaries. Thirty Mile Creek is approximately 2.7 miles long, occupying an approximate 6.5 square-mile drainage area, with the North Prong of the Alafia River as the receiving water. A Total Maximum Daily Load (TMDL) for nutrients and dissolved oxygen (DO) for Thirty Mile Creek, which is part of the larger Alafia River Planning Unit and the Tampa Bay Tributaries Basin, was completed by the Department in September 2004 (http://www.dep.state.fl.us/water/thirtyMileCreek/DOTMDL.pdf). The stream was verified impaired for nutrients and DO, and was included on the Verified List of impaired waters for the Tampa Bay Tributaries Basin that was adopted by Secretarial Order in May 2004. This TMDL establishes the allowable loadings to Thirty Mile Creek that would restore the waterbody such that it meets its applicable water quality criteria for DO and nutrients. The Class III freshwater DO criterion states that DO shall not be less than 5.0 mg/L (Chapter 62-3.2, F.A.C., Surface Water Quality Standards). In contrast to this straightforward numeric DO criterion, Florida's nutrient criterion is narrative only — nutrient concentrations of a body of water shall not be altered so as to cause an imbalance in natural populations of aquatic flora or fauna. Given the uncertainty of nutrient reactions within streams, the Department applied a chlorophyll *a* target for this TMDL that should result in annual average chlorophyll below the IWR impairment threshold for streams. Specifically, the Department calculated an allocation for Total Nitrogen that would ensure that the waterbody does not exceed 20 µg/L in any given month.

Mosaic Phosphates Company's Nichols Plant (formerly IMC Phosphates Company's Nichols Concentrates Plant) manufactured sulfuric acid, phosphoric acid, and mono and diammonium phosphate (see Facility Summary in Appendix B). Phosphoric acid production was suspended in October 1998 and the plant was permanently closed in December 1999. The closure of the facility is authorized in accordance with the requirements of Chapter 62-673, Florida Administrative Code (F.A.C.) and the design specifications prepared by Ardaman & Associates, Inc. with dates of September 15, 2000, November 22, 2000, May 1, 2001, and July 6, 2001. Only the phosphogypsum stack system was authorized for closure, excluding the Total Perimeter Containment System (TPCS), Southwest Interceptor Drain System, items addressed in Consent Order No. 87-0174, and soil-bentonite slurry cut-off walls. The phosphogypsum stack system includes a 20.2 hectare (50 acre) lined process water-cooling pond and associated conveyance pumps, piping and ditching used in conjunction with the 72.8 hectare (180-acre) phosphogypsum stack. The stack system is being closed in seven phases over a period of approximately eight years, with a completion date set for 2010.

Other operations at this site included electric cogeneration (the simultaneous production of electricity and useful thermal energy from a single source (Heltzer, J. M. 1994)), phosphogypsum storage, raw material storage and handling, wastewater storage and handling, process material handling, and product shipping facilities.

Methods

The purpose of this investigation was to determine the potential effects of the facility's effluent on the biota of the receiving waters. Chemical and biological comparisons were made between a Control Site (located in Thirty Mile Creek approximately 50 meters upstream of the discharge and ten meters upstream of the CSX railroad crossing) and a Test Site (located in Thirty Mile Creek approximately 150 meters downstream of the discharge). Detailed methods and their relationship to Florida Administrative Code are given in Appendix C.

All field and laboratory biological methods followed Biology Section Standard Operating Procedures (SOPs, see http://www.floridadep.org/labs/qa/2002sops.htm for details) and met FDEP quality assurance/quality control standards (see http://www.floridadep.org/labs/qa/index htm).

The following were involved in this investigation: Jacki Champion, and Scott Rose (FDEP Bureau of Mine Reclamation), and FDEP Central Laboratory in Tallahassee. See Appendix D for the chain of custody form (sample submittal form). The report was reviewed by District representatives and the Point Source Studies Review Committee (Wayne Magley, Shannan Bogdanov, and Michael Tanski).

Results and Discussion

- Specific chemical results are reported in Table 1 and Table 2 and a complete list of chemical analytes can be reviewed in Appendix E. Effluent metal iron was detected at levels that complied with Class III Water Quality Criteria (62-302.530 F.A.C.) and facility permit limits

Table 1. Effluent limits, Class III Criteria and chemical, microbiological, and toxicological data.

Mosaic Phosphate Company - Nichols Plant	Class III Stds	Effluent Limits	Effluent Samples	Control Site	Test Site
Organic Constituents (µg/L)					
None Detected	-	-	-	-	-
Nutrients (mg/L)					
Ortho-phosphate	-	-	0.067	0.4	0.72
Total Phosphorus	-	≤ 10.0	0.17 Y	0.54	0.86 A
Ammonia	-	-	0.16 Y	0.12	0.011 I
Unionized Ammonia	≤ 0.02 c	-	≤ 0.02c	≤ 0.02c	≤ 0.02c
Nitrate+Nitrite	-	-	0.043 Y	0.33	1.2
Total Kjeldahl Nitrogen	-	-	0.22 IY	0.68	0.32 I
Organic Nitrogen	-	-	0.06 cY	0.56 cY	0.31 cY
Total Nitrogen	-	3 *	0.26 c	1.01 c	1.52 c
General Physical and Chemical Parameters					
Alpha, Total (pCi/L)	-	≤ 15	2.4	-	-
Alpha-Counting Error (pCi/L)	-	-	1.3	-	-
Radium 226 + 228 (pCi/L)	-	-	0.7	-	-
Radium 226-Counting Error (pCi/L)	-	-	0.2	-	-
Radium 228 (pCi/L)	-	-	0.9 U	-	-
Radium 228-Counting Error (pCi/L)	-	-	0.5	-	-
Chloride (mg/L)	-	-	9.8	-	-
Fluoride (mg/L)	≤ 10	≤ 10	0.37	2.4	0.95
Sulfate (mg/L)	-	-	80	110	110
Temperature (°C)	-	-	26.4	25.3	24.1
Color (pcu)	-	-	10	-	-
TDS (mg/L)	-	-	247	-	-
TSS (mg/L)	-	≤ 20	4 U	6 I	4 U
Habitat Assessment	-	-	-	135	137
Dissolved Oxygen (mg/L)	≥ 5.0	≥ 5.0	6.9	6.8	8.4
pH (S.U.)	-	6.0-8.5	7.2	7.8	7.8
Conductivity (µmohs/cm)	≤ 1275	≤ 1275	372	557	441
Oil and Grease (mg/L)	≤ 5	-	1.7 UJ	-	-
Turbidity	-	33.3 t	1.3	4.3	1.3
Flow (MGD)	-	Report	-	-	-
Hardness (mg/L)	-	-	179.6 c	206.5 c	187.5 c
Chlorophyll *a* (µg/L)	-	-	0.96 U	0.92 U	0.85 U
AGP (mg DryWt/L)	-	-	4.81	24.4	77.5 A
Toxicology Bioassays 4 in 24 hours (96 hr acute screening, % mortality in 100% effluent)					
Fish (*Cyprinella leedsi)*	-	≤ 20	5%	-	-
Fish (*Cyprinella leedsi)*	-	≤ 20	5%	-	-
Fish (*Cyprinella leedsi)*	-	≤ 20	5%	-	-
Fish (*Cyprinella leedsi)*	-	≤ 20	5%	-	-
Water flea (*Ceriodaphnia dubia)*	-	≤ 20	0%	-	-
Water flea (*Ceriodaphnia dubia)*	-	≤ 20	0%	-	-
Water flea (*Ceriodaphnia dubia)*	-	≤ 20	0%	-	-
Water flea (*Ceriodaphnia dubia)*	-	≤ 20	0%	-	-

Value exceeds the Class III Water Quality Criteria or permit limits

* Effluent limit based on 24-hour composite sample

A - Value reported is the mean of two or more determinations

b - Value is calculated based on hardness

c - Value is calculated

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

J - Estimated value

t - Shall not exceed 29 NTUs above background

U - Material analyzed for but not detected; value reported is the method detection limit

Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.

Table 2. Effluent limits, Class III Freshwater Criteria and Metals data.

Mosaic Phosphates Company - Nichols Plant	Class III Stds	Effluent Limits	Effluent Samples	Class III Stds	Control Site	Class III Stds	Test Site
Metals (µg/L unless otherwise noted)							
Aluminum	-	-	53 A	-	230	-	91
Arsenic	≤ 50	-	0.55 I	-	2.2	-	0.97 I
Cadmium	≤ 1.8 b	-	0.05 U	2.0 b	0.05 U	1.9b	0.05 U
Calcium (mg/L)	-	-	47.5 A	-	45.6	-	47.2
Chromium-III	≤ 139.2 b	-	0.3 U	156.1b	0.47 I	144.2b	0.3 U
Copper	≤ 15.4 b	-	0.47 I	17.3b	0.2 U	16.0b	0.28 I
Iron	≤ 1000	-	111 A	-	191	-	84
Lead	≤ 6.7 b	-	0.2 U	8.0b	0.21 I	7.1b	0.2 U
Magnesium (mg/L)	-	-	14.8 A	-	22.5	-	16.9
Nickel	≤ 85.6 b	-	1 U	96.3b	1 U	88.8b	1 U
Selenium	≤ 5	-	0.5 U	-	0.51 I	-	0.5 U
Silver	≤ 0.07	-	0.025 U	-	0.025 U	-	0.025 U
Zinc	≤ 196.7 b	-	1.5 U	221.5b	3.6 U	204.1b	3.6 U

b - Value is calculated based on hardness

A - Value reported is the mean of two or more determinations

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

U - Material analyzed for but not detected; value reported is the method detection limit

(Table 2). The metals arsenic and copper were found in the effluent at levels above the method detection limit (MDL) and below the practical quantitation limit (PQL). No organic pollutants were detected in the effluent.

- Effluent conductivity, pH and dissolved oxygen complied with Class III Water Quality Criteria (62-302 F.A.C.) and facility permit limits (Table 1).
- Effluent radium 226+228 (0.115 pCi/L) and total alpha particle activity (2.4 pCi/L) were detected at levels below the 5 pCi/L and 15 pCi/L Class III Water Quality standards (Criterion 62-302.530 (58a) and 62-302.530 (58b) F.A.C) and permit limits.
- Effluent total suspended solids (4U mg/l) and fluoride (0.37 mg/L) complied with the permit limits. Effluent total dissolved solids were 247 mg/L.
- Dissolved oxygen, pH and conductivity at the Control and Test Sites complied with Class III Water Quality Criteria (Table 1, 62-302.530 F.A.C.).
- The effluent sample was not acutely toxic to the fish, *Cyprinella leedsi,* or to the water flea, *Ceriodaphnia dubia,* during 96-hour acute screening bioassays (See Table 1 for percent mortality, Appendix F for bioassay bench sheets, and Appendix G for supporting standard reference toxicant data). While the acute screening toxicity tests do not reflect the permit required conditions, the Department uses it to provide reasonable assurance that the facility does not adversely affect waters of the state.
- Fecal and total coliforms data were not collected during this sampling event.
- The effluent total nitrogen concentration was 0.26 mg/L (Table 1). Effluent total phosphorus (0.17 mg/L), ortho-phosphate (0.067 mg/L), and nitrate+nitrite (0.043 mg/L) appeared to contribute to the levels of these nutrients in the Test Site sample (Table 1). Test Site ortho-phosphate (0.72 mg/L) and total phosphorus (0.86 mg/L) levels were nearly twice those in the Control Site (0.4 and 0.54 mg/L, respectively). Total nitrogen in the Control Site sample was 1.01 mg/L and 1.52 mg/L in the Test Site sample , nearly a 1/3 increase. Test Site nitrate+nitrite (1.2 mg/L) concentration was nearly four times that in the Control Site (0.33 mg/L) sample. Test Site levels of these nutrients ranked in the 90th to 95th percentile when compared with levels typical of Florida streams (Appendix H) compared to the 80th percentile for Control Site levels. In May 2004, Department staff were contacted by an IMC representative and informed of a non-permitted discharge that was reaching Thirty Mile Creek upstream of the Control Site. The seepage consisted of a groundwater plume being released from a former chemical processing facility, which has been subsequently mined.
- Algal growth potential (AGP) is a measure of nutrients available for algal growth (Miller *et al*. 1978). Raschke and Shultz (1987) found that AGP above 5.0 mg dry wt/L represent a "problem" threshold for fresh receiving waters, implying nutrient enrichment. The effluent AGP value was 4.81 mg dry wt/L. The AGP values in the Control Site (24.4 mg dry weight/L) and Test Site (77.5 mg dry wt/L) were above the "problem" threshold (Table 3). The low effluent AGP value may be the result of normal variation between grab samples or due to an unidentified source of nutrients located between the Control and Test Sites. There was little or no evidence of growth inhibition in the AGP data (Table 3).
- Chlorophyll-*a* was not detected in water samples of the effluent or from the Control or Test Sites (Table 1). We note that nutrients in the water column may or may not fuel algal production immediately, depending upon the sum of environmental conditions that limit algal growth at the site (e.g. pH, shading, turbidity). Thus it is not necessarily

Table 3. Measured and predicted algal growth potential (AGP) for total soluble nitrogen (TSIN) and total nitrogen (TN) limitation of the freshwater species Psedokirchneriella subcapitata.

Mosaic Phosphates Company - Nichols Plant					
Location	AGP (measured)	Predicted AGP (TSIN) ± 20%	Predicted AGP (TN) ± 20%	Inorganic N:P ratio	Total N:P ratio
Effluent Sample	4.81	7.71 ± 1.542	9.99 ± 1.998	3.03	1.55
Control Site	24.4	17.1 ± 3.42	38.38 ± 7.676	1.12	1.87
Test Site	77.5A	46.02 ± 9.204	57.76 ± 11.552	1.68	1.77

A - Value reported is the mean of two or more determinations

contradictory for ambient nutrient levels to be high and for no chlorophyll to be detected in water samples

- Control and Test Sites showed little difference in algal community composition (Tables 4a and 4b, Appendix J). Both sites had similar number of taxa, percent dominant taxon, percent blue-green algae and diatoms.
- Habitat assessment scores were 137 at the Control Site and at the Test Site (Table 1, data sheets in Appendix I).
- Quantitative measures of benthic macroinvertebrate assemblages from Hester-Dendy samplers showed little difference between the Test Site compared to the Control Site (Table 5, Appendix K). Shannon Weaver diversity, the Florida Index, number of taxa, and the percent dominant taxon were similar at both sites. Shannon-Weaver diversity decreased by 9.8% at the Test Site (3.60) compared to the Control Site (3.99), while taxa richness, the Florida Index, and the number of EPT taxa increased at the Test Site compared to the Control Site.
- Qualitative measures of benthic macroinvertebrate assemblages from dipnet samples are summarized in Table 6 and in Appendix L. The most notable differences between the two sites were fewer total taxa (Control Site = 31, Test Site = 24), an increase in the dominant taxon (16.2% at the Control Site, 33.3% at the Test Site), and an increase in sensitive taxa (2 at the Control Site, 4 at the Test Site). Habitat assessment scores were 135 at the Control Site and 137 at the Test Site, with the primary parameters scoring in the suboptimal category. (Table 1, data sheets in Appendix I).

Summary

Data from this inspection indicate that effluent metals, total phosphorus, total nitrogen, total alpha, radium 226 + 228, and fluoride complied with Class III Water Quality criteria and permit limits. Effluent AGP was below the 5.0 mg dry weight/L "problem" threshold however, AGP levels at the Test Site increased from those at the Control, both were found to be above the "problem" threshold of 5 mg dry weight/L. Test Site levels of nutrients ranked in the 90th to 95th percentile when compared with levels typical of Florida streams (Appendix H) compared to the 80th percentile for Control Site levels.

Effluent total dissolved solids were very high (247 mg/L) and should be considered for inclusion in future permits.

With the exception of the much higher abundance of both macroinvertebrates and algae at the downstream Test Site, sampling of the biological communities showed only minor difference between the upstream and downstream sites.

Total nitrogen levels in the effluent sample, as well as, in the Control and Test Site samples were found to be higher than the 20 µg/L target set forth in the 2004 Thirty Mile Creek TMDL.

Literature Cited

Barbour, M. T. and J. B. Stribling. 1994. A technique for assessing stream habitat structure. In: Proceedings of Riparian Ecosystems in the Humid United States: Functions and Values. U. S. Dept. Agriculture. 15-18 March 1993, Atlanta, Ga. 22 pp.

Beck, W. M. Jr. 1954. Studies in stream pollution biology 1. A simplified ecological classification of organisms. Quart. J. Fla. Acad. Sci. 17(4): 211-227.

Fore, L. 2004. Development and Testing of Biomonitoring Tools for Macroinvertebrates in Florida Streams.

Heltzer, J. M. 1994. Cogeneration of Steam and Electric Power: Pollution Prevention Opportunities and Options. Commonwealth of Virginia Department of Environmental Quality Office of Pollution Prevention Report 49-1 September 1994

Magurran, A. E. 1988. Ecological diversity and its measurement. Princeton University Press, Princeton, New Jersey.

Table 4a. Oualitative periphyton composition from natural substrates.

Mosaic Phosphates Company - Nichols Plant	Control Site	Test Site
Number of Taxa	56	54
Percent Dominant Taxon	21.2	17.2
Dominant Taxon (name)	*Navicula* sp.	*Bacillaria paxillifer*
Number of Algal Units Identified	316	314
Percentage Composition		
Blue-green algae	1.9	1.3
Diatoms	98.1	98.7

Table 4b. Phytoplankton composition

Mosaic Phosphates Company - Nichols Plant	Control Site	Test Site
Number of Taxa	66	60
Shannon-Weaver Diversity	5.04	4.86
Chlorophyll a (µg/L)	0.92 U	.85U
Phaeophytin (µg/L)	1.6 U	1.5U
Algal Density (number/cm²)	303	609
Percent Dominant Taxon	10.9	12.6
Dominant Taxon (name)	*Achnanthes lanceolata rostrata*	*Navicula* sp.
Number of Algal Units Identified	308	303
Percentage Composition		
Blue-green algae	2.6	1.6
Diatoms	92.1	96.4
Green algae	4.0	1.3
Other	1.3	0.7

U - Material analyzed for but not detected; value reported is the method detection limit

Table 5. Macroinvertebrate Hester-Dendy Samples - Quantitative

Mosaic Phosphate Company - Nichols Plant	Control Site	Test Site
Summary Statisics		
Shannon-Weaver Diversity	3.99	3.6
Number of Taxa	41	47
Florida Index	24	25
Number of EPT Taxa	7	12
Percent Dominant Taxon	23.6	29
Dominant Taxon (name)	*Baetis intercalaris*	*Microcylloepus pusillus*
Dominant Taxon (group)	Ephemeroptera	Coleoptera
Total Number of Individuals (counted)	155	380
Total Number of Individuals (#/m^2)	465	1139
Community Composition: Percent of total		
Coleoptera	7.1	35
Diptera	43.6	29
Ephemeroptera	32.2	12.1
Gastropoda	2.4	0.4
Trichoptera	12.7	22.2
Other	1.9	1.3
Functional Feeding Groups: Percent of total		
Piercers	0.7	4.2
Predators	9.1	6.8
Surface Deposit Feeders	43.6	36.7
Suspension Feeders	15.3	17.2
Scavengers	0.3	0.2
Scrapers	18.6	26.7
Shredders	7.4	8.1
Unknown	5	0.2

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.

Plafkin, J. L., M. T. Barbour, K. D. Porter, S. K. Gross and R. M. Hughes. 1989. Rapid bioassessment protocols for use in streams and rivers: Benthic macroinvertebrates and fish. U. S. EPA, Office of Water Regulations and Standards, Washington D.C., EPA 440-4-89-001

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.

Ross, L. T. 1990. Methods for aquatic biology. Florida Department of Environmental Regulation Technical Series 10(1): 1-47.

Sokal, R. R. and F. J. Rohlf. 1995. Biometry, Third edition. W. H. Freeman and Company, New York.

Stevenson, R. J. and L. L. Bahls. 1999. Periphyton protocols. Pp. 6.1-6.22 in: Rapid bioassessment protocols for use in wadeable streams and rivers. 2nd edition. By: M. T. Barbour, J. Gerritsen, B. D. Snyder and J. B. Stribling. EPA 841-B-99-002. U. S. Environmental Protection Agency, Office of Water, Washington, D. C.

Stevenson, R. J. and J. P. Smol. 2003. Use of algae in environmental assessments, pp. 775-803, in: Freshwater algae of North America, edited by J. D. Wehr and R. G. Sheath, Academic Press, San Diego. 918 pp.

Wallace, J. B., J. W. Grubaugh and M. R. Whiles. 1996. Biotic indices and stream ecosystem processes: results from an experimental study. Ecol. Appl. 6(1): 140-151.

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

Table 6. Macroinvertebrate Dipnet Samples - Qualitative

Mosaic Phosphate Company - Nichols Plant	Control Site	Test Site
Summary Statistics		
Number of Total Taxa	31	24
Number of Ephemeroptera Taxa	4	1
Number of Trichoptera Taxa	4	7
Number of Clinger Taxa	5	5
Number of Long-lived Taxa	2	1
Number of Sensitive Taxa	2	4
Percent of Dominant Taxon	16.2	33.3
Percent Suspension Feeders and Filterers	6.7	15.2
Percent of Tanytarsini individuals	6.7	3.9
Percent of Very Tolerant individuals	1.9	0
Total Number of Individuals	105	102
Community Composition: Percent of total		
Dominant Taxon (name)	Hydrobiidae	*Microcylloepus pusillus*
Dominant Taxon (group)	Gastropoda	Coleoptera
Amphipoda	3.8	1.0
Coleoptera	21.9	42.2
Diptera	22.9	19.6
Ephemeroptera	10.5	2.0
Gastropoda	17.1	1.0
Odonata	6.7	2.0
Oligochaeta	1.9	0
Pelecypoda	1.0	7.8
Trichoptera	13.3	24.5
Other	0.9	0
Functional Feeding Groups: Percent of total		
Burrowing Deposit Feeders	1.9	0
Piercers	9.5	8.8
Predators	9.5	6.4
Surface Deposit Feeders	44.8	35.3
Suspension Feeders and Filterers	6.7	15.2
Scrapers	18.6	27.9
Shredders	9.1	6.4

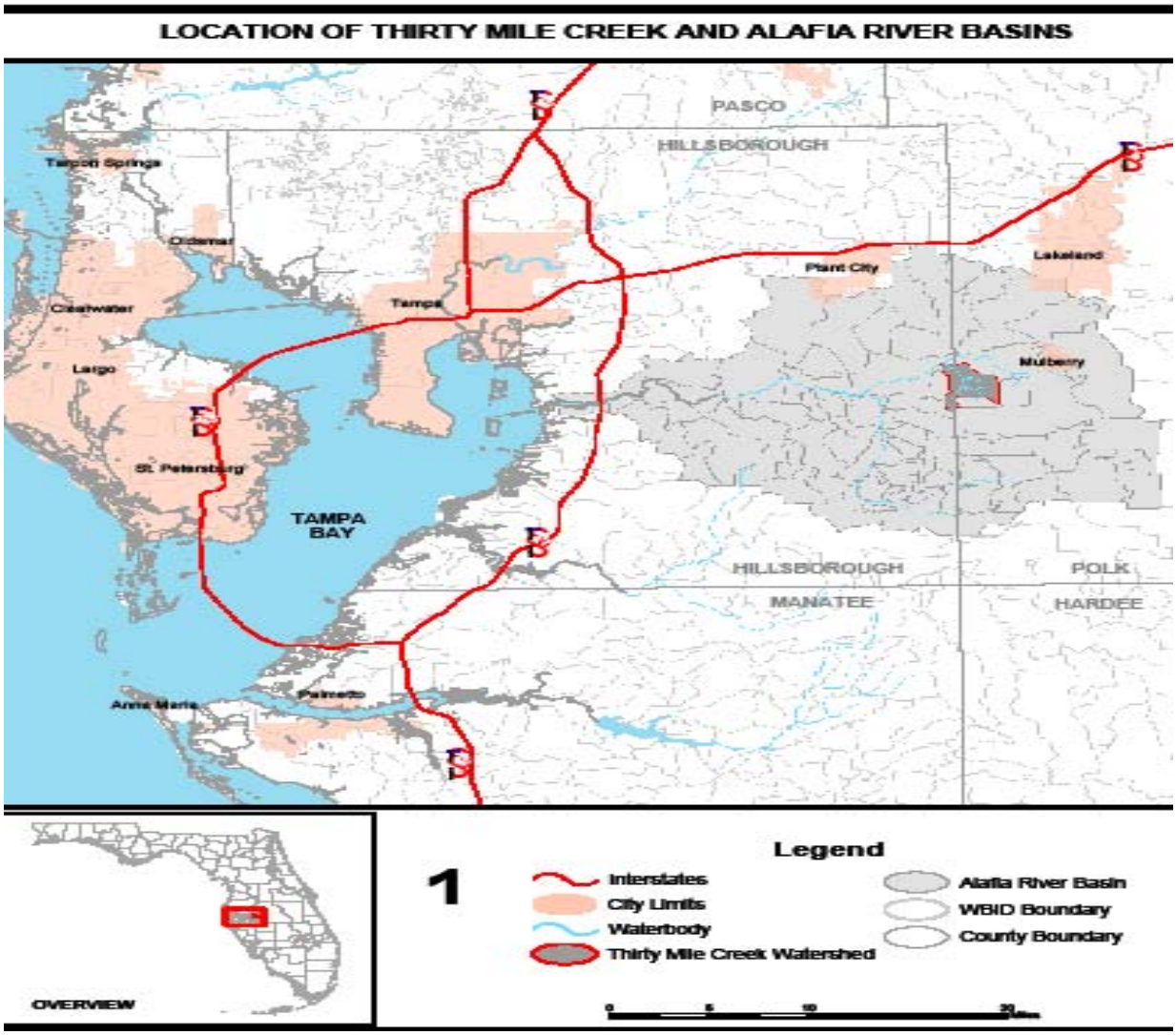
USEPA. 2002. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms. 4th Edition. EPA-821-R-02-013.

Appendices

- Appendix A. Map of facility
- Appendix B. Facility summary and DMR data
- Appendix C. Explanation of measurements
- Appendix D. Chain of Custody form
- Appendix E. Chemical analyses of effluent and receiving water.
- Appendix F. Additional physical, chemical, toxicological and microbiological results
- Appendix G. Standard Reference Toxicant test data
- Appendix H. Typical values for selected parameters in Florida waters
- Appendix I. Habitat Assessment field sheets
- Appendix J1. Periphyton: Taxa list and density (number of individuals per mL)
- Appendix J2. Periphyton: Taxa list and number of individuals counted
- Appendix K1. Hester-Dendy multi-plate samplers: Taxa list and macroinvertebrate density (average number of individuals per m^2)
- Appendix K2. Hester-Dendy multi-plate samplers: Taxa list and total number of macroinvertebrates counted
- Appendix L1. Dipnet samples: Taxa list and number of macroinvertebrates counted (collapsed)
- Appendix L2. Dipnet samples: Taxa list and number of macroinvertebrates counted

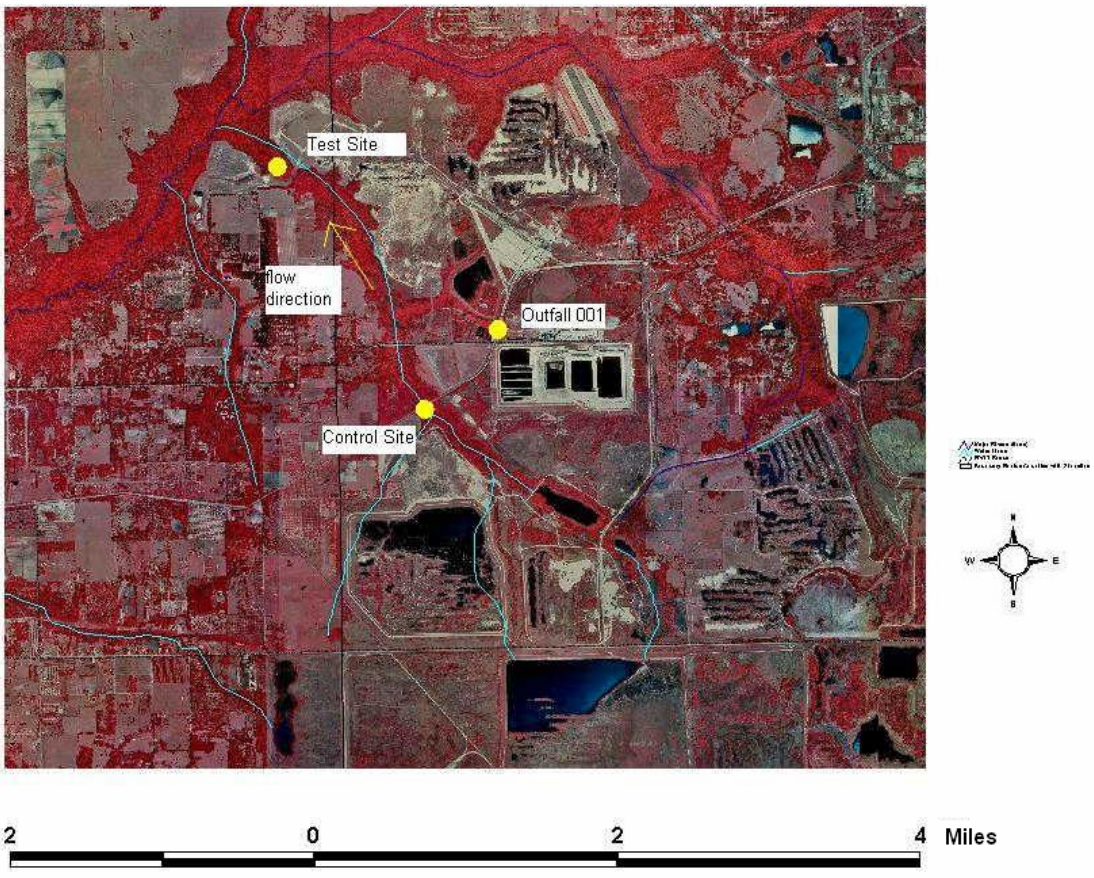
Appendix A

Map of Facility



LOCATION OF THIRTY MILE CREEK AND ALAFIA RIVER BASINS

Mosaic Nichols FYI Sites



Appendix B

Facility summary and DMR data

<table>
<tr><td colspan="2">Facility Name (as it appears on permit): Mosaic Phosphates Company-Nichols Plant</td><td>Former Names: IMC Phosphates Company-Nichols Concentrates Plant</td></tr>
<tr><td>Physical Address:
5000 County Road 676
Nichols, Florida</td><td>NPDES Permit No.: FL0030139
Expiration Date: 3/27/07</td><td>Prepared By: Jacki Champion</td></tr>
<tr><td>County: Polk</td><td>District: SW-Phosphate
Mgmt.</td><td>Facility Type: Chemical Plant - Closed</td></tr>
<tr><td colspan="3">Function of Facility: Currently this facility is under closure. Historically, it operated as a phosphate fertilizer manufacturing plant. Previously manufactured products include sulfuric acid, phosphoric acid and mono and diammonium phosphate. The plant permanently shut down in December 1999.</td></tr>
<tr><td colspan="3">Sampling Location (actual permit designation of permitted sampling point): Outfall 001 and Internal Outfall 002. All discharge from Outfall I-002 discharges to waters of the state through Outfall 001.</td></tr>
<tr><td colspan="3">Description of permitted outfall:</td></tr>
<tr><td colspan="3">Description of treatment process (if multiple discharge points, include a map or diagram of facility):
Treatment of the process water at this facility consists of two-stage lime treatment followed by acidulation for pH adjustment. Currently, process water is being treated in batches.</td></tr>
<tr><td colspan="2">Receiving Waters: Thirty Mile Creek</td><td>Classification (indicate whether fresh or marine): Class III Freshwaters</td></tr>
<tr><td colspan="2">Temperature (C):</td><td>Design Flow:</td></tr>
<tr><td colspan="2">pH (SU):</td><td>Mean Flow (for previous 12 months): 4.55 MGD for 2005</td></tr>
<tr><td colspan="2">Conductivity (umhos/cm):</td><td>Flow During Survey:</td></tr>
<tr><td colspan="2">Method of Chlorination na</td><td>Method of Dechlorination na</td></tr>
<tr><td colspan="2">Dissolved Oxygen (mg/L):</td><td>Total Residual Chlorine (mg/L) (after disinfection):na</td></tr>
</table>

Discharge is: Continuous X Intermittent Seasonal X Rainfall Dependent Other
Toxicity Test Requirements (routine and/or additional test language test species, salinity adjustment, etc.): Chronic Testing once per permit cycle. Acute Testing is conducted once during dry season and once during the wet season, except when discharge is occurring from I-002. The testing is conducted monthly. See language below.
Administrative or Consent Orders: A consent order was issued in 1989 for Groundwater violations. The order is still open.
Facility Mixing Zone Details: None
List permit violations (DMR data) and plant upsets that occurred at the plant within the last year: June 2005-Unionized ammonia and dissolved oxygen violation, March 2005- total nitrogen violation, January 2005-Unionized ammonia and conductance violations. (Other nutrient violations in 2005 were during the Administrative Order allowing BAT treated water to be discharged.)
Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions: A FDEP bioassessment occurred in October 1997. Dipnet samples indicated degradation at the test site, however due to no difference in the Hester-Dendy at the two sites, habitat availability was thought to be the limiting factor. Algal diversity decreased from the control to test site, algal density was low at both sites, and chlorophyll-a was not detected. AGP values were high, 74.2 mg dry wt/L and 96.0 mg dry wt/L at the control and test sites respectively. The effluent had high total nitrogen 5.4 mg/L concentration.
Discuss MOR trends to prior data; is trend improving or declining:
List Effluent Limits (include additional sheets as necessary):

Parameter and Units	**Limit**	**Describe special permit conditions and permit modifications**:

1. During the period beginning on the issuance date and lasting through the expiration date of this permit, the permittee is authorized to discharge from Outfall D-001 (see Attachment A), process wastewater, non-process wastewater, and stormwater. Such discharge shall be limited and monitored by the permittee as specified below:

2.

	Discharge Limitations			Monitoring Requirements	
Parameters (units)	**Monthly Average**	**Daily Maximum**	**Daily Minimum**	**Monitoring Frequency***	**Sample Type**
Flow (mgd)	Report	Report	--	Continuous	Recorder
pH (su)	Report	8.5 See Cond I.A.14.	6.0	Continuous	Recorder
Temperature (C), Water (deg.C)	Report	Report See Cond I.A.14.	--	Weekly	Grab
Nitrogen, Ammonia, Total (as N) (mg/l)	Report	Report See Cond I.A.14.	--	Weekly	Grab
Ammonia, Unionized (mg/l)	Report	0.02 See Cond I.A.14.	--	Weekly	Calculated
Oxygen, Dissolved (DO) (mg/l)	Report	--	5.0	Weekly	Grab
Specific Conductance (umho/cm)	Report	See Cond. I.A.2.	--	Weekly	Grab
Specific Conductance (Background) (umho/cm)	Report	Report	--	Weekly	Grab
Solids, Total Suspended (mg/l)	Report	Report	--	Weekly	Grab
BOD, Carbonaceous 5-day, 20C (mg/l)	Report	Report	--	Weekly	Grab
Phosphate, Ortho (as P) (mg/l)	Report	Report	--	Weekly	Grab
Fluoride, Total (as F) (mg/l)	Report	10.0	--	Weekly	24-hour Comp

	Discharge Limitations			Monitoring Requirements	
Parameters (units)	**Monthly Average**	**Daily Maximum**	**Daily Minimum**	**Monitoring Frequency***	**Sample Type**
Nitrogen, Total (as N) (mg/l) See Cond. 1.A.11.	Report	3.0**	--	Weekly	24-hour Comp
Nitrogen, Total (as N) (lbs/day) See Cond. 1.A.11.	Report	Report	--	Weekly	Calculated
Nitrogen, Total (lb/yr)	--	54,827**	--	Annually	Calculated
Phosphorus, Total (as P) (mg/l)	7.0	10.0	--	Weekly	24-hour Comp
Phosphorus, Total (as P) (lbs/day) See Cond. I.A.11.	Report	Report	--	Weekly	Calculated
Turbidity (ntu)	Report	See Cond. I.A.3	--	Weekly	Grab
Turbidity (Background) (ntu)	Report	Report	--	Weekly	Grab
Sulfate, Total (mg/l)	Report	Report	--	Weekly	24-hour Comp
Alpha, Gross Particle Activity (pci/l)	--	15.0 See Cond I.A.13.	--	Monthly	24-hour Comp
Radium 226 + Radium 228, Total (pci/l)	--	5.0 See Cond. I.A.12.	--	Monthly	24-hour Comp
Whole Effluent Toxicity	See Permit Condition I.A.4 and I.A.5.			--	--

* All monitoring frequencies shall be based on standard calendar periods.

** Total nitrogen values (goals) which shall be for monitoring and reporting purposes only. (See Part I.A.21)

2. The permittee shall initiate the series of tests described below beginning on the first

discharge to evaluate whole effluent toxicity of the discharge from outfall D-001. All test species, procedures and quality assurance criteria used shall be in accordance with Short-**term methods for Estimating the** Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA/600/4-91/002, or the most current edition. The control and dilution water will be moderately hard water as described in EPA/600/4-91/002, Table 3, or the most current edition. A standard reference toxicant (SRT) quality assurance (QA) chronic toxicity test shall be conducted concurrently or no greater than 30 days before the date of the "routine" test, with each species used in the toxicity tests. The results of all QA toxicity tests shall be submitted with the discharge monitoring report (DMR). Any deviation from the bioassay procedures outlined herein shall be submitted in writing to the Department for review and approval prior to use.

a. (1) The permittee shall conduct a daphnid, Ceriodaphnia dubia, Survival and Reproduction test and a fathead minnow, Pimephales promelas, Larval Survival and Growth Test. These tests shall be conducted using a control (0% effluent) and one test concentration of 100% effluent.

(2) For each set of tests conducted, a *24-hour* composite sample of final effluent shall be collected and used per the sampling schedule discussed in EPA/600/4-91/002, Section 8, or the most current edition. Two additional composite samples shall be collected according to the protocol and used as renewal solutions on Day 3 (48 hours) and Day 5 (96 hours) of the test.

(3) If control mortality exceeds 20% for either species in any test, the test for that species (including the control) shall be repeated. A test will be considered valid only if control mortality does not exceed 20% for either species. If, in any separate test, 100% mortality occurs prior to the end of the test, and control mortality is less than 20% at that time, that test (including the control) shall be terminated with the conclusion that the sample demonstrates unacceptable chronic toxicity. Additionally, each test must meet the acceptability criteria for the test species as defined in EPA/600/4-91/002 Section 13.11 and Section 11.11, respectively, or the most current edition.

b. (1) The toxicity tests specified above shall be conducted on the first discharge (for intermittent discharges) or within 60 days (for continuous discharges) following the issuance of this permit. Upon the completion of this test which demonstrates that no unacceptable toxicity (as defined in Part I.A.4.c.(1) below) has been identified, the permittee will not be required to undergo chronic toxicity testing for the remainder of this permit.

(2) Results from "routine" tests shall be reported according to EPA/600/4-91/002, Section 10, Report Preparation (or the most current edition), and shall be submitted to the Department as specified in Conditions I.E.2. and 3.

Additionally, all results shall be recorded and submitted on the Discharge Monitoring Report (DMR) in the following manner:

If the NOEC of a test species is less than 100% effluent, "<100%" should be entered on the DMR for that species. If the NOEC of a test species is greater than or equal to 100% effluent, ">100%" should be entered.

c. (1) An NOEC of less than 100% effluent in any "routine" or additional definitive test will be a violation of these permit conditions and Rule 62-302.530(62), F. A. C.

(2) If an NOEC of less than 100% effluent is found in a "routine" test, the permittee shall conduct three additional tests on each species indicating the violation.

(3) The first additional test shall be conducted using a control (0% effluent) and a minimum of five dilutions: 100%, 50%, 25%, 12.5% and 6.25% effluent. The dilution series may be modified in the second and third test to more accurately identify the toxicity, such that at least two dilutions above (not to exceed 100% effluent) and two dilutions below the target concentration and a control (0% effluent) are run. All test results shall be statistically analyzed according to the Appendices in EPA/600/4-91/002, or the most current edition.

(4) For each additional test, the sample collection requirements and the test acceptability criteria specified in section a. above must be met for the test to be considered valid. The first test shall begin within two weeks of the end of the "routine" tests, and shall be conducted weekly thereafter until three additional, valid tests are completed. The additional tests will be used to determine if the toxicity found in the "routine" test is still present.

(5) If after completion of a failed routine test, the facility is not discharging, the additional toxicity sampling and testing described in Part I.A.5.c.(4) above, shall be performed upon resumption of the discharge.

(6) Results from additional tests, required due to a chronic toxicity violation in the "routine" tests, shall be submitted in a single report prepared according to EPA/600/4-91/002, Section 10, or the most current edition, and submitted within 45 days of completion of the third additional, valid test. Upon the completion of

the third additional test, the permittee will meet with the Department within 30 days of the report submittal to identify corrective actions necessary to remedy the observed chronic toxicity.

3. In order to provide the Department with reasonable assurance that the discharge from Outfall 001 does not violate the acute toxicity requirements of Section 62-302.500, F.A.C., the permittee shall perform the toxicity tests as specified below and submit the results to the Department.

The permittee shall initiate the series of tests described below, beginning in the first testing period following the effective date of this permit, to evaluate whole effluent toxicity of the discharge from Outfall 001. All test species, procedures and quality assurance criteria used shall be in accordance with Methods for Measuring Acute Toxicity of Effluents to Freshwater and Marine Organisms, EPA/600/4-90/027F, or the most current edition. The control water and dilution water used will be moderately hard water as described in EPA/600/4-90/027F, Table 6, or the most current edition. A standard reference toxicant (SRT) quality assurance (QA) acute toxicity test shall be conducted concurrently or no greater than 30 days before the date of the "routine" test, with each species used in the toxicity tests. The results of all toxicity tests shall be submitted with the discharge monitoring report (DMR). Any deviation of the bioassay procedures outlined herein shall be submitted in writing to the Department for review and approval prior to use.

a. (1) The permittee shall conduct 96-hour acute static renewal toxicity tests using the daphnid, Ceriodaphnia dubia, and the bannerfin shiner, Cyprinella leedsi. All tests will be conducted on four separate grab samples collected at evenly-spaced (6-hr) intervals over a 24-hour period and used in four separate tests in order to catch any peaks of toxicity and to account for daily variations in effluent quality.

(2) If control mortality exceeds 10% for either species in any test, the test(s) for that species (including the control) shall be repeated. A test will be considered valid only if control mortality does not exceed 10% for either species. If, in any separate grab sample test, 100% mortality occurs prior to the end of the test, and control mortality is less than 10% at that time, that test (including the control) shall be terminated with the conclusion that the sample demonstrates unacceptable acute toxicity.

b. (1) The toxicity tests specified above shall be conducted once during the months of December, January and February, and again during the months of July, August and September, but not to exceed two tests per year, except as follows. During the discharge of treated process water from IMS 002, the permittee shall conduct the acute toxicity tests specified above monthly. Samples shall be collected only during actual discharge events. These tests are referred to as “routine” tests. The permittee shall monitor the toxicity, as described above, for the life of this permit.

(2) Results from “routine” tests shall be reported according to EPA/600/4-90/027F, Section 12, Report Preparation (or the most current edition), and shall be submitted to the address listed in Conditions I.E.2. and 3.

c. (1) All “routine” tests shall be conducted using a control (0% effluent) and a test concentration of 100% final effluent.

(2) Mortalities of greater than 50% in a 100% effluent in any “routine” sample or an LC50 of less than 100% effluent in any additional definitive test will constitute a violation of these permit conditions, and Rule 62-302.200(1), Rule 62-302.500(1)(d) and Rule 62-4.244(3)(a), F. A. C.

d. (1) If unacceptable acute toxicity (greater than 20% mortality of either test species in any grab sample test) is found in a “routine” test, the permittee shall conduct three additional tests on each species indicating unacceptable toxicity. The first additional test will include four grab samples taken as described in Condition I.A.5.a.(1) and run as four separate definitive analyses. The second and third additional definitive tests will be run on a single grab sample collected on the day and time when the greatest toxicity was identified in the first additional definitive test. Results for each additional test will include the determination of LC50 values with 95% confidence limits.

(2) The first additional test shall be conducted using a control (0% effluent) and a minimum of five dilutions: 100%, 50%, 25%, 12.5% and 6.25% effluent. The dilution series may be modified in the second and third test to more accurately identify the toxicity, such that at least two dilutions above and two dilutions below the target toxicity and a control (0% effluent) are run.

(3) For each additional test, the sample collection requirements and the test acceptability criteria specified in Condition I.A.5.a. above must be met for the

test to be considered valid. The first test shall begin within two weeks of the end of the “routine” tests, and shall be conducted weekly thereafter until *three* additional, valid tests are completed. The additional tests will be used to determine if the toxicity found in the “routine” test is still present.

(4) Results from additional tests, required due to unacceptable acute toxicity in the “routine” tests, shall be submitted in a single report prepared according to EPA/600/4-90/027F, Section 12, or the most current edition and submitted within 45 days of completion of the additional, valid tests. Upon completion of the third additional test, the permittee will schedule to meet with the Department within 30 days of the report submittal to identify the cause(s) and corrective actions (if applicable) necessary to remedy the unacceptable acute toxicity.

(3) If acute toxicity is found, additional chronic toxicity testing may be required.

Appendix C

Explanation of Measurements

(1) Quality Assurance and Quality Control

FDEP's quality assurance requirements for analytical laboratories and field activities are codified in Chapter 62-160, F.A.C., Quality Assurance (QA Rule) and in internal Standard Operating Procedures (FDEP SOPs). Methods for all analyses are on file at the FDEP Central Laboratory in Tallahassee and may be viewed on the web at http://www.floridadep.org/labs/sop/index.htm and/or http://www.floridadep.org/labs/qa/index.htm .

(2) Chemical Analyses of the Effluent

The effluent was analyzed for nutrients, metals, organic constituents (base, neutral, and acid extractables) and pesticides following FDEP SOPs. A list of the analytes tested for, results, data qualifiers, the minimum detection limit and the practical quantitation limit are given in Appendix D. The results from these analyses were compared with Water Quality Criteria (62-302 F.A.C.) and facility permit limits (Table 1, Appendix B). Exceedances of Water Quality Criteria may be violations of specific provisions of Chapter 62-302 (F.A.C.) and/ or facility permit limits.

(3) Toxicity Bioassays

Acute screening toxicity bioassays were performed on the effluent sample using the water flea, *Ceriodaphnia dubia,* and the fish, *Cyprinella leedsi* following FDEP SOPs TA07_01 and TA07_02. Failure of toxicity testing may constitute a violation of 62-302.520(21), 62-302.530(62) and/or facility permit limits. Standard reference toxicant tests are conducted monthly to ensure quality in toxicity testing.

(4) Bacteriological Testing

The effluent and water from control and test sites were analyzed for the presence and concentration of total and fecal coliform bacteria following FDEP SOPs MB1_0 and MB1_1. High levels of fecal or total coliform bacteria may constitute violation of 62-302.530(6), 62-302.530(7) and/or facility permit limits.

(5) Habitat Assessment

Habitat assessment is used to evaluate the physical structure and extent of disturbance in a waterbody. Eight aspects are ranked, with 20 possible points for each aspect (QA Rule SOP FT 3100). The Habitat Assessment score includes types and amounts of benthic substrates, water velocity, amount of sand or silt accumulation, extent of artificial channelization, bank stability, and riparian zone width and vegetation type. All scores are summed to yield an overall Habitat Assessment score. Habitat Assessment score ranges from 11-160 and overall habitat quality is assigned to one of four categories: Optimal (120-160 points), Suboptimal (80-119 points), Marginal (40-79 points), and Poor (11-39 points).

(6) Algal Growth Potential (AGP)

The effluent and water from control and test sites are autoclaved, filtered (0.45μm), inoculated with the unicellular green alga, *Pseudokirchneriella subcapitata* (formerly *Selenastrum capricornutum,* USEPA 2002*),* and incubated for 14 days (FDEP SOP

TA08_05). The algal growth potential (AGP) value is the peak growth of the alga within that 14-day period, recorded as mg dry weight/L. Raschke and Shultz (1987) found that an AGP above 5.0 mg dry weight/L represents a "problem" threshold for fresh receiving waters, implying nutrient enrichment. High AGP values may constitute one line of evidence for violation of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C. and/or 62-302.530(48)(b) F.A.C..

The concentration of nutrients in a water sample may be used to calculate the expected yield of AGP under the assumption that other required nutrients (e.g. silicon, micronutrients) are present in excess (Miller *et al*. 1978). The expected amount of production is calculated as 38 times the total soluble inorganic nitrogen (nitrate and nitrite plus ammonia) under nitrogen limitation or 430 times the ortho-phosphate (OP) concentration under phosphorus limitation with an error of $\pm$ 20%. When the ratio of nitrogen to phosphorus (N: P) is less than 10:1, nitrogen limitation of algal production is likely. When the N: P ratio is 20:1 or greater, phosphorus limitation is likely (USEPA 2000). For ratios in-between, co-limitation may occur. Production of lower biomass than expected may be evidence of growth inhibition related to toxic compounds present in the water sample tested and may be a violation of 62-302.530(62) F.A.C..

(7) Algal Phytoplankton and Periphyton Assemblages

Methods: Qualitative periphyton were sampled at both control and test sites by taking subsamples of algae from natural substrates throughout the sample reach (QA Rule FS7220). Phytoplankton were sampled using a 1 L grab sample (QA Rule SOP FS7100). Periphyton were subsampled and identified to the lowest practical level, usually species (FDEP SOPs AB03, AB03_1 and AB05).

Chlorophyll *a* Content: Chlorophyll *a* content is measured in phytoplankton samples to estimate algal biomass (FDEP SOP BB05). High algal biomass implies nutrient stress (Stevenson and Bahls 1999) and may be a violation of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C. and/or 62-302.530(48)(b) F.A.C..

Algal Density: Algal density is estimated as number of natural units/ml for phytoplankton samples and number of natural units/cm^2 for periphyton samples. Although algal density of a single site is highly variable and depends on a number of factors, comparison of algal density at a control site to algal density at a related test site gives a partial comparison of algal biomass at the two sites (Stevenson and Smol 2003).

Taxa richness: Taxa richness is the number of distinct algal taxa present in a sample. Extreme nutrient enrichment tends to reduce the number of different types of algae present in a sample because a few tolerant taxa tend to reproduce rapidly and constitute the majority of the cells present. However, moderate nutrient enrichment of nutrient poor waters may sometimes be correlated with increased algal taxa richness (Stevenson and Bahls 1999) as the algal community begins to respond to the increased input of nutrients.

Community Composition: Shifts in relative proportions of major groups of algae downstream of a point source, compared to upstream, control conditions, may indicate negative effects of a discharge (Stevenson and Bahls 1999) and may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

Shannon-Weaver Diversity Index: This index is specified in the Florida Administrative Code 62-302 as a measure of biological integrity. Low diversity scores are undesirable. Where diversity is low, only a few taxa are abundant as compared to an area where many taxa are present with more equitable abundance among taxa (Magurran 1988). Low diversity scores related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

(8) Benthic Macroinvertebrate Assemblages

Methods: Benthic macroinvertebrates were collected using two methods. Quantitative samples were collected from Hester-Dendy multi-plate samplers incubated for 28 days (QA Rule SOP FS7430). Qualitative collections are made using 20 dipnet sweeps (QA Rule SOP FS7420). Benthic macroinvertebrates were sorted and identified to the lowest practical taxonomic level, usually species (FDEP SOP IZ06).

Taxa richness: Taxa richness is the number of distinct macroinvertebrate taxa present in a sample. Stress, habitat destruction and pollution tend to reduce the number of different types of organisms present (Karr and Chu 1998). Decreases in taxa richness related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

Percent Contribution of Dominant Taxon: Percent contribution of the dominant taxon is calculated by dividing the number of individuals in the most abundant taxa by the total number of individuals counted. Percent contribution of the dominant taxon tends to increase with increasing perturbation (Plafkin *et al*., 1989). Increases in the percent contribution of the dominant taxon related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C. and/or 62-302.530(48)(b) F.A.C..

Shannon-Weaver Diversity Index: This index is specified in the Florida Administrative Code 62-302 as a measure of biological integrity. Low diversity scores are undesirable. Where diversity is low, only a few taxa are abundant as compared to an area where many taxa are present in equitable abundance among taxa (Magurran 1988). A difference of 25% in Shannon-Weaver diversity between results from Hester-Dendy multiplate samplers incubated for 28 days at test and control sites constitutes a violation of 62-302.530(11) F.A.C..

Community Composition: Shifts in proportions of major groups of organisms downstream of a point source, compared to upstream, control conditions, may indicate negative effects of a discharge (Karr and Chu 1998). Shifts in community composition related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

Functional Feeding Groups: Environmental degradation may differentially affect groups of invertebrates based on how the group feeds (e.g. predators, deposit feeders, etc.). In Florida, pollution may be responsible for reducing the numbers of filter feeders (FDEP 1994) and shredders (EA Engineering 1994). Changes in the proportions of functional feeding groups related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

(9) Statistical Comparisons

Statistical comparisons of the proportions of taxa, major groups or feeding groups were made using 95% confidence intervals on proportions. A 95% confidence interval is the range of values above and below a given proportion that has a 95% chance of containing the true proportion (Sokal and Rohlf 1995). If the 95% confidence intervals for two proportions do not overlap, then the proportion of X in sample 1 is significantly different from the proportion of X in sample 2 at $p<0.05$. A "$p<0.05$" level of significance means that there is less than a 5% chance that the true proportions in the two samples are the same. All comparisons that are labeled as significant in the text have a probability <0.05 that the proportions are the same.

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2006-05-22-18
Mosaic Phosphates Co-Nichols Concentrates

Requester: Shannan Bogdanov

Field Report Prepared By: Jacki Champion

Customer: BMR-TAMPA

Collected By: Jacki Champion / Scott Rose

Send Final Report To Vishwas Sathe

Project ID: FYI5

Sampling Agency: FDEP

PMAS: 1163

Lab ID *	Location: Mosaic Nichols			☐ Comp ☒ Grab	Collection (begin) Date 5/22/06 Time 9:25 ☐ Eastern ☐ Central	Collection (end) Date — Time — ☐ Eastern ☐ Central		Bottle Group(s)**	A
	Field ID: Outfall 001				Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L) 6.94	Storet Station Number		
	Matrix (Include type e.g. Salt, Fresh, etc): Fresh Water	Temp (C) 26.42	pH 7.20	Sample Depth ☐ m ☐ ft	372	☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm)	NPDES Number		
	Latitude o ' "	Longitude o ' "		Comments					
Lab ID *	Location: Mosaic Nichols - Bioassay			☐ Comp ☒ Grab	Collection (begin) Date 5/21/06 Time 9:30 ☐ Eastern ☐ Central	Collection (end) Date — Time — ☐ Eastern ☐ Central		Bottle Group(s)**	E
	Field ID: Outfall 001				Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number		
	Matrix (Include type e.g. Salt, Fresh, etc): Fresh Water	Temp (C)	pH	Sample Depth ☐ m ☐ ft		☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number		
	Latitude o ' "	Longitude o ' "		Comments					
Lab ID *	Location: Mosaic Nichols - Bioassay			☐ Comp ☒ Grab	Collection (begin) Date 5/21/06 Time 5:30 ☐ Eastern ☐ Central	Collection (end) Date — Time — ☐ Eastern ☐ Central		Bottle Group(s)**	E
	Field ID: Outfall 001				Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number		
	Matrix (Include type e.g. Salt, Fresh, etc): Fresh Water	Temp (C)	pH	Sample Depth ☐ m ☐ ft		☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number		
	Latitude o ' "	Longitude o ' "		Comments					
Lab ID *	Location: Mosaic Nichols - Bioassay			☐ Comp ☒ Grab	Collection (begin) Date 5/22/06 Time 9:30 am ☐ Eastern ☐ Central	Collection (end) Date — Time — ☐ Eastern ☐ Central		Bottle Group(s)**	E
	Field ID: Outfall 001				Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number		
	Matrix (Include type e.g. Salt, Fresh, etc): Fresh Water	Temp (C)	pH	Sample Depth ☐ m ☐ ft		☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number		
	Latitude o ' "	Longitude o ' "		Comments					

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
Jacki Champion	5:30	DHL					SK	5-23-06 / 9:30am

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

3 Bioassay
1031
cw

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2006-05-22-18
Mosaic Phosphates Co-Nichols Concentrates

Requester: Shannan Bogdanov

Field Report Prepared By: Jacki Champion

Customer: BMR-TAMPA

Collected By: Jacki Champion / Scott Rose

Send Final Report To Vishwas Sathe

Project ID: FYI5

Sampling Agency: FDEP

PMAS: 1163

Lab ID *
Location: Mosaic Nichols
Field ID: 30-mile Creek-Control Site-Hester Dendy
Matrix (Include type e.g. Salt, Fresh, etc): Fresh - Invert
Temp (C) | pH
Latitude o ' " . Longitude o ' " .
☐ Comp ☐ Grab
Collection (begin) Date 4/22/06 Time 10:00 (Eastern) Central
Collection (end) Date 5/22/06 Time 3:30 (Eastern) Central
Tot Res Chlorine (mg/L) | Diss Oxygen (mg/L) | Storet Station Number
Sample Depth ☐ m ☐ ft
☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
NPDES Number
Bottle Group(s)**: C
Comments:

Lab ID *
Location: Mosaic Nichols
Field ID: 30-mile Creek-Control Site-Hester Dendy
Matrix (Include type e.g. Salt, Fresh, etc): Fresh-Invert
Temp (C) | pH
Latitude o ' " . Longitude o ' " .
☐ Comp ☐ Grab
Collection (begin) Date 4/22/06 Time 1000 (Eastern) Central
Collection (end) Date 5/22/06 Time 3:30 (Eastern) Central
Tot Res Chlorine (mg/L) | Diss Oxygen (mg/L) | Storet Station Number
Sample Depth ☐ m ☐ ft
☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
NPDES Number
Bottle Group(s)**: C
Comments:

Lab ID *
Location: Mosaic Nichols
Field ID: 30 mile Creek-Control Site
Matrix (Include type e.g. Salt, Fresh, etc): Fresh-Invert
Temp (C) | pH
Latitude o ' " . Longitude o ' " .
☐ Comp ☐ Grab
Collection (begin) Date 5/22/06 Time 3:00 (Eastern) Central
Collection (end) Date — Time — (Eastern) Central
Tot Res Chlorine (mg/L) | Diss Oxygen (mg/L) | Storet Station Number
Sample Depth ☐ m ☐ ft
☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
NPDES Number
Bottle Group(s)**: C
Comments: Macroinverts.-sweeps

Lab ID *
Location: Mosaic Nichols
Field ID: Blanks
Matrix (Include type e.g. Salt, Fresh, etc): Fresh Water
Temp (C) | pH
Latitude o ' " . Longitude o ' " .
☒ Grab ☐ Comp
Collection (begin) Date 5/22/06 Time 9:10 (Eastern) Central
Collection (end) Date — Time — (Eastern) Central
Tot Res Chlorine (mg/L) | Diss Oxygen (mg/L) | Storet Station Number
Sample Depth ☐ m ☐ ft
☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
NPDES Number
Bottle Group(s)**: D
Comments:

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
J. Champion	5/22/06 5:30	DHL					SK	5/23/06 9:30 am

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

Took 2 Hester Dendys 5/23/06 10 Am TODD

last revised October 1, 2003

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2006-05-22-18
Mosaic Phosphates Co-Nichols Concentrates

Requester: Shannan Bogdanov

Field Report Prepared By: Jackie Champion

Customer: BMR-TAMPA

Collected By: Jackie Champion / Scott Rose

Send Final Report To Vishwas Sathe

Project ID: FYI5

Sampling Agency: FDEP

PMAS: 1163

Lab ID *: Location: Mosaic Nichols - Bioassay
Field ID: Outfall 001
Matrix (Include type e.g. Salt, Fresh, etc): Fresh Water
Temp (C): ~~Temp (C)~~ pH:
Latitude: o ' " Longitude: o ' "
☐ Comp ☒ Grab
Collection (begin) Date 5/22/06 Time 9:50 Eastern Central
Collection (end) Date Time Eastern Central
Tot Res Chlorine (mg/L):
Diss Oxygen (mg/L):
Storet Station Number:
Sample Depth ☐ m ☐ ft
☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
NPDES Number:
Bottle Group(s)**: F
Comments:

Lab ID *: Location: Mosaic Nichols
Field ID: ~~Thirty~~ 30-mile Creek-Test Site
Matrix (Include type e.g. Salt, Fresh, etc): Fresh Water
Temp (C): 24.06 pH: 7.81
Latitude: o ' " Longitude: o ' "
☐ Comp ☒ Grab
Collection (begin) Date 5/22/06 Time 1265 Eastern Central
Collection (end) Date ✓ Time Eastern Central
Tot Res Chlorine (mg/L):
Diss Oxygen (mg/L): 8.44
Storet Station Number:
Sample Depth ☒ m ☐ ft: 0.3
441
☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm)
NPDES Number:
Bottle Group(s)**: C/B
Comments:

Lab ID *: Location: Mosaic Nichols
Field ID: 30-mile Creek-Test Site - Hester Dendy
Matrix (Include type e.g. Salt, Fresh, etc): Fresh Invert
Temp (C): pH:
Latitude: o ' " Longitude: o ' "
☐ Comp ☒ Grab
Collection (begin) Date 4/22/06 Time 4:30 Eastern Central
Collection (end) Date 5/22/06 Time 12:30 Eastern Central
Tot Res Chlorine (mg/L):
Diss Oxygen (mg/L):
Storet Station Number:
Sample Depth ☐ m ☐ ft
☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
NPDES Number:
Bottle Group(s)**: C
Comments:

Lab ID *: Location: Mosaic Nichols
Field ID: 30-mile Creek-Test Site - Hester Dendy
Matrix (Include type e.g. Salt, Fresh, etc): Fresh Invert
Temp (C): pH:
Latitude: o ' " Longitude: o ' "
☐ Comp ☐ Grab
Collection (begin) Date 4/22/06 Time 4:30 Eastern Central
Collection (end) Date 5/22/06 Time 12:30 Eastern Central
Tot Res Chlorine (mg/L):
Diss Oxygen (mg/L):
Storet Station Number:
Sample Depth ☐ m ☐ ft
☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
NPDES Number:
Bottle Group(s)**: C
Comments:

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
J. Champion	5/22/06 3:30	DHL					SK	5/23/06 ~~9:00~~ 9:30 am SK

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

Took 2 Hester Dendy's 5/23/06 10 AM

last revised October 1, 2003

(Bioassay 1031 cw

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2006-05-22-18
Mosaic Phosphates Co-Nichols Concentrates

Requester: Shannan Bogdanov

Field Report Prepared By: Jacki Champion

Customer: BMR-TAMPA

Collected By: Jacki Champion / Scott Rose

Send Final Report To Vishwas Sathe

Project ID: FYI5

Sampling Agency: FDEP

PMAS: 1163

Lab ID *
Location: Mosaic Nichols
Field ID: 30-mile Creek-Test Site- Hester Dendy
Matrix (Include type e.g. Salt, Fresh, etc): Fresh Invert
Temp (C) | pH
Latitude o ' " . Longitude o ' " .

☐ Comp ☐ Grab
Collection (begin) Date 4/22/06 Time 430 (Eastern / Central)
Collection (end) Date 5/22/06 Time 2:30 (Eastern / Central)
Bottle Group(s)**: C
Tot Res Chlorine (mg/L) | Diss Oxygen (mg/L) | Storet Station Number
Sample Depth ☐ m ☐ ft | ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm) | NPDES Number
Comments

Lab ID *
Location: Mosaic Nichols
Field ID: 30-mile Creek - Test Site
Matrix (Include type e.g. Salt, Fresh, etc): Fresh Invert
Temp (C) | pH
Latitude o ' " . Longitude o ' " .

☐ Comp ☐ Grab
Collection (begin) Date 5/22/06 Time 12:00 (Eastern / Central)
Collection (end) Date ____ Time ____ (Eastern / Central)
Bottle Group(s)**: C
Tot Res Chlorine (mg/L) | Diss Oxygen (mg/L) | Storet Station Number
Sample Depth ☐ m ☐ ft | ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm) | NPDES Number
Comments: @ Macroinverts-Sweeps

Lab ID *
Location: Mosaic Nichols
Field ID: 30-mile Creek - Control Site
Matrix (Include type e.g. Salt, Fresh, etc): Fresh Water
Temp (C): 25.31 | pH: 7.83
Latitude o ' " . Longitude o ' " .

☒ Comp ☐ Grab
Collection (begin) Date 5/22/06 Time 4:55 (Eastern / Central)
Collection (end) Date ____ Time ____ (Eastern / Central)
Bottle Group(s)**: B/C
Tot Res Chlorine (mg/L): ____ | Diss Oxygen (mg/L): 6.80 | Storet Station Number
Sample Depth ☒ m: 0.4 ☐ ft | ☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm): 557 | NPDES Number
Comments

Lab ID *
Location: Mosaic Nichols
Field ID: 30-mile Creek-Control Site - Hester Dendy
Matrix (Include type e.g. Salt, Fresh, etc): Fresh Invert
Temp (C) | pH
Latitude o ' " . Longitude o ' " .

☐ Comp ☐ Grab
Collection (begin) Date 5/22/06 Time 10:00 (Eastern / Central)
Collection (end) Date 5/22/06 Time 3:30 (Eastern / Central)
Bottle Group(s)**: C
Tot Res Chlorine (mg/L) | Diss Oxygen (mg/L) | Storet Station Number
Sample Depth ☐ m ☐ ft | ☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm) | NPDES Number
Comments

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
J. Champion	5/22/06 5:30	DHL						5.23.06 11:30am

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Took 2 Hester Dendys 5/23/06 10Am

Samples in Coolers with Incorrect Preservation or Damaged Evidence Tape

Cooler ID	Bottle Field ID	Bottle Test ID(s)	Tape intact on Bottle? Yes	No

Bottles Not Intact

Field ID	Bottle Test ID(s)	Loose Cap	Damaged Cap CK	BR	Damaged Container CK	BR	Evid.Tape Not Intact

Samples With Incorrect pH Preservation

Field ID	Bottle Test ID(s)	pH	Action Taken
Outfall 001	924303	72	Preserved in Lab

Samples With Insufficient Volume for Analyses

Field ID	Bottle Test ID(s)	Action Taken

Additional Comments:

CK - Cracked, BR - Broken

Appendix E

Chemical analysis of effluent and receiving water

DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
05/22/06	Effluent	Bio-AGP/LimNut	Algal Growth Potential	4.81	mg DryWt/L		0.3	0.9
05/22/06	Effluent	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.96	ug/L	U	0.96	2.9
05/22/06	Effluent	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	1.7	ug/L	U	1.7	5.1
05/22/06	Effluent	Bio-Peri/Phyto	Phytoplankton-Quantitative-# Wet Taxa	11	#Taxa			
05/22/06	Effluent	Bio-Peri/Phyto	Phytoplankton-Quantitative-#Diatom Taxa	34	#Taxa			
05/21/06	Effluent	Bio-Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	LC50	L		
05/21/06	Effluent	Bio-Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	LC50	L		
05/22/06	Effluent	Bio-Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	LC50	L		
05/22/06	Effluent	Bio-Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	No Result	LC50			
05/21/06	Effluent	Bio-Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	LC50	L		
05/21/06	Effluent	Bio-Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	LC50	L		
05/22/06	Effluent	Bio-Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	LC50	L		
05/22/06	Effluent	Bio-Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	LC50	L		
05/22/06	Effluent	BNA-Water	1,2,4-Trichlorobenzene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	1,2-Dichlorobenzene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	1,3-Dichlorobenzene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	1,4-Dichlorobenzene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	2,4,6-Trichlorophenol	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	2,4-Dichlorophenol	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	2,4-Dimethylphenol	49	ug/L	U	49	190
05/22/06	Effluent	BNA-Water	2,4-Dinitrophenol	15	ug/L	U	15	58
05/22/06	Effluent	BNA-Water	2,4-Dinitrotoluene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	2,6-Dinitrotoluene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	2-Chloronaphthalene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	2-Chlorophenol	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	ug/L	U	2.9	12
05/22/06	Effluent	BNA-Water	2-Nitrophenol	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	3,3'-Dichlorobenzidine	39	ug/L	U	39	160
05/22/06	Effluent	BNA-Water	4,4'-DDD	1.5	ug/L	U	1.5	5.8
05/22/06	Effluent	BNA-Water	4,4'-DDE	1.5	ug/L	U	1.5	5.8
05/22/06	Effluent	BNA-Water	4,4'-DDT	1.5	ug/L	UJ	1.5	5.8
05/22/06	Effluent	BNA-Water	4-Bromophenyl phenyl ether	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	4-Chloro-3-methylphenol	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	4-Chlorophenyl phenyl ether	1.9	ug/L	U	1.9	7.8
05/22/06	Effluent	BNA-Water	4-Nitrophenol	15	ug/L	U	15	58
05/22/06	Effluent	BNA-Water	Acenaphthene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Acenaphthylene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Aldrin	1.5	ug/L	U	1.5	5.8
05/22/06	Effluent	BNA-Water	alpha-BHC	1.5	ug/L	U	1.5	5.8
05/22/06	Effluent	BNA-Water	Anthracene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Benzidine	97	ug/L	U	97	390
05/22/06	Effluent	BNA-Water	Benzo(a)anthracene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Benzo(a)pyrene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Benzo(b)fluoranthene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Benzo(g,h,i)perylene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Benzo(k)fluoranthene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	beta-BHC	1.5	ug/L	U	1.5	5.8
05/22/06	Effluent	BNA-Water	Bis(2-chloroethoxy)methane	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Bis(2-chloroethyl)ether	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	ug/L	U	2.9	12
05/22/06	Effluent	BNA-Water	Bis(2-ethylhexyl)phthalate	15	ug/L	U	15	58
05/22/06	Effluent	BNA-Water	Butyl benzyl phthalate	4.9	ug/L	U	4.9	19
05/22/06	Effluent	BNA-Water	Chrysene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	delta-BHC	1.5	ug/L	U	1.5	5.8
05/22/06	Effluent	BNA-Water	Dibenzo(a,h)anthracene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Dieldrin	1.5	ug/L	U	1.5	5.8
05/22/06	Effluent	BNA-Water	Diethyl phthalate	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Dimethyl phthalate	49	ug/L	U	49	190
05/22/06	Effluent	BNA-Water	Di-n-butyl phthalate	4.9	ug/L	U	4.9	19
05/22/06	Effluent	BNA-Water	Di-n-octyl phthalate	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Endosulfan I	3.9	ug/L	U	3.9	16
05/22/06	Effluent	BNA-Water	Endosulfan II	3.9	ug/L	U	3.9	16
05/22/06	Effluent	BNA-Water	Endosulfan sulfate	1.5	ug/L	U	1.5	5.8
05/22/06	Effluent	BNA-Water	Endrin	1.5	ug/L	U	1.5	5.8
05/22/06	Effluent	BNA-Water	Endrin aldehyde	3.9	ug/L	U	3.9	16
05/22/06	Effluent	BNA-Water	Fluoranthene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Fluorene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	gamma-BHC	1.5	ug/L	U	1.5	5.8
05/22/06	Effluent	BNA-Water	Heptachlor	1.5	ug/L	U	1.5	5.8

DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
05/22/06	Effluent	BNA-Water	Heptachlor epoxide	1.5	ug/L	U	1.5	5.8
05/22/06	Effluent	BNA-Water	Hexachlorobenzene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Hexachlorobutadiene	2.9	ug/L	U	2.9	12
05/22/06	Effluent	BNA-Water	Hexachlorocyclopentadiene	2.9	ug/L	UJ	2.9	12
05/22/06	Effluent	BNA-Water	Hexachloroethane	2.9	ug/L	U	2.9	12
05/22/06	Effluent	BNA-Water	Indeno(1,2,3-cd)pyrene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Isophorone	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Naphthalene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Nitrobenzene	1.9	ug/L	U	1.9	7.8
05/22/06	Effluent	BNA-Water	N-Nitrosodimethylamine	1.9	ug/L	U	1.9	7.8
05/22/06	Effluent	BNA-Water	N-Nitrosodi-n-propylamine	1.9	ug/L	U	1.9	7.8
05/22/06	Effluent	BNA-Water	N-Nitrosodiphenylamine	2.9	ug/L	UJ	2.9	12
05/22/06	Effluent	BNA-Water	Pentachlorophenol	2.9	ug/L	U	2.9	12
05/22/06	Effluent	BNA-Water	Phenanthrene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Phenol	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	BNA-Water	Pyrene	0.97	ug/L	U	0.97	3.9
05/22/06	Effluent	GC-Water	Alachlor	0.57	ug/L	U	0.57	2.3
05/22/06	Effluent	GC-Water	Ametryn	0.048	ug/L	U	0.048	0.19
05/22/06	Effluent	GC-Water	Atrazine	0.048	ug/L	U	0.048	0.19
05/22/06	Effluent	GC-Water	Azinphos Methyl	0.19	ug/L	U	0.19	0.76
05/22/06	Effluent	GC-Water	Bromacil	0.19	ug/L	UJ	0.19	0.76
05/22/06	Effluent	GC-Water	Butylate	0.19	ug/L	U	0.19	0.76
05/22/06	Effluent	GC-Water	Chlorpyrifos Ethyl	0.048	ug/L	U	0.048	0.19
05/22/06	Effluent	GC-Water	Chlorpyrifos Methyl	0.095	ug/L	U	0.095	0.38
05/22/06	Effluent	GC-Water	Diazinon	0.048	ug/L	UJ	0.048	0.19
05/22/06	Effluent	GC-Water	Ethion	0.048	ug/L	U	0.048	0.19
05/22/06	Effluent	GC-Water	Ethoprop	0.095	ug/L	UJ	0.095	0.38
05/22/06	Effluent	GC-Water	Fenamiphos	0.19	ug/L	U	0.19	0.76
05/22/06	Effluent	GC-Water	Fonofos	0.095	ug/L	U	0.095	0.38
05/22/06	Effluent	GC-Water	Hexazinone	0.095	ug/L	U	0.095	0.38
05/22/06	Effluent	GC-Water	Malathion	0.14	ug/L	U	0.14	0.56
05/22/06	Effluent	GC-Water	Metalaxyl	0.24	ug/L	U	0.24	0.96
05/22/06	Effluent	GC-Water	Metolachlor	0.48	ug/L	U	0.48	1.9
05/22/06	Effluent	GC-Water	Metribuzin	0.095	ug/L	U	0.095	0.38
05/22/06	Effluent	GC-Water	Mevinphos	0.19	ug/L	U	0.19	0.76
05/22/06	Effluent	GC-Water	Naled	0.76	ug/L	U	0.76	3
05/22/06	Effluent	GC-Water	Norflurazon	0.14	ug/L	U	0.14	0.56
05/22/06	Effluent	GC-Water	Parathion Ethyl	0.14	ug/L	U	0.14	0.56
05/22/06	Effluent	GC-Water	Parathion Methyl	0.095	ug/L	U	0.095	0.38
05/22/06	Effluent	GC-Water	Phorate	0.048	ug/L	UJ	0.048	0.19
05/22/06	Effluent	GC-Water	Prometryn	0.14	ug/L	U	0.14	0.56
05/22/06	Effluent	GC-Water	Simazine	0.048	ug/L	U	0.048	0.19
05/22/06	Effluent	Metals-Water	Aluminum	53	ug/L	A	4	16
05/22/06	Effluent	Metals-Water	Arsenic	0.55	ug/L	I	0.5	2
05/22/06	Effluent	Metals-Water	Cadmium	0.05	ug/L	U	0.05	0.2
05/22/06	Effluent	Metals-Water	Calcium	47.5	mg/L	A	0.02	0.08
05/22/06	Effluent	Metals-Water	Chromium	0.3	ug/L	U	0.3	1.2
05/22/06	Effluent	Metals-Water	Copper	0.47	ug/L	I	0.2	0.8
05/22/06	Effluent	Metals-Water	Iron	111	ug/L	A	5	20
05/22/06	Effluent	Metals-Water	Lead	0.2	ug/L	U	0.2	0.8
05/22/06	Effluent	Metals-Water	Magnesium	14.8	mg/L	A	0.005	0.02
05/22/06	Effluent	Metals-Water	Nickel	1	ug/L	U	1	4
05/22/06	Effluent	Metals-Water	Selenium	0.5	ug/L	U	0.5	2
05/22/06	Effluent	Metals-Water	Silver	0.025	ug/L	U	0.025	0.1
05/22/06	Effluent	Metals-Water	Zinc	1.5	ug/L	U	1.5	6
05/22/06	Effluent	Nutrients-Liquid	Ammonia-N	0.16	mg N/L	Y	0.01	0.02
05/22/06	Effluent	Nutrients-Liquid	Chloride	9.8	mg Cl/L		0.4	1
05/22/06	Effluent	Nutrients-Liquid	Color	10	PCU		5	5
05/22/06	Effluent	Nutrients-Liquid	Fluoride	0.37	mg F/L		0.05	0.1
05/22/06	Effluent	Nutrients-Liquid	Kjeldahl Nitrogen	0.22	mg N/L	IY	0.16	0.4
05/22/06	Effluent	Nutrients-Liquid	NO2NO3-N	0.043	mg N/L	Y	0.004	0.01
05/22/06	Effluent	Nutrients-Liquid	O-Phosphate-P	0.067	mg P/L		0.008	0.02
05/22/06	Effluent	Nutrients-Liquid	Sulfate	80	mg SO4/L		0.4	1
05/22/06	Effluent	Nutrients-Liquid	TDS	247	mg/L		15	60
05/22/06	Effluent	Nutrients-Liquid	Total-P	0.17	mg P/L	Y	0.02	0.06
05/22/06	Effluent	Nutrients-Liquid	TSS	4	mg/L	U	4	16
05/22/06	Effluent	Nutrients-Liquid	Turbidity	1.3	NTU		0.05	0.05
05/22/06	Effluent	Overflow	Alpha, Total	2.4	pCi/L			
05/22/06	Effluent	Overflow	Alpha-Counting Error	1.3	pCi/L			
05/22/06	Effluent	Overflow	Oil and Grease	1.7	mg/L	UJ		
05/22/06	Effluent	Overflow	Radium 226	0.7	pCi/L			
05/22/06	Effluent	Overflow	Radium 226-Counting Error	0.2	pCi/L			
05/22/06	Effluent	Overflow	Radium 228	0.9	pCi/L	U		
05/22/06	Effluent	Overflow	Radium 228-Counting Error	0.5	pCi/L			

DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
05/22/06	CONTROL SITE	Bio-AGP/LimNut	Algal Growth Potential	24.4	mg DryWt/L		0.3	0.9
05/22/06	CONTROL SITE	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.92	ug/L	U	0.92	2.8
05/22/06	CONTROL SITE	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	1.6	ug/L	U	1.6	4.9
05/22/06	CONTROL SITE	Bio-Invertebrates	Macroinvert-FW-Qual-Dipnetx20-# Taxa	31	# Taxa			
05/22/06	CONTROL SITE	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	17	# Taxa			
05/22/06	CONTROL SITE	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	26	# Taxa			
05/22/06	CONTROL SITE	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	28	# Taxa			
05/22/06	CONTROL SITE	Bio-Peri/Phyto	Periphyton-Qualitative-# Diatom Taxa	54	# Taxa			
05/22/06	CONTROL SITE	Bio-Peri/Phyto	Periphyton-Qualitative-# Wet Taxa	2	#Taxa			
05/22/06	CONTROL SITE	Bio-Peri/Phyto	Phytoplankton-Quantitative-# Wet Taxa	13	#Taxa			
05/22/06	CONTROL SITE	Bio-Peri/Phyto	Phytoplankton-Quantitative-#Diatom Taxa	54	#Taxa			
05/22/06	CONTROL SITE	Metals-Water	Aluminum	230	ug/L		4	16
05/22/06	CONTROL SITE	Metals-Water	Arsenic	2.2	ug/L		0.5	2
05/22/06	CONTROL SITE	Metals-Water	Cadmium	0.05	ug/L	U	0.05	0.2
05/22/06	CONTROL SITE	Metals-Water	Calcium	45.6	mg/L		0.02	0.08
05/22/06	CONTROL SITE	Metals-Water	Chromium	0.47	ug/L	I	0.3	1.2
05/22/06	CONTROL SITE	Metals-Water	Copper	0.2	ug/L	U	0.2	0.8
05/22/06	CONTROL SITE	Metals-Water	Iron	191	ug/L		5	20
05/22/06	CONTROL SITE	Metals-Water	Lead	0.21	ug/L	I	0.2	0.8
05/22/06	CONTROL SITE	Metals-Water	Magnesium	22.5	mg/L		0.005	0.02
05/22/06	CONTROL SITE	Metals-Water	Nickel	1	ug/L	U	1	4
05/22/06	CONTROL SITE	Metals-Water	Selenium	0.51	ug/L	I	0.5	2
05/22/06	CONTROL SITE	Metals-Water	Silver	0.025	ug/L	U	0.025	0.1
05/22/06	CONTROL SITE	Metals-Water	Zinc	3.6	ug/L	U	3.6	14
05/22/06	CONTROL SITE	Nutrients-Liquid	Ammonia-N	0.12	mg N/L		0.01	0.02
05/22/06	CONTROL SITE	Nutrients-Liquid	Fluoride	2.4	mg F/L		0.05	0.1
05/22/06	CONTROL SITE	Nutrients-Liquid	Kjeldahl Nitrogen	0.68	mg N/L		0.16	0.4
05/22/06	CONTROL SITE	Nutrients-Liquid	NO2NO3-N	0.33	mg N/L		0.004	0.01
05/22/06	CONTROL SITE	Nutrients-Liquid	O-Phosphate-P	0.4	mg P/L		0.016	0.04
05/22/06	CONTROL SITE	Nutrients-Liquid	Sulfate	110	mg SO4/L		1	2.5
05/22/06	CONTROL SITE	Nutrients-Liquid	Total-P	0.54	mg P/L		0.02	0.06
05/22/06	CONTROL SITE	Nutrients-Liquid	TSS	6	mg/L	I	4	16
05/22/06	CONTROL SITE	Nutrients-Liquid	Turbidity	4.3	NTU		0.05	0.05
05/22/06	TEST SITE	Bio-AGP/LimNut	Algal Growth Potential	77.5	mg DryWt/L	A	0.3	0.9
05/22/06	TEST SITE	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
05/22/06	TEST SITE	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	1.5	ug/L	U	1.5	4.5
05/22/06	TEST SITE	Bio-Invertebrates	Macroinvert-FW-Qual-Dipnetx20-# Taxa	24	# Taxa			
05/22/06	TEST SITE	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	32	# Taxa			
05/22/06	TEST SITE	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	29	# Taxa			
05/22/06	TEST SITE	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	32	# Taxa			
05/22/06	TEST SITE	Bio-Peri/Phyto	Periphyton-Qualitative-# Diatom Taxa	51	# Taxa			
05/22/06	TEST SITE	Bio-Peri/Phyto	Periphyton-Qualitative-# Wet Taxa	3	#Taxa			
05/22/06	TEST SITE	Bio-Peri/Phyto	Phytoplankton-Quantitative-# Wet Taxa	9	#Taxa			
05/22/06	TEST SITE	Bio-Peri/Phyto	Phytoplankton-Quantitative-#Diatom Taxa	51	#Taxa			
05/22/06	TEST SITE	Metals-Water	Aluminum	91	ug/L		4	16
05/22/06	TEST SITE	Metals-Water	Arsenic	0.97	ug/L	I	0.5	2
05/22/06	TEST SITE	Metals-Water	Cadmium	0.05	ug/L	U	0.05	0.2
05/22/06	TEST SITE	Metals-Water	Calcium	47.2	mg/L		0.02	0.08
05/22/06	TEST SITE	Metals-Water	Chromium	0.3	ug/L	U	0.3	1.2
05/22/06	TEST SITE	Metals-Water	Copper	0.28	ug/L	I	0.2	0.8
05/22/06	TEST SITE	Metals-Water	Iron	84	ug/L		5	20
05/22/06	TEST SITE	Metals-Water	Lead	0.2	ug/L	U	0.2	0.8
05/22/06	TEST SITE	Metals-Water	Magnesium	16.9	mg/L		0.005	0.02
05/22/06	TEST SITE	Metals-Water	Nickel	1	ug/L	U	1	4
05/22/06	TEST SITE	Metals-Water	Selenium	0.5	ug/L	U	0.5	2
05/22/06	TEST SITE	Metals-Water	Silver	0.025	ug/L	U	0.025	0.1
05/22/06	TEST SITE	Metals-Water	Zinc	3.6	ug/L	U	3.6	14
05/22/06	TEST SITE	Nutrients-Liquid	Ammonia-N	0.011	mg N/L	I	0.01	0.02
05/22/06	TEST SITE	Nutrients-Liquid	Fluoride	0.95	mg F/L		0.05	0.1
05/22/06	TEST SITE	Nutrients-Liquid	Kjeldahl Nitrogen	0.32	mg N/L	I	0.16	0.4
05/22/06	TEST SITE	Nutrients-Liquid	NO2NO3-N	1.2	mg N/L		0.02	0.05
05/22/06	TEST SITE	Nutrients-Liquid	O-Phosphate-P	0.72	mg P/L		0.08	0.2
05/22/06	TEST SITE	Nutrients-Liquid	Sulfate	110	mg SO4/L		0.4	1
05/22/06	TEST SITE	Nutrients-Liquid	Total-P	0.86	mg P/L	A	0.02	0.06
05/22/06	TEST SITE	Nutrients-Liquid	TSS	4	mg/L	U	4	16
05/22/06	TEST SITE	Nutrients-Liquid	Turbidity	1.3	NTU		0.05	0.05
05/22/06	BLANKS	BNA-Water	1,2,4-Trichlorobenzene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	1,2-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	1,3-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	1,4-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	2,4,6-Trichlorophenol	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	2,4-Dichlorophenol	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	2,4-Dimethylphenol	48	ug/L	U	48	190
05/22/06	BLANKS	BNA-Water	2,4-Dinitrophenol	14	ug/L	U	14	57

DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
05/22/06	BLANKS	BNA-Water	2,4-Dinitrotoluene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	2,6-Dinitrotoluene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	2-Chloronaphthalene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	2-Chlorophenol	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	ug/L	U	2.9	11
05/22/06	BLANKS	BNA-Water	2-Nitrophenol	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	3,3'-Dichlorobenzidine	38	ug/L	U	38	150
05/22/06	BLANKS	BNA-Water	4,4'-DDD	1.4	ug/L	U	1.4	5.7
05/22/06	BLANKS	BNA-Water	4,4'-DDE	1.4	ug/L	U	1.4	5.7
05/22/06	BLANKS	BNA-Water	4,4'-DDT	1.4	ug/L	UJ	1.4	5.7
05/22/06	BLANKS	BNA-Water	4-Bromophenyl phenyl ether	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	4-Chloro-3-methylphenol	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	4-Chlorophenyl phenyl ether	1.9	ug/L	U	1.9	7.6
05/22/06	BLANKS	BNA-Water	4-Nitrophenol	14	ug/L	U	14	57
05/22/06	BLANKS	BNA-Water	Acenaphthene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Acenaphthylene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Aldrin	1.4	ug/L	U	1.4	5.7
05/22/06	BLANKS	BNA-Water	alpha-BHC	1.4	ug/L	U	1.4	5.7
05/22/06	BLANKS	BNA-Water	Anthracene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Benzidine	95	ug/L	U	95	380
05/22/06	BLANKS	BNA-Water	Benzo(a)anthracene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Benzo(a)pyrene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Benzo(b)fluoranthene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Benzo(g,h,i)perylene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Benzo(k)fluoranthene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	beta-BHC	1.4	ug/L	U	1.4	5.7
05/22/06	BLANKS	BNA-Water	Bis(2-chloroethoxy)methane	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Bis(2-chloroethyl)ether	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	ug/L	U	2.9	11
05/22/06	BLANKS	BNA-Water	Bis(2-ethylhexyl)phthalate	14	ug/L	U	14	57
05/22/06	BLANKS	BNA-Water	Butyl benzyl phthalate	4.8	ug/L	U	4.8	19
05/22/06	BLANKS	BNA-Water	Chrysene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	delta-BHC	1.4	ug/L	U	1.4	5.7
05/22/06	BLANKS	BNA-Water	Dibenzo(a,h)anthracene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Dieldrin	1.4	ug/L	U	1.4	5.7
05/22/06	BLANKS	BNA-Water	Diethyl phthalate	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Dimethyl phthalate	48	ug/L	U	48	190
05/22/06	BLANKS	BNA-Water	Di-n-butyl phthalate	4.8	ug/L	U	4.8	19
05/22/06	BLANKS	BNA-Water	Di-n-octyl phthalate	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Endosulfan I	3.8	ug/L	U	3.8	15
05/22/06	BLANKS	BNA-Water	Endosulfan II	3.8	ug/L	U	3.8	15
05/22/06	BLANKS	BNA-Water	Endosulfan sulfate	1.4	ug/L	U	1.4	5.7
05/22/06	BLANKS	BNA-Water	Endrin	1.4	ug/L	U	1.4	5.7
05/22/06	BLANKS	BNA-Water	Endrin aldehyde	3.8	ug/L	U	3.8	15
05/22/06	BLANKS	BNA-Water	Fluoranthene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Fluorene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	gamma-BHC	1.4	ug/L	U	1.4	5.7
05/22/06	BLANKS	BNA-Water	Heptachlor	1.4	ug/L	U	1.4	5.7
05/22/06	BLANKS	BNA-Water	Heptachlor epoxide	1.4	ug/L	U	1.4	5.7
05/22/06	BLANKS	BNA-Water	Hexachlorobenzene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Hexachlorobutadiene	2.9	ug/L	U	2.9	11
05/22/06	BLANKS	BNA-Water	Hexachlorocyclopentadiene	2.9	ug/L	UJ	2.9	11
05/22/06	BLANKS	BNA-Water	Hexachloroethane	2.9	ug/L	U	2.9	11
05/22/06	BLANKS	BNA-Water	Indeno(1,2,3-cd)pyrene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Isophorone	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Naphthalene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Nitrobenzene	1.9	ug/L	U	1.9	7.6
05/22/06	BLANKS	BNA-Water	N-Nitrosodimethylamine	1.9	ug/L	U	1.9	7.6
05/22/06	BLANKS	BNA-Water	N-Nitrosodi-n-propylamine	1.9	ug/L	U	1.9	7.6
05/22/06	BLANKS	BNA-Water	N-Nitrosodiphenylamine	2.9	ug/L	UJ	2.9	11
05/22/06	BLANKS	BNA-Water	Pentachlorophenol	2.9	ug/L	U	2.9	11
05/22/06	BLANKS	BNA-Water	Phenanthrene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Phenol	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	BNA-Water	Pyrene	0.95	ug/L	U	0.95	3.8
05/22/06	BLANKS	GC-Water	Alachlor	0.57	ug/L	U	0.57	2.3
05/22/06	BLANKS	GC-Water	Ametryn	0.048	ug/L	U	0.048	0.19
05/22/06	BLANKS	GC-Water	Atrazine	0.048	ug/L	U	0.048	0.19
05/22/06	BLANKS	GC-Water	Azinphos Methyl	0.19	ug/L	U	0.19	0.76
05/22/06	BLANKS	GC-Water	Bromacil	0.19	ug/L	UJ	0.19	0.76
05/22/06	BLANKS	GC-Water	Butylate	0.19	ug/L	U	0.19	0.76
05/22/06	BLANKS	GC-Water	Chlorpyrifos Ethyl	0.048	ug/L	U	0.048	0.19
05/22/06	BLANKS	GC-Water	Chlorpyrifos Methyl	0.095	ug/L	U	0.095	0.38
05/22/06	BLANKS	GC-Water	Diazinon	0.048	ug/L	UJ	0.048	0.19
05/22/06	BLANKS	GC-Water	Ethion	0.048	ug/L	U	0.048	0.19
05/22/06	BLANKS	GC-Water	Ethoprop	0.095	ug/L	UJ	0.095	0.38

DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
05/22/06	BLANKS	GC-Water	Fenamiphos	0.19	ug/L	U	0.19	0.76
05/22/06	BLANKS	GC-Water	Fonofos	0.095	ug/L	U	0.095	0.38
05/22/06	BLANKS	GC-Water	Hexazinone	0.095	ug/L	U	0.095	0.38
05/22/06	BLANKS	GC-Water	Malathion	0.14	ug/L	U	0.14	0.56
05/22/06	BLANKS	GC-Water	Metalaxyl	0.24	ug/L	U	0.24	0.96
05/22/06	BLANKS	GC-Water	Metolachlor	0.48	ug/L	U	0.48	1.9
05/22/06	BLANKS	GC-Water	Metribuzin	0.095	ug/L	U	0.095	0.38
05/22/06	BLANKS	GC-Water	Mevinphos	0.19	ug/L	U	0.19	0.76
05/22/06	BLANKS	GC-Water	Naled	0.76	ug/L	U	0.76	3
05/22/06	BLANKS	GC-Water	Norflurazon	0.14	ug/L	U	0.14	0.56
05/22/06	BLANKS	GC-Water	Parathion Ethyl	0.14	ug/L	U	0.14	0.56
05/22/06	BLANKS	GC-Water	Parathion Methyl	0.095	ug/L	U	0.095	0.38
05/22/06	BLANKS	GC-Water	Phorate	0.048	ug/L	UJ	0.048	0.19
05/22/06	BLANKS	GC-Water	Prometryn	0.14	ug/L	U	0.14	0.56
05/22/06	BLANKS	GC-Water	Simazine	0.048	ug/L	U	0.048	0.19
05/22/06	BLANKS	Metals-Water	Aluminum	4.8	ug/L	I	4	16
05/22/06	BLANKS	Metals-Water	Arsenic	0.5	ug/L	U	0.5	2
05/22/06	BLANKS	Metals-Water	Cadmium	0.05	ug/L	U	0.05	0.2
05/22/06	BLANKS	Metals-Water	Calcium	0.02	mg/L	U	0.02	0.08
05/22/06	BLANKS	Metals-Water	Chromium	0.3	ug/L	U	0.3	1.2
05/22/06	BLANKS	Metals-Water	Copper	0.2	ug/L	U	0.2	0.8
05/22/06	BLANKS	Metals-Water	Iron	5	ug/L	U	5	20
05/22/06	BLANKS	Metals-Water	Lead	0.2	ug/L	U	0.2	0.8
05/22/06	BLANKS	Metals-Water	Magnesium	0.005	mg/L	U	0.005	0.02
05/22/06	BLANKS	Metals-Water	Nickel	1	ug/L	U	1	4
05/22/06	BLANKS	Metals-Water	Selenium	0.5	ug/L	U	0.5	2
05/22/06	BLANKS	Metals-Water	Silver	0.025	ug/L	U	0.025	0.1
05/22/06	BLANKS	Metals-Water	Zinc	1.5	ug/L	I	1.5	6
05/22/06	BLANKS	Nutrients-Liquid	Ammonia-N	0.01	mg N/L	U	0.01	0.02
05/22/06	BLANKS	Nutrients-Liquid	Kjeldahl Nitrogen	0.08	mg N/L	U	0.08	0.2
05/22/06	BLANKS	Nutrients-Liquid	NO2NO3-N	0.004	mg N/L	U	0.004	0.01
05/22/06	BLANKS	Nutrients-Liquid	O-Phosphate-P	0.012	mg P/L		0.004	0.01
05/22/06	BLANKS	Nutrients-Liquid	Total-P	0.02	mg P/L	U	0.02	0.06

Appendix F

Additional physical, chemical, toxicological and microbiological results

FDEP Biology Section - Acute Screen 4/24 Bioassay Bench Sheets

Facility: Mosaic Phosphates Company – Nichols Plant

Address: 5000 County Road 676

City: Nichols County: Polk

Contact/District: Jacki Champion / Southwest District

NPDES Permit #: FL 0030139

LIMS Job #: TLH-2006-05-23-09 LIMS Sample #: 924750

Lims Data Entry: MF 6-5-06 Data Entry Verification: 6-9-06 SP

Sample Collection: Date: 5-21-06 Time: 1730

Hold Time Start: Date: ~~5-21-06~~ SP 5-22-06 Time: 0950

Sample: 1 of 4

Comments:
Chronological sample collection order 2,1,3,4
These tests (1+3) were run for 48 hours only due to lack of sample for renewal. District contact notified lab of sampler failure and requested 48 hour tests, MF 5-22-06 MF

Test 2+4 Temps: Inc #2 23.2–25.7 ; Room B246 24.0–24.9 (96 hour period)

Instructions (for below): Circle appropriate wording. If yes is circled, complete blanks.

Test Type: ~~Definitive~~ Screen

Static / (Static Renewal) / Flow-through

Test Duration: 48 (96) Hours.

Light Intensity: 50 - 100 ft. candles.

Photoperiod: 16 hours light 8 hours dark.

Test 1 validation: Test 1: SOP TA 07 01

Control survival ≥90% (Yes) No

Temperature Range ≤3°C: (Yes) No

Test 2 validation: Test 2: SOP TA 07 02

Control survival ≥90%: (Yes) No

Temperature Range ≤3°C: (Yes) No

Initial sample handling:

PH adjustment: yes (no) Initial pH: ____ NaOH N HCl N ____ Drops mL Final pH: ____

Aeration: (yes) no Initial DO: 10.1 mg/L Final DO: 8.2 mg/L Duration: 20 minutes Rate: ~100 bubbles/min

Salinity adjusted (Test 1): yes (no) Initial Salinity: ____ Final Salinity: ____ Salts Hypersaline brine

Salinity adjusted (Test 2): yes (no) Initial Salinity: ____ Final Salinity: ____ Salts Hypersaline brine

Dechlorination: yes (no) ____ mL of 0.025N Sodium Thiosulfate per liter of sample Final TRC: ____

Temperature Range °C

Incubator # 2 Range 23.3-25.6

Room B246: 24.0-24.9

Waterbath: N/A

(For Test 1+3 only 48 hour coverage MF 6-20-06)

Sample Validation:

Temperature: Shipped ≤6°C (Yes) No Hand Delivered: Cooling (received °C < collected °C) Yes No

Holding Time: ≤36 Hours (Yes) No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Investigators' Signatures
[illegible signatures]
Marshall Fairclott
REVIEWER

Water Quality Parameters	20% DMW	Moderately Hard Water/ (Well Water)	Salt Water ASW NSW Test 1	Salt Water ASW NSW Test 2	Other:	Original	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):	N/A	N/A	N/A	N/A	N/A	not measured		–	SP
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03				<0.03	HACH	SP/EW	MF
Alkalinity (mg/L as $CaCO_3$):	81	136				100	HACH	BA/SP/MF/SA	MF
Hardness (mg/L as $CaCO_3$):	85	137				161	HACH	BA/SP/MF/SA	MF
Total Ammonia (mg/L as N):	<0.017	<0.017				0.110	DENVER	MF	SP
Salinity (ppt):	<1	<1				<1	YSI / Mettler	SP	MF

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FDEP Biology Section - Bioassay Survival Sheet

LIMS Sample #: 924570 **Test #:** 1 **Test Started:** Date 5-23-06 Time: 1140
Organism: C. dubia **SOP #:** TA 07_01 **Test Ended:** Date 5-25-06 Time: 10:40
Organism Batch: 22-06 **Diluent/ Batch:** DMW 1 13-06
Organism Age: <24 hrs **Food:** YCT *P. subcapitata* *Artemia*
Chamber Size: 30 mL **Batch:** 5-05 2-06 —
Test Volume: 20 mL **Feeding:** ~~Prior to test~~ - ~~Prior to renewal~~ - Daily NA

Concentration	Replicate	Chamber #	Test Hour: 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	A	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5	5			
	D	D	5	5	5			
100%	A	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5	5			
	D	D	5	5	5			
Organisms loaded by: BA		Checked by:	[redacted]	SP	MF			

Loading Verified by: JD

m = missing d = dead BR = before renewal AR = after renewal

Comments:

Test Results:
% mortality in 100% sample: Ø
LC_{50}: >100 If Calculated: 95% CI_______ Method:_______

Screening Tests:
Report LC50 as >100%, =100%, or <100%.
Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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FDEP Biology Section - Bioassay Survival Sheet

LIMS Sample #: 924570 **Test #:** 2 **Test Started:** Date 5-23-06 Time: 1310

Organism: C. leedsi **SOP #:** TA 07_02 **Test Ended:** Date 5-25-06 Time: 1100

Organism Batch: 10-06 **Diluent/ Batch:** Well H_2O / 5-23-06

Organism Age: 12 days **Food:** YCT *P. subcapitata* *Artemia*

Chamber Size: 1000 mL **Batch:** — — GSL-536-90

Test Volume: 500 mL **Feeding:** Prior to test - ~~Prior to renewal~~ - Daily NA

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	A	F1	5	5	5			
	B	F2	5	5	5			
	C	F3	5	5	5			
	D	F4	5	5	5			
100%	A	F5	5	4/0	4			
	B	F6	5	5	5			
	C	F7	5	5	5			
	D	F8	5	5	5			
Organisms loaded by: JD		Checked by:	[redacted]	JD	JD			

Loading Verified by: SP

m = missing d = dead BR = before renewal AR = after renewal

Comments:

Test Results:

% mortality in 100% sample: 5

LC_{50}: >100 If Calculated: 95% CI__________ Method:__________

Screening Tests:

Report LC50 as >100%, =100%, or <100%.

Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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FDEP Biology Section - Bioassay Parameter Sheet

LIMS Sample # : 924570 **Test #:** 1 of 2

TEST SOP #: TA07_ 01 **Test Species:** (*Ceriodaphnia dubia*) *Cyprinella leedsi* *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

Concentration CTRL	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	|	B			
pH (S.U.)	8.1	|	8.1			
Temperature °C	25.0	|	24.4			
Dissolved Oxygen mg/L	7.6	|	7.4			
Conductivity (µmhos) mmhos	184	|	204			
(initials) Measured by:	[illegible]		[illegible]			
(initials) Recorded by:	[illegible]		[illegible]			

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	|	B			
pH (S.U.)	8.1	|	8.2			
Temperature °C	25.0	|	24.2			
Dissolved Oxygen mg/L	7.7	|	7.5			
Conductivity (µmhos) mmhos	377	|	417			
(initials) Measured by:	[illegible]		[illegible]			
(initials) Recorded by:	[illegible]		[illegible]			

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

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FDEP Biology Section - Bioassay Parameter Sheet

LIMS Sample # : 921570 **Test #:** 2 of 2

TEST SOP #: TA07_02_ **Test Species:** *Ceriodaphnia dubia* *(Cyprinella leedsi)* *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

Concentration CTRL	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	8.0	8.2	8.2			
Temperature °C	~~7.6~~ 8.1	24.4	24.0			
Dissolved Oxygen mg/L	~~25~~ 7.6	6.0	6.6			
Conductivity ~~µmhos~~ mmhos	276	327	285			
(initials) Measured by:	SP	JD	SP/MF	~~MF~~		
(initials) Recorded by:	SP	JD	SP/MF			

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	8.1	8.1	8.2			
Temperature °C	25.4	24.4	24.2			
Dissolved Oxygen mg/L	7.7	6.0	6.9			
Conductivity ~~µmhos~~ mmhos	383	418	387			
(initials) Measured by:	SP	JD	MF/SP			
(initials) Recorded by:	SP	JD	MF/SP			

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity ~~µmhos~~ mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity ~~µmhos~~ mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

V 2.0 2/24/04

FDEP Biology Section - Acute Screen 4/24 Bioassay Bench Sheets

Facility: Mosaic Phosphates Company - Nichols Plant
Address: 5000 County Road 676
City: Nichols County: Polk
Contact/District: Jacki Champion / Southwest District
NPDES Permit #: FL 0030139
LIMS Job # TLH-2006-05-23-09 LIMS Sample #: 924749
Lims Data Entry: 6-5-06 MF Data Entry Verification: 6-9-06 SP

Sample Collection: Date: 5-21-06 Time: 0930
Hold Time Start: Date: ~~5-21-06~~ 5-22-06 Time: 0950
Sample: 2 of 4

Comments:
Temperatures: Inc#2 23.2-25.7
B246 24.0-24.9 (96 hour period)
~~These tests were run for 48 hours due to lack of sample for renewal.~~ District contact MF wrong test comment 5-22-06

Instructions (for below): Circle appropriate wording. If yes is circled, complete blanks.

Test 1 validation:
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No
Test 1: SOP TA 07_01

Test 2 validation:
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No
Test 2: SOP TA 07_02

Initial sample handling:
PH adjustment: yes (no) Initial pH: ____ NaOH N HCl N ____ Drops mL Final pH: ____
Aeration: ~~yes~~ (no) Initial DO: ____ mg/L Final DO: ____ mg/L Duration: ____ minutes Rate: ~ ____ bubbles/min
Salinity adjusted (Test 1): yes (no) Initial Salinity: ____ Final Salinity: ____ Salts Hypersaline brine
Salinity adjusted (Test 2): yes (no) Initial Salinity: ____ Final Salinity: ____ Salts Hypersaline brine
Dechlorination: yes (no) ____ mL of 0.025N Sodium Thiosulfate per liter of sample. Final TRC: ____

Sample Validation:
Temperature: Shipped ≤6°C (Yes) No Hand Delivered: Cooling (received °C < collected °C) Yes No
Holding Time: ≤36 Hours (Yes) No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Investigators' Signatures
Saal Pichard
Bruce Acock
James Daniel
Eric Pair
Marshall Faircloth
Nicole Wellendorf
REVIEWER

Water Quality Parameters	Original Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):	~~<0.03~~ SP	not measured	–	SP
Lab Total Residual Cl2 (mg/L):	<0.03	HACH	EW	MF
Alkalinity (mg/L as $CaCO_3$):	103	HACH	SP	MF
Hardness (mg/L as $CaCO_3$):	162	HACH	SP	MF
Total Ammonia (mg/L as N):	0.103	DENVER	MF	SP
Salinity (ppt):	<1	YSI / Mettler	SP	MF

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FDEP Biology Section - Bioassay Survival Sheet

LIMS Sample #: 924749 Test #: 1 Test Started: Date 5-23-06 Time: 1200
Organism: C. dubia SOP #: TA 07_01 Test Ended: Date ~~5-25-06~~ 5-27-06 Time: 10:45
Organism Batch: 22-06 Diluent/ Batch: DMW 1 13-06
Organism Age: <24 hrs Food: YCT P. subcapitata Artemia
Chamber Size: 30 mL Batch: 5-05 2-06 —
Test Volume: 20 mL Feeding: (Prior to test) - ~~Prior to renewal~~ - Daily

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
GRL	A	A	5	5	5	5	4D	4
	B	B	5	5	5	5	4D	4
	C	C	5	5	5	5	5	5
	D	D	5	5	5	5	5	5
100%	A	A	5	5	5	5	~~D 3rd~~ 5	5
	B	B	5	5	5	5	5	5
	C	C	5	5	5	5	5	5
	D	D	5	5	5	5	5	5
Organisms loaded by: PA		Checked by:		SP	MF	MF	SP	JD
Loading Verified by: JD								

m = missing d = dead BR = before renewal AR = after renewal

Comments:
(A) picked up wrong vial SP

Test Results:
% mortality in 100% sample: Ø
LC_{50}: >100 If Calculated: 95% CI _____ Method: _____

Screening Tests:
Report LC50 as >100%, =100%, or <100%.
Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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FDEP Biology Section - Bioassay Survival Sheet

LIMS Sample #: 924749 Test #: 2 Test Started: Date 5-23-06 Time: 12:15
Organism: C. leedsi SOP #: TA 07_ 02 Test Ended: Date ~~5-23-06~~ 5-27-06 Time: ~~11:05~~ 12:00 (SD)
Organism Batch: 10-06 Diluent/ Batch: well H2O / 5-23-06
Organism Age: 12 days Food: YCT P. subcapitata Artemia
Chamber Size: 1000 mL Batch: - - GSL-536-90
Test Volume: 500 mL Feeding: ~~Prior to test~~ Prior to renewal - Daily

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	A ~~HAP~~	F9	5	5	5	5	5	5
	B	F10	5	5	5	5	5	5
	C	F11	5	5	5	5	5	5
	D	F12	5	5	5	5	5	5
100%	A	F13	5	5	5	5	5	5
	B	F14	5	5	5	5	5	5
	C	F15	5	5	5	5	5	5
	D	F16	5	5	5	5	5	5
Organisms loaded by: SD		Checked by:		SD	SD	SD	SD	SD
Loading Verified by: SP								

m = missing d = dead BR = before renewal AR = after renewal

Comments:

Test Results:
% mortality in 100% sample: 0
LC_{50}: >100 If Calculated: 95% CI_____ Method:_____

Screening Tests:
Report LC50 as >100%, =100%, or <100%.
Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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FDEP Biology Section - Bioassay Parameter Sheet

LIMS Sample # : 924749 **Test #:** 1 of 2

TEST SOP #: TA07_01 **Test Species:** (*Ceriodaphnia dubia*) *Cyprinella leedsi* *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

Concentration CTRL	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	|	B	B	|	C
pH (S.U.)	8.0	|	8.2	8.2	|	8.3
Temperature °C	25.1	|	24.0	24.3	|	24.0
Dissolved Oxygen mg/L	7.5	|	7.3	7.5	|	7.7
Conductivity ~~µmhos~~ mmhos	186	|	199	171	|	202
(initials) Measured by:	[illegible]		[illegible]	[illegible]		JD
(initials) Recorded by:	[illegible]		[illegible]	[illegible]		JD

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	|	B	B	|	C
pH (S.U.)	7.9	|	8.2	~~8.8~~ 7.4	|	8.4
Temperature °C	25.2	|	24.0	24.1	|	24.3
Dissolved Oxygen mg/L	7.7	|	7.4	7.8	|	7.9
Conductivity ~~µmhos~~ mmhos	376	|	417	365	|	410
(initials) Measured by:	[illegible]		[illegible]	[illegible]		JD
(initials) Recorded by:	[illegible]		[illegible]	[illegible]		JD

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

000049

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FDEP Biology Section - Bioassay Parameter Sheet

LIMS Sample # : 924749 **Test #:** 2 of 2

TEST SOP #: TA07_02 **Test Species:** *Ceriodaphnia dubia* (*Cyprinella leedsi*) *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

Concentration CTRL	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	8.0	8.2	8.1	8.0	8.1	8.1
Temperature °C	25.0	25.9	24.8	24.4	24.7	24.9
Dissolved Oxygen mg/L	~~25.0~~ 7.4	5.9	6.9	7.4	6.9	7.2
Conductivity ~~µmhos~~ mmhos	276	311	279	267	269	274
(initials) Measured by:	[illegible]	JD	[illegible]	JD	JD	JD
(initials) Recorded by:	[illegible]	JD	[illegible]/JD	JD	JD	JD

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	8.0	8.1	8.1	7.6	8.1	7.9
Temperature °C	25.2	24.3	24.7	24.5	24.3	24.8
Dissolved Oxygen mg/L	7.4	5.9	6.9	7.6	7.0	7.4
Conductivity ~~µmhos~~ mmhos	383	414	382	366	383	388
(initials) Measured by:	[illegible]	JD	[illegible]/JD	JD	JD	JD
(initials) Recorded by:	[illegible]	JD	[illegible]/JD	JD	JD	JD

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity ~~µmhos~~ mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity ~~µmhos~~ mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

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FDEP Biology Section - Acute Screen 4/24 Bioassay Bench Sheets

Facility: Mosaic Phosphates Company-Nichols Plant

Address: 5000 County Road 676

City: Nichols County: Polk

Contact/District: Jacki Champion/Southwest District

NPDES Permit #: FL 0030139

LIMS Job #: TLH-2006-05-23-09 LIMS Sample #: 924751

Lims Data Entry: 6-5-06 MF Data Entry Verification: 6-9-06 SP

Sample Collection: Date: 5-22-06 Time: 0130

Hold Time Start: Date: 5-22-06 Time: ~~0130~~ SP 0950

Sample: 3 of 4

Comments:

These tests were run for 48 hours due to lack of sample for renewal. District contact informed lab of automatic sampler failure & requested 48 hour tests. MF 5-23-06

Temperatures: °C Inc#2 23.3-25.6
B246 24.0-24.9

Instructions (for below): Circle appropriate wording. If yes is circled, complete blanks.

Test 1 validation:
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No
Test 1: SOP TA 07_01

Test 2 validation:
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No
Test 2: SOP TA 07_02

Initial sample handling:

PH adjustment: yes (no) Initial pH: ____ NaOH N HCl N ____ Drops mL Final pH: ____

Aeration: (yes) no Initial DO: 10.1 mg/L Final DO: 8.2 mg/L Duration: 20 minutes Rate: ~100 bubbles/min

Salinity adjusted (Test 1): yes (no) Initial Salinity: ____ Final Salinity: ____ Salts Hypersaline brine

Salinity adjusted (Test 2): yes (no) Initial Salinity: ____ Final Salinity: ____ Salts Hypersaline brine

Dechlorination: yes (no) ____ mL of 0.025N Sodium Thiosulfate per liter of sample. Final TRC: ____

Sample Validation:

Temperature: Shipped ≤6°C (Yes) No Hand Delivered: Cooling (received °C < collected °C) Yes No

Holding Time: ≤36 Hours (Yes) No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Investigators' Signatures
[signatures]

REVIEWER [signature]

Water Quality Parameters	Original Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):	not measured		—	SP
Lab Total Residual Cl2 (mg/L):	<0.03	HACH	EW	SP
Alkalinity (mg/L as $CaCO_3$):	102	HACH	SP	MF
Hardness (mg/L as $CaCO_3$):	104	HACH	SP	MF
Total Ammonia (mg/L as N):	0.103	DENVER	MF	SP
Salinity (ppt):	<1	YSI / Mettler	SP	MF

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FDEP Biology Section - Bioassay Survival Sheet

LIMS Sample #: 924751 **Test #:** 1 **Test Started:** Date 5-23-06 Time: 12:10
Organism: C. dubia **SOP #:** TA 07_01 **Test Ended:** Date 5-25-06 Time: 10:50
Organism Batch: 22-06 **Diluent/ Batch:** DMW 1-13-06
Organism Age: <24 hrs **Food:** YCT *P. subcapitata* *Artemia*
Chamber Size: 30 mL **Batch:** 5-05 2-06 –
Test Volume: 20 mL **Feeding:** Prior to test - ~~Prior to renewal~~ NA - Daily

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	A	A	5	5	5			
	B	B	5	5	5			
	C	C	5	4 1D	4			
	D	D	5	5	5			
100%	A	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5	5			
	D	D	5	5	5			
Organisms loaded by: BA		Checked by:	[redacted]	BA	MF			

Loading Verified by: JD

Comments:

m = missing d = dead BR = before renewal AR = after renewal

Test Results:
% mortality in 100% sample: Ø
LC_{50}: >100 If Calculated: 95% CI______ Method:______
Screening Tests:
Report LC50 as >100%, =100%, or <100%.
Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

V 2.1 11/01/2005

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FDEP Biology Section - Bioassay Survival Sheet

LIMS Sample #: 924751 **Test #:** 2 **Test Started:** Date 5-23-06 Time: 1225 (2.0) ~~1035~~
Organism: C. leedsi **SOP #:** TA 07_02 **Test Ended:** Date 5-25-06 Time: 11:00
Organism Batch: 10-06 **Diluent/ Batch:** Well H_2O / 5-23-06
Organism Age: 12 days **Food:** YCT *P. subcapitata* *Artemia*
Chamber Size: 1000 mL **Batch:** – – GSL-536-90
Test Volume: 500 mL **Feeding:** Prior to test - ~~Prior to renewal~~ - Daily NA

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	A	F17	5	5	5			
	B	F18	5	5	5			
	C	F19	5	5	5			
	D	F20	5	5	5			
100%	A	F21	5	5	5			
	B	F22	5	5	5			
	C	F23	5	5	5			
	D	F24	5	5	5			
Organisms loaded by: JD		Checked by:	[redacted]	JD	JD			

Loading Verified by: SP

Comments:

m = missing d = dead BR = before renewal AR = after renewal

Test Results:
% mortality in 100% sample: 0
LC_{50}: >100 If Calculated: 95% CI________ Method:________

Screening Tests:
Report LC50 as >100%, =100%, or <100%.
Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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FDEP Biology Section - Bioassay Parameter Sheet

LIMS Sample # : 924751 Test #: 1 of 2

TEST SOP #: TA07_01 Test Species: (Ceriodaphnia dubia) Cyprinella leedsi Pimephales promelas Americamysis bahia Menidia beryllina Other:_____

Concentration CTRL	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A		B			
pH (S.U.)	7.9		8.1			
Temperature °C	25.0		25.0			
Dissolved Oxygen mg/L	7.6		7.3			
Conductivity ~~µmhos~~ mmhos	184		179			
(initials) Measured by:	[illegible]		[illegible]			
(initials) Recorded by:	[illegible]		[illegible]			

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A		B			
pH (S.U.)	7.8		8.2			
Temperature °C	25.1		24.1			
Dissolved Oxygen mg/L	7.7		7.4			
Conductivity ~~µmhos~~ mmhos	384		388			
(initials) Measured by:	[illegible]		[illegible]			
(initials) Recorded by:	[illegible]		[illegible]			

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity ~~µmhos~~ mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity ~~µmhos~~ mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

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V 2.0 2/24/04

FDEP Biology Section - Bioassay Parameter Sheet

LIMS Sample # : 924751 **Test #:** 2 of 2

TEST SOP #: TA07_ 02 **Test Species:** *Ceriodaphnia dubia* (*Cyprinella leedsi*) *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:

Concentration CTRL	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	8.0	8.2	8.2			
Temperature °C	25.0	24.7	24.2			
Dissolved Oxygen mg/L	7.5	6.0	6.6			
Conductivity (µmhos) mmhos	275	289	289			
(initials) Measured by:	[illegible]	JD	SP MF			
(initials) Recorded by:	[illegible]	JD	SP MF			

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	7.9	8.2	8.1			
Temperature °C	25.0	25.9	24.1			
Dissolved Oxygen mg/L	7.7	6.3	6.8			
Conductivity (µmhos) mmhos	379	431	398			
(initials) Measured by:	[illegible]	JD	SP MF			
(initials) Recorded by:	[illegible]	JD	SP MF			

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

V 2.0 2/24/04

FDEP Biology Section - Acute Screen 4/24 Bioassay Bench Sheets

Facility: Mosaic Phosphates Company- Nichols Plant
Address : 5000 County Road 676
City: Nichols County: Polk
Contact/District: Jacki Champion / Southwest District
NPDES Permit #: FL 0030139
LIMS Job #: TLH-2006-05-23-09 LIMS Sample #: 924752
Lims Data Entry: 6-5-06 MF Data Entry Verification: 6-9-06 SP

Sample Collection: Date: 5-22-06 Time: 0950
Hold Time Start: Date: 5-22-06 Time: 0950
Sample: 4 of 4

Comments:
Temperatures: Inc#2 23.2-25.7 (96 hour Period)
: B246 24.0-24.9
Ceriodaphnia dubia test Terminated at 72 hours due to control failure, 15% mortality.
MF 5/31/06

Instructions (for below): Circle appropriate wording. If yes is circled, complete blanks.

Test 1 validation:
Control survival ≥90%: Yes **No**
Temperature Range ≤3°C: **Yes** No
Test 1: SOP TA 07_ 01

Test 2 validation:
Control survival ≥90%: **Yes** No
Temperature Range ≤3°C: **Yes** No
Test 2: SOP TA 07_ 02

Initial sample handling:
PH adjustment : yes **no** Initial pH: _____ NaOH N HCl N _____ Drops mL Final pH: _____
Aeration : **yes** no Initial DO: 9.6 mg/L Final DO: 8.4 mg/L Duration: 20 minutes Rate: ~100 bubbles/min
Salinity adjusted (Test 1): yes **no** Initial Salinity: 4 SP Final Salinity: _____ Salts Hypersaline brine
Salinity adjusted (Test 2): yes **no** Initial Salinity: _____ Final Salinity: _____ Salts Hypersaline brine
Dechlorination: yes **no** _____ mL of 0.025N Sodium Thiosulfate per liter of sample. Final TRC: _____

Sample Validation:
Temperature: Shipped ≤6°C **Yes** No Hand Delivered: Cooling (received °C < collected °C) Yes No
Holding Time: ≤36 Hours **Yes** No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Investigators' Signatures
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
REVIEWER

Water Quality Parameters	Original Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):	not measured		—	SP
Lab Total Residual Cl2 (mg/L):	<0.03	HACH	SW	SP
Alkalinity (mg/L as $CaCO_3$):	102	HACH	SP	MF
Hardness (mg/L as $CaCO_3$):	162	HACH	SP	MF
Total Ammonia (mg/L as N):	0.088	DENVER	MF	SP
Salinity (ppt):	<1	YSI / Mettler	SP	MF

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FDEP Biology Section - Bioassay Survival Sheet

LIMS Sample #: 924752 | Test #: 1 | Test Started: Date 5-23-06 Time: 12 30

Organism: C dubia | SOP #: TA 07_01 | Test Ended: Date 5-26-05 Time: 11:20

Organism Batch: 22-06 | Diluent/ Batch: DMW / 13-06

Organism Age: <24 hrs | Food: YCT, *P. subcapitata*, *Artemia*

Chamber Size: 30 mL | Batch: 5-05, 2-06, —

Test Volume: 20 mL | Feeding: Prior to test - Prior to renewal - Daily

Concentration	Replicate	Chamber #	Test Hour: 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	A	A	5	5	5	5	3 2D	
	B	B	5	5	5	5	5	
	C	C	5	5	5	5	4 1D	
	D	D	5	5	5	5	5	
100%	A	A	5	~~5~~ 4 1D Ⓐ	Ⓐ ~~4~~ 5	Ⓐ ~~4~~ 5	5	
	B	B	5	~~5~~ ~~5~~ ~~4~~ 1D	5	5	5	
	C	C	5	5	5	5	5	
	D	D	5	5	5	5	5	
Organisms loaded by: BA		Checked by:	[redacted]	SD/BA	MF	MF	SP	

Loading Verified by: SD

m = missing d = dead BR = before renewal AR = after renewal

Comments:
Ⓐ 5 organisms found at 72 hours SP
test terminated at 72 hours due to 15% mortality in the control

NCR 2085 created. MF 6/5/06

Test Results:

% mortality in 100% sample: Ø @ 72 hours

LC_{50}: NA If Calculated: 95% CI______ Method:______

Screening Tests:

Report LC50 as >100%, =100%, or <100%.

Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

V 2.1 11/01/2005

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FDEP Biology Section - Bioassay Survival Sheet

LIMS Sample #: 924752　　**Test #:** 2　　**Test Started:** Date 5-23-06 Time: 12:30
Organism: C.leodsi　　**SOP #:** TA 07_02　　**Test Ended:** Date 5.2.7.06 Time: 12:00
Organism Batch: 10-06　　**Diluent/ Batch:** Well H2O / 5-23-06
Organism Age: 12 days　　**Food:** YCT　*P. subcapitata*　*Artemia*
Chamber Size: 1000 mL　　**Batch:** –　–　GSL-536-90
Test Volume: 500 mL　　**Feeding:** Prior to test - Prior to renewal - Daily

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	A	C10	5	5	5	4/0	4	4
	B	C11	5	5	5	5	5	5
	C	C12	5	5	5	5	5	5
	D	C13	5	5	5	5	5	5
100%	A	C14	5	5	5	5	5	5
	B	C15	5	5	5	5	5	5
	C	C16	5	5	5	5	5	5
	D	C17	5	5	5	5	5	5
Organisms loaded by: JD		Checked by:	[redacted]	JD	JD	JD	JD	JD

Loading Verified by: SP

Comments:

m = missing d = dead BR = before renewal AR = after renewal

Test Results:
% mortality in 100% sample: Ø
LC_{50}: >100　If Calculated: 95% CI ______ Method: ______

Screening Tests:
Report LC50 as >100%, =100%, or <100%.
Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

V 2.1 11/01/2005

FDEP Biology Section - Bioassay Parameter Sheet

LIMS Sample # : 924752 **Test #:** 1 of 2

TEST SOP #: TA07_01 **Test Species:** (*Ceriodaphnia dubia*) ~~*Cyprinella leedsi*~~ *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

Concentration CTRL	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	|	B	B	C	
pH (S.U.)	7.9	|	8.3	8.3	7.8	
Temperature °C	24.7	|	24.2	24.2	24.9	
Dissolved Oxygen mg/L	7.4	|	7.4	7.5	7.2	
Conductivity (~~µmhos~~) mmhos	185	|	177	171	192	
(initials) Measured by:	[illegible]		[illegible]	[illegible]	[illegible]	
(initials) Recorded by:	[illegible]		[illegible]	[illegible]	[illegible]	

Comments: Test terminated at 72 hours due to 15% Control failure MF 5/31/06

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	|	B	B	C	
pH (S.U.)	8.0	|	8.2	7.6	8.1	
Temperature °C	24.4	|	24.1	24.2	24.5	
Dissolved Oxygen mg/L	7.7	|	7.5	7.6	7.5	
Conductivity (~~µmhos~~) mmhos	383	|	385	371	407	
(initials) Measured by:	[illegible]		[illegible]	[illegible]	[illegible]	
(initials) Recorded by:	[illegible]		[illegible]	[illegible]	[illegible]	

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

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V 2.0 2/24/04

Page

FDEP Biology Section - Bioassay Parameter Sheet

LIMS Sample # : 924752 **Test #:** 2 of 2

TEST SOP #: TA07_ 02 **Test Species:** *Ceriodaphnia dubia* (*Cyprinella leedsi*) *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

Concentration CTRL	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	8.0	8.2	8.2	8.1	8.1	8.0
Temperature °C	24.4	25.0	24.8	25.1	24.9	24.0
Dissolved Oxygen mg/L	7.4	6.3	7.0	7.2	6.6	6.9
Conductivity ~~µmhos~~ mmhos	276	299	283	271	272	277
(initials) Measured by:	[illegible]	JD	[illegible]	JD	JD	JD
(initials) Recorded by:	[illegible]	JD	AS/JD	JD	JD	JD

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	8.0	8.1	8.2	7.7	7.8	8.0
Temperature °C	24.2	24.7	24.8	25.1	24.8	24.0
Dissolved Oxygen mg/L	7.7	6.4	6.9	7.4	6.5	7.1
Conductivity ~~µmhos~~ mmhos	383	418	399	374	396	391
(initials) Measured by:	[illegible]	JD	[illegible]	JD	JD	JD
(initials) Recorded by:	[illegible]	JD	[illegible] /JD	JD	JD	JD

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	~~72 Hr.~~	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity ~~µmhos~~ mmhos						
~~(initials)~~ Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	~~72 Hr.~~	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity ~~µmhos~~ mmhos						
~~(initials)~~ Measured by:						
(initials) Recorded by:						

Comments:

V 2.0 2/24/04

Appendix G

Standard Reference Toxicant

11842 Research Circle
Alachua, FL 32615
T: (386) 462-7889
F: (386) 462-7264
www.hydrosphere.net

HYDROSPHERE
research

Packaging List

Date	Customer Number	Order Shipped Via
5/1/2006	NA	Hydrosphere Research
Customer		**Order Prepared By**
FDEP Marshall Faircloth Biology Mail Stop 6515 2600 Blair Stone Road Tallahassee, Fl 32399-2400		D. Chash

Quantity	Description
150	C. leedsi, CL#1098, Hatched 4/26/2006
150	P. promelas, FM#1023, Hatched 4/27/2006
150	M. bahia from Aquatic Indicators
150	M. beryllina from Aquatic Indicators

MBL Aquaculture
4569 Samuel Street
Sarasota, Florida 34233
TEL: (800) 889-0384
FAX: (941) 922-3874
EMAIL: sales@mblaquaculture.com
WEB: www.MBLAquaculture.com

NELAC Accredited

Organism Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Date: 5/22/06

Shipped to: FDEP

P.O. No: _____

Species	Quantity	Age	Brood Number	Temperature	Salinity
Mysidopsis bahia					
Menidia beryllina					
Cyprinella leedsi	25+	11 Day	CL0571	25°C	
Pimephales promelas					

Packed by: Frank Gary

Shipped Via: FedEx

Notes: _____

Thank you for your order.

FDEP Biology Section - Acute SRT Bench Sheet

Test Organism: *Americamysis bahia* (Method 2007.0) · *Menidia beryllina* (Method 2006.0) · *Hyalella azteca* (Method 100.1 EPA-600-R-99-064) · *Ceriodaphnia dubia* (Method 2002.0) · (circled) *Cyprinella leedsi* (Method 2000.0) · *Pimephales promelas* (Method 2000.0) · Other: ______

Method from EPA-821-R-02-012
Test Type: Definitive
Static / (circled) Static Renewal
Test Page 1 of 2

Diluent/ Batch#: Wel H2O, 5-1-06
Toxicant/ Batch#: NaCl, 5-06

Test Beginning: Date: 5-2-06 Time: 1340
Test Ending: Date: 5-6-06 Time: 0810

Water Quality Parameters:

	Diluent	Method	Initials
Total Residual Cl_2 (mg/L):	<0.03	Hach	SP
Alkalinity (mg/L as $CaCO_3$):	148	Hach	SW
Hardness (mg/L as $CaCO_3$):	138	Hach	SW
Total Ammonia (mg/L as N):	<0.01	Denver	MF
Salinity (ppth):	<1	Mettler	BA

Organism Batch #/ Age: 9-06, 4days
Feeding: ~~Prior to test~~ / (circled) Prior to renewal / Daily
Food: YCT · P.subcapitata · Artemia
Food Batch: – · – · GSL-536-90
Chamber size: 1000 mL
Test volume: 500 mL per replicate

Conc. µg/L / (circled) g/L	Rep.	Chamber#	Number Live 0 hr (~~48 hr~~)	Number Live 24 hr (~~72 hr~~)	Number Live 48 hr (~~96 hr~~)	pH (SU) 0 hr (~~48 hr~~)	pH (SU) 24 hr (~~72 hr~~)	pH (SU) 48 hr (~~96 hr~~)	Temperature (°C) 0 hr (~~48 hr~~)	Temperature (°C) 24 hr (~~72 hr~~)	Temperature (°C) 48 hr (~~96 hr~~)	D.O. (mg/l) 0 hr (~~48 hr~~)	D.O. (mg/l) 24 hr (~~72 hr~~)	D.O. (mg/l) 48 hr (~~96 hr~~)	UNCORRECTED Cond. (circled: mmhos/cm) / Cond. (µmhom/cm) 0 hr (~~48 hr~~)	Cond. 24 hr (~~72 hr~~)	Cond. 48 hr (~~96 hr~~)
Control	A	A13	10	10	10	8.0		8.2	24.8		24.8	7.1		7.0	0.277		0.298
	B	A14	10	10	10		8.2			24.9			6.8			0.340	
	C																
	D																
6.0	A	A15	10	9 1D	9	7.9		8.1	25.2		25.1	7.1		6.9	10.30		10.27
	B	A16	10	9 1D	9		8.0			24.9			6.4			10.1	
	C																
	D																
7.0	A	A17	10	8 2D	7 1D	7.8		8.1	25.5		25.1	7.1		6.6	12.65		12.43
	B	A18	10	6 4D	6		8.0			25.0			6.3			12.2	
	C																
	D																
8.0	A	A19	10	3 7D	2 1D	7.8		8.1	25.4		25.3	7.0		6.5	14.32		14.15
	B	A20	10	1 9D	1		8.0			25.1			6.1			13.8	
	C																
	D																
9.0	A	A21	10	1 9D	1	7.8		8.1	25.3		25.1	7.1		6.3	15.77		15.84
	B	A22	10	0 10D	–		7.9			25.3			6.2			15.5	
	C																
	D																
10.0	A	A23	10	1 9D	0 1D	7.8		8.1	25.3		24.9	7.0		6.3	17.49		17.04
	B	A24	10	1 9D	0 1D		8.0			25.1			6.0			17.1	
	C																
	D																
	A																
	B																
	C																
	D																
Loaded / measured by:			JD	BA	JD	BA	JD	BA	BA	BA	BA	BA	JD	BA	BA	JD	BA
Recorded by:			SP	BA	JD	BA	JD	BA	BA	BA	BA	BA	JD	BA	BA	JD	BA

Investigators' Signatures
[illegible]
[illegible]
[illegible]
Marshall Faircloth
[illegible]
[illegible]
REVIEWER

Concentrations prepared by: BA/ JD
Loading verified by: SP
Light Intensity: 50-100 Ft. candles
Photoperiod: 16 hours Light / 8 hours dark
Temperature Range °C:
Incubator # 3 min. 24.9 max. 25.6 mean 25.3
Incubator # ___ min. ___ max. ___ mean ___
Room B246 min. 24.7 max. 25.1 mean 24.5

Remarks:

Statistical Results: Method: Spearman-Karber
(circled) 48 / 96 hour LC50: 7.20
95% Confidence Interval: lower 6.87 upper 7.54

Revised 02/21/06

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FDEP Biology Section - Acute SRT Bench Sheet

Test Organism: Americamysis bahia (Method 2007.0) Menidia beryllina (Method 2006.0) Hyalella azteca (Method 100.1 EPA-600-R-99-064)
Ceriodaphnia dubia (Method 2002.0) (Cyprinella leedsi) (Method 2000.0) Pimephales promelas (Method 2000.0) Other: ______

Method from EPA-821-R-02-012
Test Type: Definitive
Static / (Static Renewal)
Test Page 2 of 2

Diluent/ Batch#: Well H_2O / 5-1-06
Toxicant/ Batch# NaCL / 5-06

Test Beginning: Date: 5-2-06 Time: 1340
Test Ending: Date: 5-6-06 Time: 0810

Water Quality Parameters:	Diluent	Method	Initials
Total Residual Cl_2 (mg/L):	<0.03	Hach	SP
Alkalinity (mg/L as $CaCO_3$):	146	Hach	EW
Hardness (mg/L as CaCO3):	138	Hach	EW
Total Ammonia (mg/L as N):	<0.017	Denver	MF
Salinity (ppth):	<1	Mettler	BA

Organism Batch #/ Age: 9-06 / 4 days
Feeding: ~~Prior to test~~ / ~~Prior to renewal~~ / Daily
Food: YCT P.subcapitata Artemia
Food Batch: - - GSL-536-9C
Chamber size: 1000 mL
Test volume: 500 mL per replicate

Conc. µg/L (g/L)	Rep.	Chamber#	Number Live ~~0 hr~~ 48 hr	Number Live ~~24 hr~~ 72 hr	Number Live ~~48 hr~~ 96 hr	pH (SU) ~~0 hr~~ 48 hr	pH (SU) ~~24 hr~~ 72 hr	pH (SU) ~~48 hr~~ 96 hr	Temperature (°C) ~~0 hr~~ 48 hr	Temperature (°C) ~~24 hr~~ 72 hr	Temperature (°C) ~~48 hr~~ 96 hr	D.O. (mg/l) ~~0 hr~~ 48 hr	D.O. (mg/l) ~~24 hr~~ 72 hr	D.O. (mg/l) ~~48 hr~~ 96 hr	UNCORRECTED Cond. (mmhos/cm) ~~0 hr~~ 48 hr	UNCORRECTED Cond. (mmhos/cm) ~~24 hr~~ 72 hr	UNCORRECTED Cond. (mmhos/cm) ~~48 hr~~ 96 hr
Control	A	A13	10	10	10	8.0		8.4	24.0		25.9	7.0		7.1	0.290		0.300
	B	A14	10	10	10		8.1			25.4			6.9			0.286	
	C																
	D																
6.0	A	A15	9	9	9	7.9		8.2	24.4		25.8	6.9		6.9	10.05		10.6
	B	A16	9	9	9		8.0			25.2			6.4			10.2	
	C																
	D																
7.0	A	A17	7 10	7	7	7.9		8.3	24.6		25.7	6.8		6.9	12.12		12.4
	B	A18	6	6	5 10		8.1			25.5			6.6			12.4	
	C																
	D																
8.0	A	A19	2 10	1 10	1	7.9		8.3	24.7		25.9	6.8		7.0	13.47		13.9
	B	A20	1	1	1		8.1			25.4			6.7			13.6	
	C																
	D																
9.0	A	A31	1	1	1	8.0		8.3	24.7		25.8	7.0		6.9	15.48		15.9
	B	A32	-	-	-		8.2			25.4			6.9			15.7	
	C																
	D																
10.0	A	A23	-	-	-	-		-	-		-	-		-	-		-
	B	A24	-	-	-		-			-			-			-	
	C																
	D																
	A																
	B																
	C																
	D																
Loaded / measured by:			JD	JD	MF	BA	SP	MF	BA	SP	MF	BA	SP	MF	BA	SP	MF
Recorded by:			JD	JD	MF	BA	SP	MF	BA	SP	MF	BA	SP	MF	BA	SP	MF

Investigators' Signatures
James David
[illegible] Pritchard
[illegible]
Marshall [illegible]
[illegible]
Nikki Wollenhoff
REVIEWER

Concentrations prepared by: BA/SP
Loading verified by: SP
Light Intensity: 50-100 Ft. candles
Photoperiod: 16 hours Light / 8 hours dark
Temperature Range °C:
Incubator # 3 min. 24.9 max. 25.6 mean 25.3
Incubator # ____ min. ____ max. ____ mean ____
Room B246 min. 24.2 max. 25.1 mean 24.5

Remarks:

Statistical Results: Method: Spearman-Karber
48 / (96) hour LC50: 7.09
95% Confidence Interval: lower 6.79 upper 7.40

Revised 02/21/06

FDEP Biology Section - Acute SRT Bench Sheet

Test Organism: *Americamysis bahia* (Method 2007.0) *Menidia beryllina* (Method 2006.0) *Hyalella azteca* - (Method 100.1 EPA-600-R-99-064)
(*Ceriodaphnia dubia*, circled) (Method 2002.0) *Cyprinella leedsi* (Method 2000.0) *Pimephales promelas* (Method 2000.0) Other: ________

Method from EPA-821-R-02-012
Test Type: Definitive
Static / Static Renewal
Test Page 1 of 2

Diluent/ Batch#: DMW / 11-06
Toxicant/ Batch#: NaCl / 5-06

Test Beginning: Date: 5-2-06 Time: 1230
Test Ending: Date: 5-6-06 Time: 0830

Water Quality Parameters:	Diluent	Method	Initials
Total Residual Cl_2 (mg/L):	<0.03	Hach	SP
Alkalinity (mg/L as $CaCO_3$):	87	Hach	FW
Hardness (mg/L as $CaCO_3$):	93	Hach	FW
Total Ammonia (mg/L as N):	<0.01	Denver	MF
Salinity (ppth):	<1	Mettler	BA

Organism Batch #/ Age: 20-06 / <24hrs
Feeding: ~~Prior to test~~/ ~~Prior to renewal~~/ Daily (circled)
Food: YCT P.subcapitata Artemia
Food Batch: 5-05 2-06 -
Chamber size: 30 mL
Test volume: 20 mL per replicate

Conc. µg/L (g/L)	Rep.	Chamber#	Number Live 0 hr (~~48 hr~~)	Number Live 24 hr (~~72 hr~~)	Number Live 48 hr (~~96 hr~~)	pH (SU) 0 hr (~~48 hr~~)	pH (SU) 24 hr (~~72 hr~~)	pH (SU) 48 hr (~~96 hr~~)	Temperature (°C) 0 hr (~~48 hr~~)	Temperature (°C) 24 hr (~~72 hr~~)	Temperature (°C) 48 hr (~~96 hr~~)	D.O. (mg/l) 0 hr (~~48 hr~~)	D.O. (mg/l) 24 hr (~~72 hr~~)	D.O. (mg/l) 48 hr (~~96 hr~~)	UNCORRECTED Cond. (~~mmhos/cm~~) Cond. (µmhos/cm) 0 hr (~~48 hr~~)	UNCORRECTED Cond. 24 hr (~~72 hr~~)	UNCORRECTED Cond. 48 hr (~~96 hr~~)
Control	A	A	5	5	5	7.7		8.1	24.0		24.0	6.5		7.3	0.190		0.2[illegible]
	B	B	5	5	5												
	C	C	5	5	5												
	D	D	5	5	5												
1.5	A	A	5	5	5	7.7		8.0	24.5		24.3	7.1		7.1	(A) ~~4.35~~		~~3~~ 3.93
	B	B	5	5	5												
	C	C	5	5	5												
	D	D	5	5	5												
2.0	A	A	5	5	4 1D	7.8		8.1	24.8		24.34	7.3		7.2	(B) ~~4.48~~		5.01
	B	B	5	5	4 1D												
	C	C	5	5	5												
	D	D	5	5	5												
2.5	A	A	5	5	3 2D	7.9		8.1	24.6		24.3	7.2		7.0	4.32		5.34
	B	B	5	5	2 3D												
	C	C	5	5	1 4D												
	D	D	5	5	0 5D												
3.0	A	A	5	4 1D	0 4D	8.0		8.2	24.3		24.2	7.3		6.9	5.41		6.96
	B	B	5	5	0 5D												
	C	C	5	4 1D	0 4D												
	D	D	5	3 2D	0 3D												
4.0	A	A	5	0 5D	–	8.0		–	24.3		–	7.4		–	7.32		–
	B	B	5	0 5D	–		8.0			24.0			7.0			8.2	
	C	C	5	0 5D	–												
	D	D	5	0 5D	–												
	A																
	B																
	C																
	D																
Loaded / measured by:			BA	BA/SP	MF	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA
Recorded by:			SP	BA/SP	MF	BA	BA	BA	BA	VA	BA	BA	BA	BA	BA	BA	BA

Investigators' Signatures
[illegible]
[illegible]
[illegible]
[illegible]

[illegible]
REVIEWER

Concentrations prepared by: BA
Loading verified by: [illegible]
Light Intensity: 50-100 Ft. candles
Photoperiod: 16 hours Light / 8 hours dark
Temperature Range °C:
Incubator # 2 min. 25.1 max. 26.9 mean 26.2
Incubator # ___ min. ___ max. ___ mean ___
Room B246 min. 24.2 max. 25.1 mean 24.5

Remarks: (A) 2.23 ms BA
(B) 3.25 ms BA

Statistical Results: Method: Spearman-Karber
48/ 96 hour LC50: 2.32
95% Confidence Interval: lower 2.19 upper 2.44

Revised 02/21/06

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FDEP Biology Section - Acute SRT Bench Sheet

Test Organism: *Americamysis bahia* (Method 2007.0) *Menidia beryllina* (Method 2006.0) *Hyalella azteca* (Method 100.1 EPA-600-R-99-064) (*Ceriodaphnia dubia* Method 2002.0 — circled) *Cyprinella leedsi* (Method 2000.0) *Pimephales promelas* (Method 2000.0) Other: ______

Method from EPA-821-R-02-012
Test Type: Definitive
Static / Static Renewal
Test Page 2 of 2

Diluent/ Batch#: DMW / 11-06
Toxicant/ Batch# NaCl / 6-06

Test Beginning: Date: 5-2-06 Time: 1230
Test Ending: Date: 5-6-06 Time: 0520

Water Quality Parameters:	Diluent	Method	Initials
Total Residual Cl_2 (mg/L):	<0.03	Hach	SP
Alkalinity (mg/L as $CaCO_3$):	87	Hach	EW
Hardness (mg/L as CaCO3):	93	Hach	EW
Total Ammonia (mg/L as N):	<0.017	Denver	MF
Salinity (ppth):	<1	Mettler	BA

Organism Batch #/ Age: 20-06 / <24 hrs
Feeding: (Prior to test) (Prior to renewal) Daily
Food: YCT P.subcapitata Artemia
Food Batch: 5-05 2-06 –
Chamber size: 30 mL
Test volume: 20 mL per replicate

Conc. µg/L (g/L)	Rep.	Chamber#	Number Live ~~0 hr~~ 48 hr	Number Live ~~24 hr~~ 72 hr	Number Live ~~48 hr~~ 96 hr	pH (SU) ~~0 hr~~ 48 hr	pH (SU) ~~24 hr~~ 72 hr	pH (SU) ~~48 hr~~ 96 hr	Temperature (°C) ~~0 hr~~ 48 hr	Temperature (°C) ~~24 hr~~ 72 hr	Temperature (°C) ~~48 hr~~ 96 hr	D.O. (mg/l) ~~0 hr~~ 48 hr	D.O. (mg/l) ~~24 hr~~ 72 hr	D.O. (mg/l) ~~48 hr~~ 96 hr	UNCORRECTED Cond. (mmhos/cm) ~~0 hr~~ 48 hr	Cond. ~~24 hr~~ 72 hr	Cond. ~~48 hr~~ 96 hr
Control	A	A	(A) ~~24.1~~ 5	5	5	24.1 (B)		8.1	8.0 (B)		24.2	6.7		7.6	0.228		0.220
	B	B	5	5	5												
	C	C	5	5	4 1D												
	D	D	5	5	5												
1.5	A	A	~~25.2~~ 5	4 1D	3 1D	25.2		8.1	7.4		24.5	6.9		7.6	2.92		3.35
	B	B	5	4 1D	4												
	C	C	5	5	5												
	D	D	5	4 1D	4												
2.0	A	A	4 ~~25.2~~	0 4D	—	25.2		8.2	8.0		24.8	7.1		7.6	3.86		4.31
	B	B	4	3 1D	1 2D												
	C	C	5	5	4 1D												
	D	D	5	5	5												
2.5	A	A	3 ~~25.1~~	0 3D	–	25.1		–	8.0		–	7.0		–	4.6		–
	B	B	2	0 2D	–		8.0			24.5			7.8			4.79	
	C	C	1	0 1D	–												
	D	D	0	–	–												
3.0	A	A	~~24.1~~ 0	–	–	24.1		–	8.1		–	6.8		–	5.38		–
	B	B	0	–	–												
	C	C	0	–	–												
	D	D	0	–	–												
4.0	A	A	–	–	–	–		–	–		–	–		–	–		–
	B	B	–	–	–												
	C	C	–	–	–												
	D	D	–	–	–												
	A																
	B																
	C																
	D																
Loaded / measured by:			MF	BA	MF	BA	BA	MF	BA	BA	MF	BA	BA	MF	BA	BA	MF
Recorded by:			MF	BA	MF	BA	BA	MF	BA	BA	MF	BA	BA	MF	BA	BA	MF

Investigators' Signatures (A) BA
[signature]
[signature]
[signature]
[signature]

[signature]
REVIEWER

Concentrations prepared by: BA
Loading verified by: EW
Light Intensity: 50-100 Ft. candles
Photoperiod: 16 hours Light / 8 hours dark
Temperature Range °C:
Incubator # 2 min. 25.1 max. 26.9 mean 26.2
Incubator # ___ min. ___ max. ___ mean ___
Room B246 min. 24.2 max. 25.1 mean 24.5

Remarks: (A) Transcription error! Number live (48hr) in Rep A: Ctrl: 5, 1.5%: 5, 2.0%: 4, 2.5%: 3, 3.0%: 0 BA
(B) pH & temp switched @ 48 hr, rep A BA

Statistical Results: Method: Spearman-Karber
48 / ~~96~~ hour LC50: 1.95
95% Confidence Interval: lower 1.79 upper 2.13

Revised 02/21/06

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Appendix H

Typical Values for Selected Parameters in Florida Waters

Percentile Distribution (1617 stations)

CONTROL SITE

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	Measured
Periphyton Chlorophyll *a* (mg/m^2)	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85	**ND**
Hester-Dendy Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90	**3.99**
Hester-Dendy Taxa Richness	6	6.5	9	11.5	13	15	17	21.5	26	29	32	**41**
Dipnet Taxa Richness	9	12	17	20	22	24.5	26	28	31	37	53	**31**
Total Kjeldahl Nitrogen	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80	**0.68**
Total Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60	**0.12**
Nitrate plus Nitrite	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05	**0.33**
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51	**0.54**
Orthophosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37	**0.4**
Turbidity (NTU)	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30	**4.3**

TEST SITE

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	Measured
Periphyton Chlorophyll *a* (mg/m^2)	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85	**ND**
Hester-Dendy Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90	**3.6**
Hester-Dendy Taxa Richness	6	6.5	9	11.5	13	15	17	21.5	26	29	32	**47**
Dipnet Taxa Richness	9	12	17	20	22	24.5	26	28	31	37	53	**24**
Total Kjeldahl Nitrogen	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80	**0.32 I**
Total Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60	**0.11 I**
Nitrate plus Nitrite	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05	**1.2**
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51	**0.86 A**
Orthophosphate	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37	**0.72**
Turbidity (NTU)	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30	**1.3**

Taxa richness and diversity values are for benthic macroinvertebrates. Hester-Dendy sample= benthic macroinvertebrates collected from a standardized multi-plate sampler. Dipnet taxa richness = number of taxa collected in standardized dipnet sweep samples. Diversity = Shannon-Weaver H'. NTU = Nephelometric turbidity units. Adapted from Joe Hand, FDER, personal communication, 1991 (data collected 1980-1989). ND = No data.

Appendix I

Habitat Assessment Field Sheets

DEP-SOP-001/01: Form FD 9000-3 (December 11, 2001)
PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y): 5/22/06	TIME 2:00	RECEIVING BODY OF WATER 30 mile Creek → Alafia R
REMARKS:	COUNTY: Polk	LOCATION: Mosaic Nichols		FIELD ID/NAME: Control Site 30-mile Creek

RIPARIAN ZONE/STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category):

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
X		X					

LOCAL WATERSHED EROSION (check box): None ☐ Slight ☒ Moderate ☐ Heavy ☐

LOCAL WATERSHED NPS POLLUTION (check box): No evidence ☐ Slight ☐ Moderate potential ☒ Obvious sources ☐

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side: >18

LIST & MAP DOMINANT VEGETATION ON BACK

ARTIFICIALLY CHANNELIZED ☒ no ☐ recent, severe ☐ some recovery ☐ mostly recovered

ARTIFICIALLY IMPOUNDED ☐ yes more sinuous

TYPICAL WIDTH (M) DEPTH (M)/VELOCITY (M/SEC) TRANSECT — 2 m wide

0.15 m/s	0.2 m/s	0.15 m/s
0.3 m deep	0.3 m deep	0.4 m deep

HIGH WATER MARK: 1.5 + 0.4 = 1.9
(m above present water level) (present depth in m) (m above bed)

CANOPY COVER %: OPEN: ☐ LIGHTLY SHADED (11-45%): ☒ MODERATELY SHADED (46-80%): ☐ HEAVILY SHADED: ☐

SEDIMENT/SUBSTRATE

SEDIMENT ODORS: NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ ANAEROBIC: ☐ OTHER: ☐

SEDIMENT OILS: ABSENT: ☒ SLIGHT: ☐ MODERATE: ☐ PROFUSE: ☐

SEDIMENT DEPOSITION: SLUDGE: ☐ SAND SMOTHERING: NONE MODERATE (SLIGHT) SEVERE SILT SMOTHERING: NONE (SLIGHT) MODERATE SEVERE OTHER: ____

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS) (5)	8	IIII		SAND (5)	70	IIII	
LEAF PACKS OF MATS				MUD/MUCK/SILT			
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE (5)	18	IIII		OTHER:			
UNDERCUT BANKS/ROOTS (5)	18	IIII					

DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP								
MID-DEPTH								
BOTTOM	0.4	25.3	7.83	6.80	557			

SYSTEM TYPE: STREAM 1ST-2ND ORDER 3RD-4TH ORDER 5TH – 6TH ORDER 7TH ORDER OR GREATER LAKE: ☐ WETLAND: ☐ ESTUARY: ☐ OTHER: ☐ ____

WATER ODORS (CHECK BOX): NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ OTHER: ☐ ____

WATER SURFACE OILS (CHECK BOX): NONE: ☒ SHEEN: ☐ GLOBS: ☐ SLICK: ☐

CLARITY (CHECK BOX): CLEAR: ☒ SLIGHTLY TURBID: ☐ TURBID: ☐ OPAQUE: ☐

COLOR (CHECK BOX): TANNIC: ☐ GREEN (ALGAE): ☐ CLEAR: ☒ OTHER: ☐ ____

WEATHER CONDITIONS/NOTES: Hot

ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☒	☐	☐
FISH	☐	☐	☐	☒
AQUATIC MACROPHYTES	☒	☐	☐	☐
IRON/SULFUR BACTERIA	☒	☐	☐	☐

SAMPLING TEAM: Jadi Champion / Scott Rose

SIGNATURE: Jadi Champion DATE: 5/22/06

DEP-SOP-001/01: Form FD 9000-5 (December 11, 2001)

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION
STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

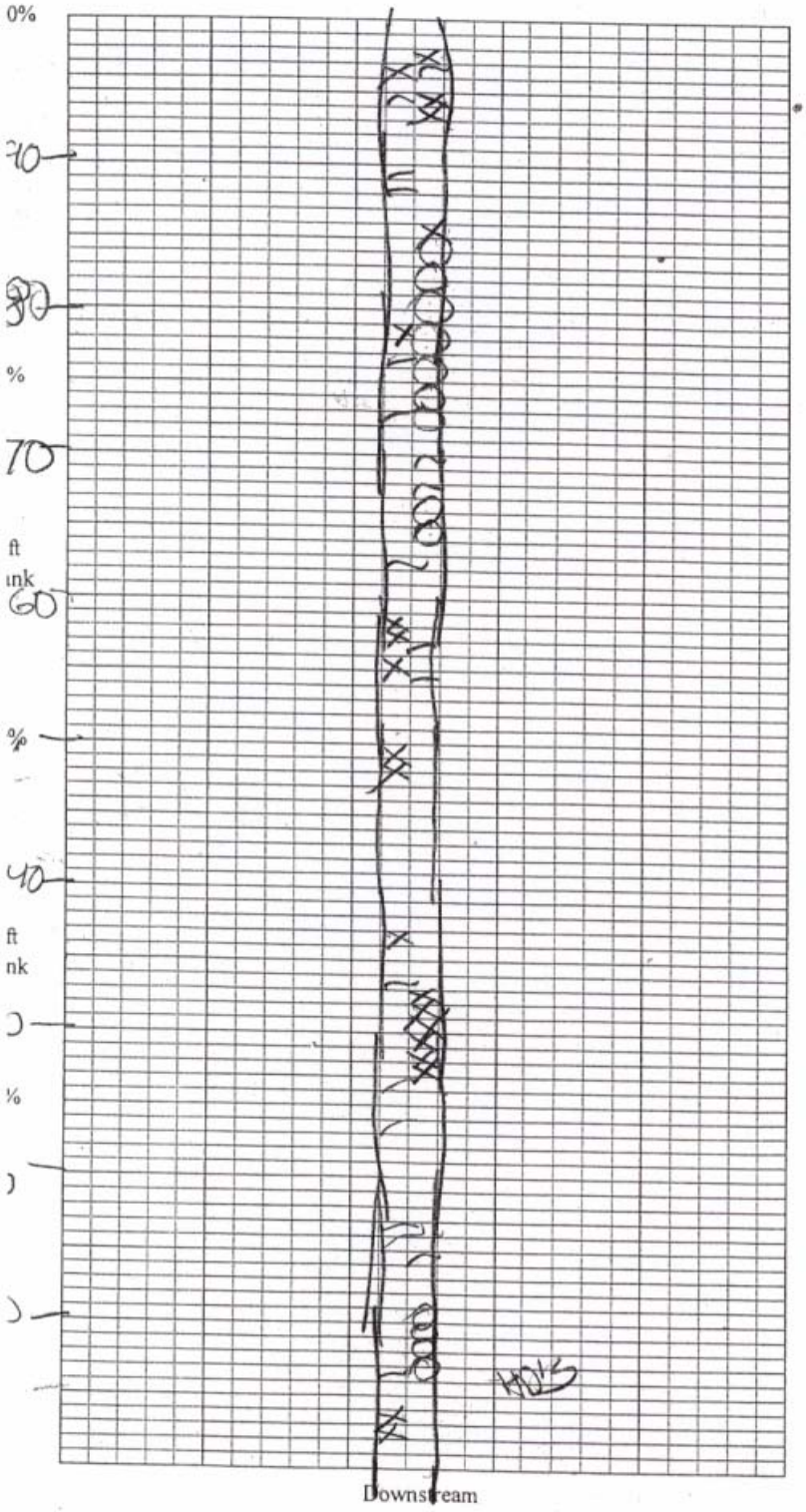
SUBMITTING AGENCY CODE: SUBMITTING AGENCY NAME:		STORET STATION NUMBER:	DATE (MMDDYY): 5/22/06	RECEIVING BODY OF WATER: 30-mile Creek → Alafia R.
REMARKS:	COUNTY: Polk	LOCATION: Mosaic Nichols		FIELD ID/NAME: Control Site, 30-mile Creek

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity 15	Four or more productive habitats present [snags, tree roots/undercut banks, aquatic vegetation, leaf packs (partially decayed), rock] 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) (15) 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 8 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered 5 4 3 2 1
Substrate Availability 15	Greater than 30% productive habitat present at site 20 19 18 17 (16)	16% to 30% productive habitat, by aerial extent (15) 14 13 12 11	6% to 15% productive habitat 10 9 8 7 6	Less than 5% productive habitat 5 4 3 2 1
Water Velocity 12	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 (12) 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec 5 4 3 2 1
Habitat Smothering 15 Primary Score 57	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20% -50% of habitats affected by sand or silt accumulation (15) 14 13 12 11	Smothering of 50% -80% of the habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, as severe problem, pools absent 5 4 3 2 1
Secondary Habitat Components Artificial Channelization 20	No artificial channelization or dredging. Stream with normal, sinuous pattern (20) 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability Right Bank 10 Left Bank 10	Stable. No evidence of erosion or bank failure. Little potential for future problems. (10) 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60% -80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank 10 Left Bank 10	Width of native vegetation (least buffered side) greater than 18 m (10) 9	Width of native vegetation (least buffered side) 12 to 18 m 8 7 6	Width of native vegetation 6 to 12 m. human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 10 Left Bank 10 Secondary Score 80	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions (10) 9	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of stream bank surfaces are vegetated and/or poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less 3 2 1

137 TOTAL SCORE

ANALYSIS DATE: 5/22/06	ANALYST: Jacki Champion	SIGNATURE: Jacki Champion

Stream/River Habitat Sketch Sheet, Form FD 9000-4 (June 1, 2001)
Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).



Substrates: Code key, draw proportionate habitat abundance.

- Snags
- Roots/undercut banks
- Leaf Packs (or mats)
- Macrophytes
- Shell Rubble
- _____
- _____

Velocity:
Note where velocity measures were taken.

Habitat Smothering:
Note areas (on map) where sand or silt is something substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetation is altered or eliminated.

Plants observed/other notes:

Mosaic Nichols
Control Site
Thirty-mile Creek
5/22/06

DEP-SOP-001/01: Form FD 9000-3 (December 11, 2001)

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: _____ SUBMITTING AGENCY NAME: _____	STORET STATION NUMBER:	DATE (M/D/Y): 5/22/06	TIME 1630	RECEIVING BODY OF WATER 30-mile Creek → Alafia R.
REMARKS:	COUNTY: Polk	LOCATION: Mosaic Nichols Test Site	FIELD ID/NAME: 30-mile Creek Test Site	

RIPARIAN ZONE/STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category):

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
X		X					

LOCAL WATERSHED EROSION (check box): None ☐ Slight ☒ Moderate ☐ Heavy ☐

LOCAL WATERSHED NPS POLLUTION (check box): No evidence ☐ Slight ☐ Moderate potential ☒ Obvious sources ☐

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side: >18

LIST & MAP DOMINANT VEGETATION ON BACK

ARTIFICIALLY CHANNELIZED ☒ no ☐ recent, ☐ severe ☐ some recovery ☐ mostly recovered

ARTIFICIALLY IMPOUNDED ☐ yes more sinuous

HIGH WATER MARK: 1.5 (m above present water level) + 0.3 (present depth in m) = 1.8 (m above bed)

TYPICAL WIDTH (M) DEPTH (M)/VELOCITY (M/SEC) TRANSECT: 3 m wide

0.2 m/s — 0.3 m deep | 0.25 m/s — 0.2 m deep | 0.2 m/s — 0.3 m deep

CANOPY COVER %: OPEN: ☐ LIGHTLY SHADED (11-45%): ☒ MODERATELY SHADED (46-80%): ☒ HEAVILY SHADED: ☐

SEDIMENT/SUBSTRATE

SEDIMENT ODORS: NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ ANAEROBIC: ☐ OTHER: ☐ _____

SEDIMENT OILS: ABSENT: ☒ SLIGHT: ☐ MODERATE: ☐ PROFUSE: ☐

SEDIMENT DEPOSITION: SLUDGE: ☐ SAND SMOTHERING: NONE SLIGHT MODERATE SEVERE SILT SMOTHERING: NONE SLIGHT MODERATE SEVERE OTHER: _____

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS) (5)	5	IIII		SAND (5)	83	IIII	
LEAF PACKS OF MATS	—	—		MUD/MUCK/SILT			
AQUATIC VEGETATION	—	—		OTHER:			
ROCK OR SHELL RUBBLE (5)	2	III		OTHER:			
UNDERCUT BANKS/ROOTS (5)	10	III		DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION			

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP								
MID-DEPTH								
BOTTOM	0.3	24.06	7.81	8.44	441			

SYSTEM TYPE: STREAM: 1ST-2ND ORDER 3RD-4TH ORDER 5TH – 6TH ORDER 7TH ORDER OR GREATER LAKE: ☐ WETLAND: ☐ ESTUARY: ☐ OTHER: ☐ _____

WATER ODORS (CHECK BOX): NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ OTHER: ☐ _____

WATER SURFACE OILS (CHECK BOX): NONE: ☒ SHEEN: ☐ GLOBS: ☐ SLICK: ☐

CLARITY (CHECK BOX): CLEAR: ☒ SLIGHTLY TURBID: ☐ TURBID: ☐ OPAQUE: ☐

COLOR (CHECK BOX): TANNIC: ☐ GREEN (ALGAE): ☐ CLEAR: ☒ OTHER: ☐ _____

WEATHER CONDITIONS/NOTES: Hot

ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☒	☐	☐
FISH	☐	☐	☐	☒
AQUATIC MACROPHYTES	☒	☐	☐	☐
IRON/SULFUR BACTERIA	☒	☐	☐	☐

SAMPLING TEAM: Jacki Champion | Scott Rose

SIGNATURE: Jacki Champion

DATE: 5/22/06

DEP-SOP-001/01: Form FD 9000-5 (December 11, 2001)

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION
STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

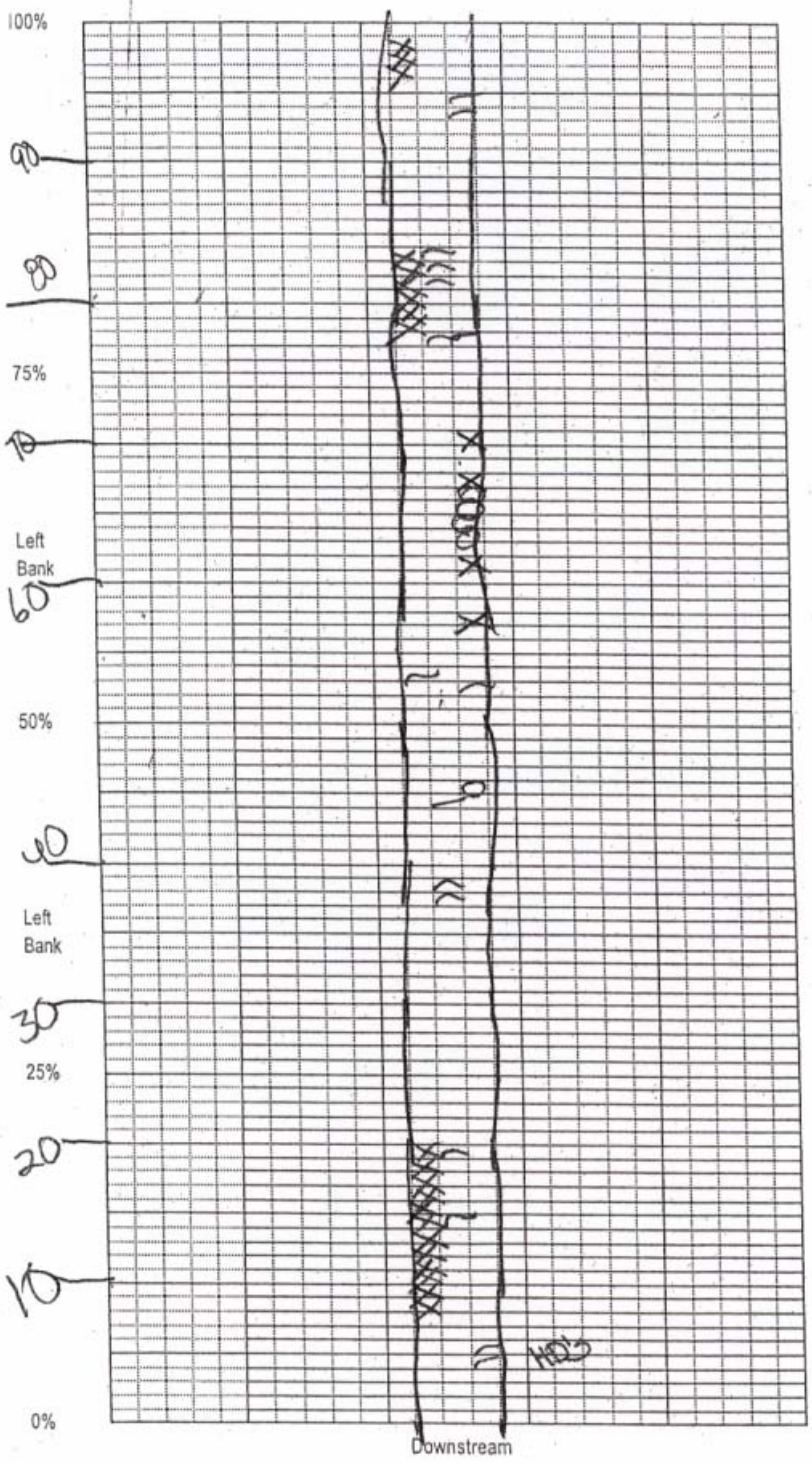
SUBMITTING AGENCY CODE: SUBMITTING AGENCY NAME:		STORET STATION NUMBER:	DATE (MM/DD/YY): 5/22/06	RECEIVING BODY OF WATER: 30-mile Creek → Alafia R.
REMARKS:	COUNTY: Polk	LOCATION: Mosaic Nichols Test Site		FIELD ID/NAME: 30-mile Creek, Test Site

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity 15	Four or more productive habitats present [snags, tree roots/undercut banks, aquatic vegetation, leaf packs (partially decayed), rock] 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) (15) 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 8 7 6	One or less productive habitat. Lack of habitat is obvious, substrates unstable or smothered 5 4 3 2 1
Substrate Availability 12	Greater than 30% productive habitat present at site 20 19 18 17 16	16% to 30% productive habitat, by aerial extent 15 14 13 (12) 11	6% to 15% productive habitat 10 9 8 7 6	Less than 5% productive habitat 5 4 3 2 1
Water Velocity 13	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 (13) 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec 5 4 3 2 1
Habitat Smothering 17 Primary Score 57	Less than 20% of habitats affected by sand or silt accumulation (20) 19 18 (17) 16	20% -50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50% -80% of the habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, as severe problem, pools absent 5 4 3 2 1
Secondary Habitat Components Artificial Channelization 20	No artificial channelization or dredging. Stream with normal, sinuous pattern (20) 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Bank Stability Right Bank 10 Left Bank 10	Stable. No evidence of erosion or bank failure. Little potential for future problems. (10) 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60% -80%) raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank 10 Left Bank 10	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12 to 18 m 8 7 6	Width of native vegetation 6 to 12 m. human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 10 Left Bank 10 Secondary Score 80	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions 10 9	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of stream bank surfaces are vegetated and/or poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less 3 2 1

137 TOTAL SCORE

ANALYST: Jacki Champion	SIGNATURE: Jacki Champion	ANALYSIS DATE: 5/22/06

Stream/River Habitat Sketch Sheet, Form FD 9000-4 (December 11, 2001)
Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).



Substrates: Code key, draw proportionate habitat abundance.

- ☐ Snags
- ☒ Roots/undercut banks
- ☐ Leaf Packs (or mats)
- ☐ Macrophytes
- ☐ Shell Rubble
- ☐ _____
- ☐ _____

Velocity:
Note where velocity measures were taken.

Habitat Smothering:
Note areas (on map) where sand or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetation is altered or eliminated.

Plants observed/other notes:

Appendix J-1

Taxa list and density (number/cm^2) for qualitative natural periphyton collections from Mosaic Phosphates Nichols facility discharge, May 22, 2006.

	Control Site	Effluent	Test Site
Bacillariophyta			
Achnanthes sp.	2	4	-
Achnanthes clevei	1	-	-
Achnanthes curvirostrum	-	-	4
Achnanthes exigua	7	40	8
Achnanthes lanceolata	3	-	6
Achnanthes lanceolata apiculata	1	2	2
Achnanthes lanceolata rostrata	33	11	32
Amphipleura pellucida	1	-	-
Amphora sp.	1	-	6
Aulacoseira sp.	-	-	10
Bacillaria paxillifer	1	-	63
Bacillariophyceae	1	11	6
Capartogramma crucicula	13	4	24
Cocconeis fluviatilis	10	-	4
Cocconeis placentula	12	23	12
Craticula sp.	-	-	48
Cyclostephanos invisitatus	1	-	-
Cyclotella sp.	-	4	-
Cyclotella meneghiniana	8	21	4
Diadesmis confervacea	3	48	18
Diadesmis contenta	1	-	-
Diploneis ovalis	1	-	-
Diploneis pseudovalis	2	-	8
Encyonema minutum	-	4	-
Eunotia sp.	-	6	-
Fragilaria sp.	2	-	10
Fragilaria capucina	-	-	2
Fragilaria pinnata	3	-	10
Fragilariaceae	6	6	57
Fragilariophyceae	1	-	-
Frustulia sp.	1	-	2
Gomphonema sp.	5	71	10
Gomphonema affine	-	2	-
Gomphonema gracile	-	-	2
Gomphonema grovei lingulatum	-	-	6
Gomphonema parvulum	-	69	4
Gyrosigma sp.	1	-	6
Gyrosigma acuminatum	4	-	4
Hippodonta sp.	4	-	28
Hippodonta capitata	6	6	4
Hippodonta hungarica	-	2	8
Luticola sp.	-	2	-
Melosira sp.	2	-	-
Navicula sp.	30	13	77

Navicula constans	1	2	2
Navicula cryptocephala	2	2	2
Navicula cryptotenella	1	-	4
Navicula elginensis	-	-	2
Navicula germainii	24	-	-
Navicula kotschyi	4	-	-
Navicula latens	-	-	2
Navicula minima	7	11	12
Navicula porifera	2	-	2
Navicula radiosa	1	-	-
Navicula rostellata	6	-	-
Navicula seminulum	6	13	2
Navicula symmetrica	3	-	2
Navicula viridulacalcis	-	2	-
Naviculaceae	9	21	36
Neidium sp.	1	-	-
Nitzschia sp.	28	105	12
Nitzschia amphibia	-	2	2
Nitzschia frustulum	-	-	2
Nitzschia palea	2	15	-
Opephora sp.	-	-	4
Pinnularia sp.	2	8	-
Planothidium delicatulum	6	-	4
Pleurosigma sp.	-	-	2
Sellaphora sp.	1	-	-
Sellaphora pupula	-	8	-
Stauroneis sp.	1	-	-
Stauroneis smithii	3	2	2
Surirella sp.	-	-	2
Synedra fasciculata	1	-	4
Synedra ulna	-	4	-
Thalassiosira	-	-	2
Tryblionella acuta	1	-	-
Chlorophycota			
Ankistrodesmus falcatus	1	-	-
Chlamydomonas sp.	-	13	-
Chlorella sp.	-	13	4
Chlorococcum sp.	1	-	-
Crucigenia irregularis	8	-	-
Scenedesmus sp.	-	2	-
Scenedesmus abundans	-	-	2
Scenedesmus bijuga	1	-	-
Scenedesmus quadricauda	-	2	-
Selenastrum sp.	-	4	2
Tetraedron minimum	1	-	-
Chrysophyta			
Chrysophyceae sp.	1	-	-
Mallomonas sp.	-	2	-
Cryptophycophyta			
Cryptomonas sp.	1	-	2
Cyanophycota			
Anabaena sp.	1	-	2

Cyanothece aeruginosa	-	-	2
Jaaginema sp.	5	19	4
Oscillatoria sp.	-	17	-
Planktolyngbya sp.	1	13	-
Planktothrix sp.	-	-	2
Pseudanabaena sp.	-	8	-
Synechocystis sp.	1	-	-
Euglenophycota			
Lepocinclis sp.	1	4	-
Prasinophyta			
Spermatozoopsis exultans	1	-	2

Appendix J-2

Taxa list and number of individuals counted for qualitative natural periphyton collections from Mosaic Phosphates Nichols facility discharge, May 22, 2006.

	Control Site	Effluent	Test Site
Bacillariophyta			
Achnanthes sp.	2	2	-
Achnanthes clevei	1	-	-
Achnanthes curvirostrum	-	-	2
Achnanthes exigua	7	19	4
Achnanthes lanceolata	3	-	3
Achnanthes lanceolata apiculata	1	1	1
Achnanthes lanceolata rostrata	34	5	16
Amphipleura pellucida	1	-	-
Amphora sp.	1	-	3
Aulacoseira sp.	-	-	5
Bacillaria paxillifer	1	-	31
Bacillariophyceae	1	5	3
Capartogramma crucicula	14	2	12
Cocconeis fluviatilis	10	-	2
Cocconeis placentula	12	11	6
Craticula sp.	-	-	24
Cyclostephanos invisitatus	1	-	-
Cyclotella sp.	-	2	-
Cyclotella meneghiniana	8	10	2
Diadesmis confervacea	3	23	9
Diadesmis contenta	1	-	-
Diploneis ovalis	1	-	-
Diploneis pseudovalis	2	-	4
Encyonema minutum	-	2	-
Eunotia sp.	-	3	-
Fragilaria sp.	2	-	5
Fragilaria capucina	-	-	1
Fragilaria pinnata	3	-	5
Fragilariaceae	6	3	28
Fragilariophyceae	1	-	-
Frustulia sp.	1	-	1
Gomphonema sp.	5	34	5
Gomphonema affine	-	1	-
Gomphonema gracile	-	-	1
Gomphonema grovei lingulatum	-	-	3
Gomphonema parvulum	-	33	2
Gyrosigma sp.	1	-	3
Gyrosigma acuminatum	4	-	2
Hippodonta sp.	4	-	14
Hippodonta capitata	6	3	2
Hippodonta hungarica	-	1	4
Luticola sp.	-	1	-
Melosira sp.	2	-	-
Navicula sp.	31	6	38

Navicula constans	1	1	1
Navicula cryptocephala	2	1	1
Navicula cryptotenella	1	-	2
Navicula elginensis	-	-	1
Navicula germainii	25	-	-
Navicula kotschyi	4	-	-
Navicula latens	-	-	1
Navicula minima	7	5	6

Appendix K-1

Benthic macroinvertebrates collapsed taxa list and density (average number of individuals/m^2 rounded to the nearest individual, n = 3 samples) from Hester-Dendy artificial substrates incubated for 28 days upstream and downstream of the Mosaic Phosphates Nichols facility and collected May 22, 2006. See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site	Test Site
Arthropoda		
Arachnida		
Acariformes		
Atractides sp.	-	3
Hygrobates sp.	-	3
Neumania sp.	-	3
Crustacea		
Amphipoda		
Hyalella azteca	8	5
Decapoda		
Cambaridae	3	-
Palaemonetes sp.	-	3
Insecta		
Coleoptera		
Dineutus sp.	5	11
Dubiraphia vittata	3	3
Microcylloepus pusillus	73	873
Stenelmis sp.	6	169
Diptera		
Ablabesmyia rhamphe grp.	3	-
Atrichopogon sp.	3	-
Cladotanytarsus cf. daviesi	-	17
Cladotanytarsus sp. A Epler	6	-
Corynoneura sp.	17	-
Corynoneura sp. B Epler	-	6
Cricotopus bicinctus	-	9
Cricotopus sp. or Orthocladius sp.	-	3
Cryptochironomus sp.	6	-
Hemerodromia sp.	37	164
Monopelopia sp.	-	3
Nilotanypus fimbriatus	-	3
Palpomyia/bezzia grp.	3	13
Pentaneura inconspicua	65	63
Polypedilum fallax	11	-
Polypedilum flavum	102	49
Polypedilum scalaenum grp.	56	3
Rheocricotopus robacki	3	339
Rheotanytarsus exiguus grp.	3	20
Rheotanytarsus pellucidus	3	37
Simulium sp.	3	-
Stenochironomus sp.	3	63

Tanytarsus sp. A Epler	67	38
Tanytarsus sp. C Epler	15	28
Tanytarsus sp. S Epler	9	3
Thienemanniella lobapodema	14	6
Thienemanniella xena	3	-
Tribelos fuscicornis	107	6
Ephemeroptera		
Baetis intercalaris	291	16
Caenis sp.	-	323
Caenis punctata	56	-
Maccaffertium exiguum	-	27
Stenacron sp.	50	-
Megaloptera		
Corydalus cornutus	3	3
Odonata		
Coenagrionidae	8	8
Gomphidae	3	8
Hetaerina sp.	-	3
Trichoptera		
Cernotina sp.	-	11
Cheumatopsyche sp.	132	420
Cyrnellus fraternus	3	3
Hydropsyche sp.	-	3
Hydroptila sp.	8	126
Nectopsyche sp.	-	8
Neotrichia sp.	13	94
Oecetis georgia	-	3
Triaenodes sp.	-	3
Mollusca		
Gastropoda		
Ancylidae	-	5
Ferrissia sp.	3	-
Haitia sp.	3	-
Hydrobiidae	24	8

Appendix K-2

Benthic macroinvertebrates taxa list and counts (number of individuals counted) collected from Hester-Dendy artificial substrates (n= 3 samples) incubated upstream and downstream of the Mosaic Phosphates Nichols facility for 28 days and collected May 22, 2006.

	Control Site	Test Site
Arthropoda		
Arachnida		
Acariformes		
Atractides sp.	-	1
Hygrobates sp.	-	1
Neumania sp.	-	1
Crustacea		
Amphipoda		
Hyalella azteca	3	2
Decapoda		
Cambaridae	1	-
Palaemonetes sp.	-	1
Insecta		
Coleoptera		
Dineutus sp.	2	4
Dubiraphia vittata	1	1
Elmidae	4	-
Microcylloepus pusillus	24	330
Stenelmis sp.	2	64
Diptera		
Ablabesmyia rhamphe grp.	1	-
Atrichopogon sp.	1	-
Ceratopogonidae	-	2
Chironomidae	12	21
Cladotanytarsus cf. daviesi	-	6
Cladotanytarsus sp. A Epler	2	-
Corynoneura sp.	6	-
Corynoneura sp. B Epler	-	2
Cricotopus bicinctus	-	3
Cricotopus sp. or Orthocladius sp.	-	1
Cryptochironomus sp.	2	-
Empididae	-	1
Hemerodromia sp.	14	61
Monopelopia sp.	-	1
Nilotanypus fimbriatus	-	1
Palpomyia/bezzia grp.	1	3
Pentaneura inconspicua	23	22
Polypedilum fallax	4	-
Polypedilum flavum	36	17
Polypedilum scalaenum grp.	20	1
Rheocricotopus robacki	1	118
Rheotanytarsus exiguus grp.	1	7

Rheotanytarsus pellucidus	1	13
Simulium sp.	1	-
Stenochironomus sp.	1	22
Tanytarsus sp.	1	2
Tanytarsus sp. A Epler	23	12
Tanytarsus sp. C Epler	5	9
Tanytarsus sp. S Epler	3	1
Thienemanniella lobapodema	5	2
Thienemanniella xena	1	-
Tribelos fuscicornis	38	2
Ephemeroptera		
Baetidae	9	-
Baetis intercalaris	101	6
Caenis sp.	16	122
Caenis punctata	5	-
Heptageniidae	4	-
Maccaffertium sp.	-	4
Maccaffertium exiguum	-	6
Stenacron sp.	15	-
Megaloptera		
Corydalus cornutus	1	1
Odonata		
Coenagrionidae	3	3
Gomphidae	1	3
Hetaerina sp.	-	1
Trichoptera		
Cernotina sp.	-	4
Cheumatopsyche sp.	50	158
Cyrnellus fraternus	1	1
Hydropsyche sp.	-	1
Hydroptila sp.	3	47
Hydroptilidae	-	1
Nectopsyche sp.	-	3
Neotrichia sp.	5	35
Oecetis georgia	-	1
Triaenodes sp.	-	1
Undetermined	-	1
Mollusca		
Gastropoda		
Ancylidae	-	2
Ferrissia sp.	1	-
Haitia sp.	1	-
Hydrobiidae	9	3

Appendix L-1

Qualitative benthic macroinvertebrate collapsed taxa list and number of individuals counted from 20-discrete-dipnet sweeps upstream and downstream of Mosaic Phosphates Nichols facility (May 22, 2006). See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site	Test Site
Annelida		
Hirudinea		
Helobdella stagnalis	1	-
Oligochaeta		
Stephensoniana trivandrana	1	-
Tubificidae	1	-
Arthropoda		
Crustacea		
Amphipoda		
Hyalella azteca	4	1
Insecta		
Coleoptera		
Dubiraphia vittata	12	1
Microcylloepus pusillus	8	34
Stenelmis sp.	3	8
Diptera		
Ablabesmyia mallochi	1	-
Ceratopogonidae	-	2
Cladotanytarsus cf. daviesi	-	1
Hemerodromia sp.	-	6
Pentaneura inconspicua	1	-
Polypedilum flavum	8	-
Polypedilum illinoense grp.	1	-
Polypedilum scalaenum grp.	1	4
Rheocricotopus robacki	1	2
Rheotanytarsus pellucidus	1	-
Simulium sp.	1	-
Stenochironomus sp.	3	1
Tanytarsus sp. A Epler	3	1
Tanytarsus sp. C Epler	-	2
Tanytarsus sp. U Epler	3	-
Tribelos fuscicornis	-	1
Ephemeroptera		
Baetis intercalaris	1	-
Caenis sp.	8	2
Callibaetis sp.	1	-
Pseudocloeon sp.	1	-
Odonata		
Argia sp.	5	2
Enallagma sp.	2	-
Trichoptera		
Cheumatopsyche sp.	1	5

Hydropsyche sp.	-	1
Hydroptila sp.	10	9
Nectopsyche sp.	-	2
Neotrichia sp.	2	6
Oecetis sp.	1	1
Triaenodes sp.	-	1
Mollusca		
Bivalvia		
Corbicula fluminea	1	8
Gastropoda		
Hydrobiidae	17	1
Pomacea paludosa	1	-

Appendix L-2

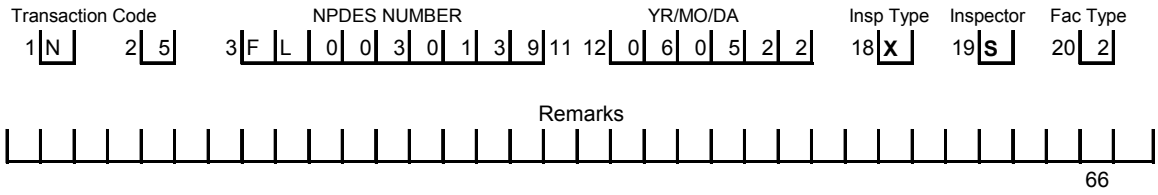
Qualitative benthic macroinvertebrate taxa list and number of individuals counted from 20-discrete-dipnet sweeps upstream and downstream of Mosaic Phosphates Nichols facility (May 22, 2006).

	Control Site	Test Site
Annelida		
Hirudinea		
Helobdella stagnalis	1	-
Oligochaeta		
Stephensoniana trivandrana	1	-
Tubificidae	1	-
Arthropoda		
Crustacea		
Amphipoda		
Hyalella azteca	4	1
Insecta		
Coleoptera		
Dubiraphia vittata	12	1
Microcylloepus pusillus	8	34
Stenelmis sp.	3	8
Diptera		
Ablabesmyia mallochi	1	-
Ceratopogonidae	-	2
Chironomidae	6	2
Cladotanytarsus cf. daviesi	-	1
Hemerodromia sp.	-	6
Pentaneura inconspicua	1	-
Polypedilum flavum	5	-
Polypedilum illinoense grp.	1	-
Polypedilum scalaenum grp.	1	2
Rheocricotopus robacki	1	2
Rheotanytarsus pellucidus	1	-
Simulium sp.	1	-
Stenochironomus sp.	2	1
Tanytarsus sp. A Epler	2	1
Tanytarsus sp. C Epler	-	2
Tanytarsus sp. U Epler	2	-
Tribelos fuscicornis	-	1
Ephemeroptera		
Baetis intercalaris	1	-
Caenis sp.	8	2
Callibaetis sp.	1	-
Pseudocloeon sp.	1	-
Odonata		
Argia sp.	3	2

Coenagrionidae	3	-
Enallagma sp.	1	-
Trichoptera		
Cheumatopsyche sp.	1	5
Hydropsyche sp.	-	1
Hydroptila sp.	10	9
Nectopsyche sp.	-	2
Neotrichia sp.	2	6
Oecetis sp.	1	1
Triaenodes sp.	-	1
Mollusca		
Bivalvia		
Corbicula fluminea	1	8
Gastropoda		
Hydrobiidae	17	1
Pomacea paludosa	1	-

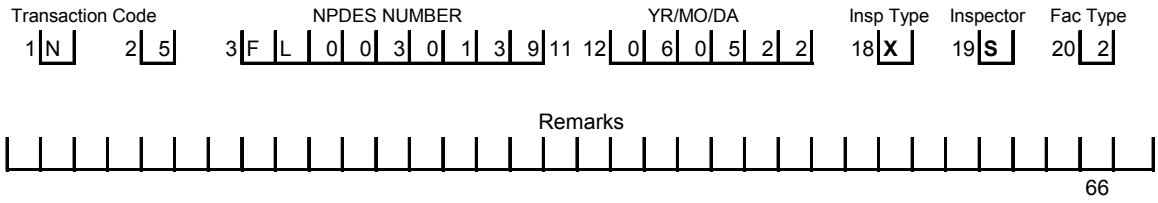
The Bioassay of the Mosaic Phosphates Nichols Plant effluent sampled on May 22, 2006, NPDES #FL0030139

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



The Priority Pollutants Analysis for Bioassay of the Mosaic Phosphates Nichols Plant effluent sampled on May 22, 2006, NPDES #FL0030139

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



Biological Analyses of the Mosaic Phosphates Nichols Plant effluent sampled on May 22, 2006, NPDES #FL0030139

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