

Biological Assessment of

Mosaic Fertilizer, L.L.C. New Wales Concentrates Plant

Polk County

NPDES # FL0036421

Sampled April 4, 2011

September 2011

Biology Section

Bureau of Laboratories

Division of Environmental Assessment and Restoration

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Facility Overview

The Mosaic Fertilizer, L.L.C. New Wales Concentrates Plant is a privately owned industrial facility responsible for the production of fertilizer and animal feed ingredients. The operation of Clay Settling Area (CSA) K-4 and Outfall D-006, formerly authorized under Mosaic Fertilizer, L.L.C.'s Kingsford Mine Permit No. FL0000256, is now under Mosaic's New Wales permit due to permit modification FL0036421-011. The hot process wastewater produced during the chemical and fertilizer manufacturing process is cooled as it circulates through the facility's cooling pond system. The cooling pond system also receives wastewater from a domestic waste package treatment plant and from a locomotive and vehicle wash station. Water from the cooling pond system is discharged from Internal Outfall I-001 into CSA A-11 and flows through a series of ditches into CSA K-4. Then, water from CSA-K4 flows through a ditch and lake system that eventually discharges via Outfall D-006 into the South Prong of the Alafia River, a Class III Fresh Water (see map Appendix A). There is no design flow for this facility. The mean flow from Outfall D-006 for April 2010 to March 2011 was 3.65 million gallons per day (MGD), and the flow measured during the sample collection was 7.10 MGD (Bureau of Mining and Minerals Regulation sampling staff).

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.

See the Facility Summary (Appendix B) for a description of the facility, summary of permit limits, and Appendix C for the Discharge Monitoring Report (DMR) Information.

Methods

The purpose of this investigation was to determine the discharge's effects on the biota of the receiving waters. Chemical and biological comparisons were made between a Control Site (located in the South Prong of the Alafia River approximately 1,385 m upstream of the point of discharge) and a Test Site (located in the South Prong approximately 885 m downstream of the point of discharge). Effluent samples for bioassay tests were taken as composite samples from Outfall D-006, and all other effluent samples were taken as grab samples.

All field and laboratory biological methods followed Bureau of Laboratories and Biology Section Standard Operating Procedures (see http://www.dep.state.fl.us/labs/library/lab_sops.htm and http://www.dep.state.fl.us/water/sas/sop/index.htm for details) and met DEP quality assurance/quality control standards (see http://www.dep.state.fl.us/water/sas/qa/index.htm). Explanations of specific methods and measurements can be found in Appendix D.

The following were involved in this investigation: Jacki Champion and Scott Rose (FDEP Bureau of Mining and Minerals Regulation, Tampa), and FDEP Central Laboratory in Tallahassee. The report was reviewed by BMR representatives and the Point Source Studies Review Committee (Ed Smith and Nancy Ross).

Results

Organic Constituents (See Table 1 and Appendix G)

- No organic analyses were conducted during this investigation.

Metals (See Table 2 and Appendix G)

- Effluent metals were detected at levels that complied with Class III Fresh Water Quality Criteria (62-302.530 F.A.C.) and effluent permit limits.
- No metals analyses were conducted for the Control Site or Test Site.
- No metals were detected in the equipment blank.

Toxicity Whole Effluent Test (See Table 1 and Appendices H and I)

- Tests were performed April 5 through April 7, 2011.

- Due to a failure of the sampling equipment, the second sample required for the renewal was not collected; therefore, chronic toxicity tests were not performed.
- The LC50 was greater than 100% effluent for the water flea, *Ceriodaphnia dubia*, and the fathead minnow, *Pimephales promelas*, during the 48 Hour Acute Definitive bioassays. There was 5% mortality in the 100% effluent during the *C. dubia* bioassay.

Physical and Chemical Parameters (See Table 1 and Appendices F and G)

- The Habitat Assessment of each site indicates slightly greater substrate diversity and less habitat smothering at the Control Site compared to the Test Site. The Control Site had slightly better riparian zone vegetation quality than the Test Site. *Hydrilla* sp., a submerged, non-native, invasive plant, was noted to be present at the Control Site. Comparisons between water velocity and channelization show that the Test Site had better flow but was more artificially channelized than the Control Site. A large pool covered the last 50 meters of the Test Site's 100 meter stretch, and, due to an inability to assess that segment and miscalculation of percent available substrate, it is not appropriate to compare the total Habitat Assessment scores.
- Dissolved oxygen (mg/L), pH (Standard Units), specific conductance (µmhos/cm), and temperature (°C) of the effluent complied with Class III Fresh Water Quality Criteria (62-302.530 F.A.C.) and effluent permit limits. Dissolved oxygen for the Control Site (2.1 mg/L) did not comply with Class III Water Quality Criterion (62-302.530(30) F.A.C.). The pH and temperature at the Control Site and at the Test Site were similar and complied with Class III criteria. The conductivity at both sites complied with Class III criterion, but the Test Site conductivity is higher compared to the Control Site due to input from the elevated effluent conductivity.
- Chlorophyll *a* in the effluent sample was almost 3 times higher than the Control Site and 2.5 times more than the Test Site sample.
- Total suspended solids (mg/L) of the effluent complied with permit limits, but there was no analysis for fixed suspended solids (mg/L).
- Turbidity (NTU), Oils and Greases (mg/L), Fluoride (mg/L), Total Alpha (pCi/L), and Radium 226 + 228 (pCi/L) for the effluent complied with permit limits and/or Class III criteria. Alpha (pCi/L) and Radium 228 (pCi/L) were detected in the equipment blank.

Nutrients (See Table 1 and Appendix G)

- Effluent nutrient levels complied with permit limits and the Class III Fresh Water Quality Criteria.
- Total phosphorus in the Control Site sample was 4 times higher than the effluent sample and twice as high as the Test Site sample. Total nitrogen values for effluent and the Test Site were also lower than the Control Site. The nutrient values do not indicate that there is nutrient enrichment from the effluent at the Test Site.
- No nutrients were detected in the equipment blank.

Algal Growth Potential (See Table 3 and Appendix G)

- Raschke and Shultz (1987) determined that AGP values above 5.0 mg dry weight/L represent a "problem" threshold for fresh receiving waters, implying nutrient enrichment. The AGP value in the effluent sample using the freshwater species, *Pseudokirchneriella subcapitata,* was approximately 4 times greater than the "problem" threshold value. The analytical chemistry suggests that the effluent is nitrogen-limited. The Control Site and Test Site AGP were both 4 times greater than the problem threshold and were both similar to the effluent value. The effluent does not appear to be contributing to nutrient enrichment at the Test Site.

Bioassessment

Phytoplankton (See Table 4 and Appendices J-1 and J-2)

- The effluent phytoplankton community was dominated by the blue-green alga *Cylindrospermopsis raciborskii*, a genus known to form blooms. *C. raciborskii* is common in tropical and subtropical eutrophic freshwaters (Komárek and Komárková, 2003, p 174) and has the potential to produce anatoxin-a, cylindrospermopsin, and saxitoxin. The Physical/Chemical

Characterization Field Sheet indicated that there was Aquashade, a pond dye to help control aquatic weeds and algae, in the outfall. While *Selenastrum* sp. was distinctly dominant at the Control Site, it appears that the contribution of the effluent diluted the Test Site community where *Selenastrum* sp. and *Cylindrospermopsis raciborskii* are co-dominants. The high concentration of *C. raciborskii* in the effluent algal sample is contributing a potential bloom species to the receiving water which could increase the likelihood of an algal bloom downstream of the outfall. The diatom community in the effluent was dominated by *Nitzschia* sp., and the communities at the Control Site and Test Site were dominated by *Nitzschia palea* and *Cyclotella atomus*, respectively.

Macroinvertebrates (See Tables 5 and Appendices K-1 and K-2)

- Quantitative macroinvertebrate data were collected from floating Hester Dendy samplers at the Control and Test Sites. The samplers were deployed March 7 to April 4 during a time of intermittent discharge flow. The Shannon-Weaver diversity scores were high at the Control and Test Sites (3.71 and 3.69, respectively) and both samples were dominated by dipterans. The dominant taxon at the Control Site, *Tanytarsus* sp. T Epler, belongs to the tanytarsini tribe of midges which are known to be sensitive and tend to decline with human disturbance. The Test Site was dominated by *Polypedilum flavum*, which is generally considered to be ubiquitous. Both sites had few sensitive taxa, such as ephermeroptera and trichoptera, present and the dominant feeding groups for both sites were surface deposit feeders, suspension feeders, and shredders. No negative effects on macroinvertebrates were detected at the Test Site due to the effluent.

Conclusion

Dissolved oxygen for the Control Site (2.1 mg/L) did not comply with the Class III Water Quality Criterion (62-302.530(30) F.A.C.). There was no analysis run for fixed suspended solids (FSS; mg/L), but due to the high level of total dissolved solids (787 mg/L) a follow-up analysis of FSS should be performed to ensure compliance with the permit limits. The AGP values for the effluent, Control Site, and Test Site were all similar and were four times greater than the “problem” threshold. Nutrient values were higher for the Control Site than the effluent and the Test Site, but the chlorophyll *a* value for the effluent was significantly higher than the Control and the Test Sites. The Test Site exhibits lower nutrient values and a higher chlorophyll *a* concentration in comparison to the Control Site. The dominant taxon in the effluent phytoplankton community, the bloom forming and potential toxin producing *Cylindrospermopsis raciborskii*, was absent at the Control Site and was co-dominant at the Test Site. This changing community composition exhibits the influence from the discharge and the contribution of a bloom species could increase the possibility of a bloom in the downstream waters. There were no detectable differences in the macroinvertebrate communities at either site. Overall, the effluent did not appear to be adversely affecting the Test Site.

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

Mosaic Fertilizer, L.L.C. New Wales Concentrate Plant	Class III Criteria	Effluent Limits	Effluent	Control Site	Test Site	Equipment Blank
Organic Constituents (µg/L)						
None Detected	-	-	None Detected			
Nutrients (mg/L)						
Ortho-phosphate	-	Report	0.35	1.8	1.3	0.004 U
Total Phosphorus	-	5.0	0.57	2.3	1.6	0.004 U
Total Ammonia	-	Report	0.01 U	0.19	0.12	0.01 U
Un-ionized Ammonia	≤ 0.02 s	≤ 0.02 s	≤ 0.02 c	≤ 0.02 c	≤ 0.02 c	≤ 0.02 c
Nitrate and Nitrite	-	-	0.029	0.028	0.06	0.004 U
Total Kjeldahl Nitrogen	-	-	1.9	2.4	2.1	0.08 U
Organic Nitrogen	-	-	1.9 c	2.2 c	2.0 c	0.035 c
Total Nitrogen	-	3.0	1.9 c	2.4 c	2.2 c	0.042 c
General Physical and Chemical Parameters						
Habitat Assessment	-	-	-	148	-	-
Dissolved Oxygen (mg/L)	≥ 5.0	≥ 5.0	9.4	2.1	5.7	-
pH (SU)	6.0 - 8.5	6.0 - 8.5	7.4	7.3	7.4	-
Conductivity (µmhos/cm)	≤ 1,275	≤ 1,275	1168	614	816	-
Temperature (°C)	-	Report	23.6	22.6	23.0	-
Sample Depth (m)	-	-	-	0.3	0.3	-
Chlorophyll *a* (µg/L) - Corrected	-	-	90	21	36	-
Phaeophytin (µg/L)	-	-	9.3	4.4	8.3	-
Total Suspended Solids (mg/L)	-	≤ 60	12 I	-	-	-
Fixed Suspended Solids (mg/L)	-	≤ 25	-	-	-	-
Total Dissolved Solids (mg/L)	-	-	787	-	-	-
Turbidity (NTU)	< 29 t	< 29 t	6.8	-	-	-
CBOD, 5 day (mg/L), N - inhibited	-	-	6.4 A	-	-	-
Oils and Greases (mg/L)	≤ 5.0	-	1.4 U	-	-	1.4 U
Chloride (mg/L)	-	-	24	-	-	0.2 U
Fluoride (mg/L)	≤ 10.0	≤ 10.0	3.6	2.2	2.7	0.035 U
Sulfate (mg/L)	-	-	410	110	210	0.2 U
Alpha, Total (pCi/L)	≤ 15	≤ 15	2.6 U	-	-	0.7 U
Alpha-Counting Error (pCi/L)	-	-	1.7	-	-	0.4
Radium 226 (pCi/L)	-	-	0.6	-	-	0.2 U
Radium 226-Counting Error (pCi/L)	-	-	0.2	-	-	0.1
Radium 228 (pCi/L)	-	-	0.8 U	-	-	0.9 U
Radium 228-Counting Error (pCi/L)	-	-	0.5	-	-	0.6
Radium 226 + 228 (pCi/L)	≤ 5	≤ 5	0.6 c	-	-	0 c
Alkalinity (mg CaCO3/L)	-	-	188	-	-	-
Flow (MGD)	-	-	7.10	-	-	-
Hardness (mg $CaCO_3$)	-	-	461 c	-	-	0.35 c
Toxicity (48 Hour Acute Definitive Toxicity, LC50, % effluent)						
Bioassay - Water flea *(Ceriodaphnia dubia)*	-	> 100	> 100	-	-	-
Bioassay - Fish *(Pimephales promelas)*	-	> 100	> 100	-	-	-

Value exceeds the Class III Water Quality Criteria or permit limits

b - Value is calculated based on hardness

c - Value is calculated

s - Single sample

t - Shall not exceed 29 NTUs above background

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. Effluent limits, Class III Freshwater Criteria and metals data. Class III Criteria based on hardness are presented individually for each site based on hardness at that site.

Mosaic Fertilizer, L.L.C. New Wales Concentrate Plant	Effluent Class III Criteria	Effluent Limits	Effluent	
Metals (µg/L unless otherwise noted)				
Aluminum	-	-	138	
Arsenic	≤ 50	-	1.02	
Cadmium	≤ 0.800 b	-	0.05	U
Calcium (mg/L)	-	-	102	
Chromium-III	≤ 268 b	-	0.3	U
Copper	≤ 30.5 b	-	0.5	U
Iron	≤ 1,000	-	34	I
Lead	≤ 18.6 b	-	0.2	U
Magnesium (mg/L)	-	-	50	
Nickel	≤ 169 b	-	0.52	I
Selenium	≤ 5.0	-	0.22	I
Silver	≤ 0.07	-	0.025	U
Zinc	≤ 388 b	-	5	U

See Table 1 for calculated hardness.

b - Value is calculated based on hardness
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 3. Measured and predicted algal growth potential (AGP; mg dry weight/L) for total soluble inorganic nitrogen (TSIN), and total nitrogen (TN) limitation of the freshwater species *Pseudokirchneriella subcapitata* and ratios of nitrogen to phosphorus.

Mosaic Fertilizer, L.L.C. New Wales Concentrate Plant												
Location	AGP (measured)		Predicted AGP (TSIN) ± 20%				Predicted AGP (TN) ± 20%				Inorganic N:P ratio	Total N:P ratio
Effluent	20.2	A	1.5	±	0.3		73.3	±	14.7		0.1	3.4
Control Site	19.2		8.3	±	1.7		92.3	±	18.5		0.1	1.1
Test Site	21.7		6.8	±	1.4		82.1	±	16.4		0.1	1.4

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

Table 4. Phytoplankton Composition - Quantitative.

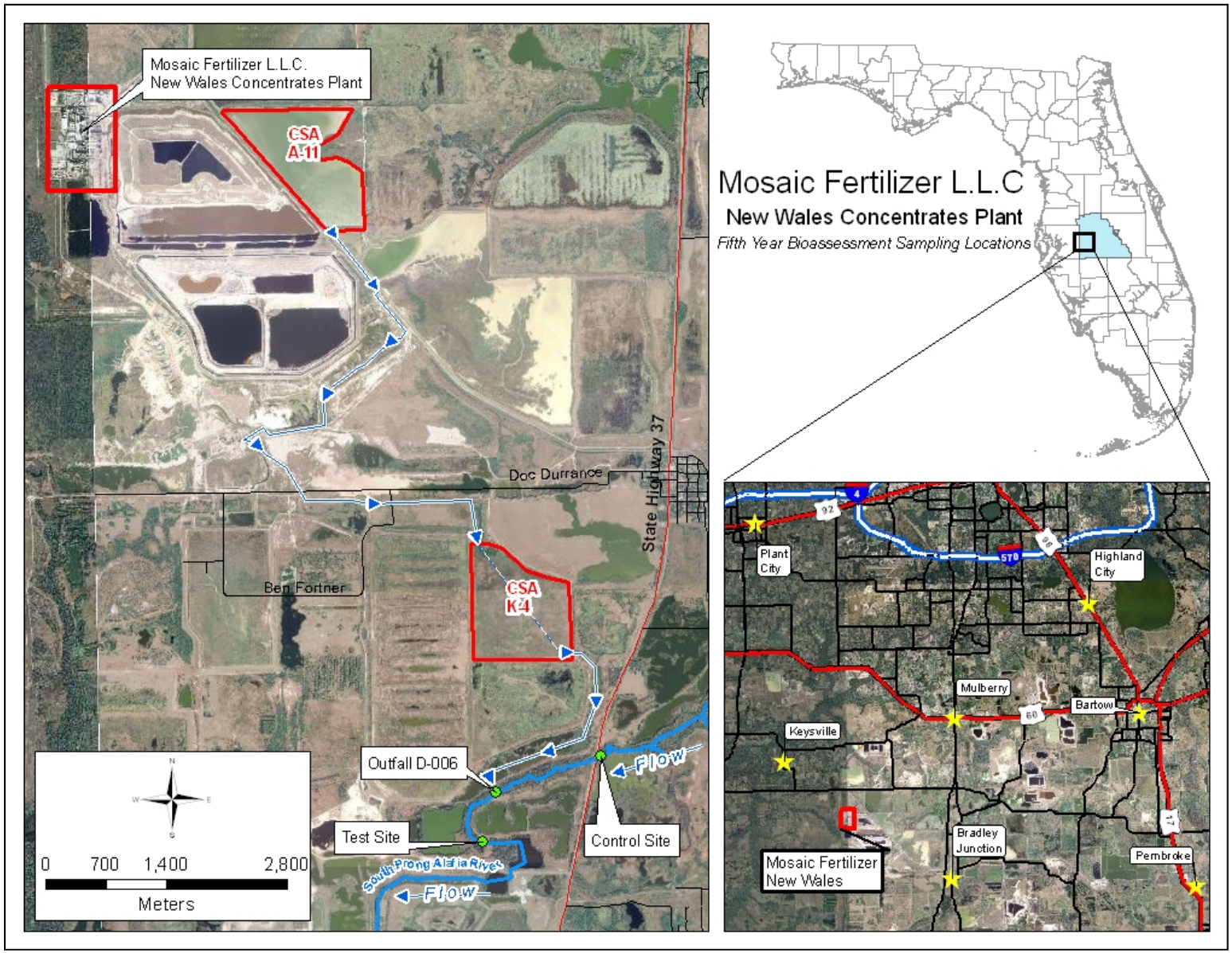
Mosaic Fertilizer, L.L.C. New Wales Concentrate Plant	Effluent	Control Site	Test Site
Number of Taxa	25	16	28
Number of Wet Algal Units Identified	302	300	307
Algal Density (number/mL)	61,008	34,860	59,080
Percent Dominant Wet Taxon	29.2	69.0	24.1
Dominant Wet Taxon Name	*Cylindrospermopsis raciborskii* (Cyanophyceae)	*Selenastrum* sp. (Chlorophyceae)	*Selenastrum* sp. (Chlorophyceae)
Number of Diatom Taxa	15	42	33
Number of Diatom Valves Identified	500	502	499
Percent Dominant Diatom Taxon	34.2	16.7	30.1
Dominant Diatom Taxon Name	*Nitzschia* sp.	*Nitzschia palea*	*Cyclotella atomus*
Percentage Composition of Wet Algae			
Blue-green algae	66.6	15.3	50.5
Green algae	21.9	76.7	44.3
Diatoms	2.3	5.3	2.6
Cryptophytes	7.6	2.3	1.6
Euglenophytes	0.0	0.3	1.0
Pyrrophytes	1.7	0.0	0.0

Table 5. Macroinvertebrate Hester-Dendy Samples - Quantitative.

Mosaic Fertilizer, L.L.C. New Wales Concentrate Plant	Control Site	Test Site
Summary Statistics		
Shannon-Weaver Diversity	3.71	3.69
Number of Taxa	42	38
Number of EPT Taxa	2	4
Percent Dominant Taxon	23.0	20.3
Dominant Taxon Name	*Tanytarsus* sp. T epler (Diptera)	*Polypedilum flavum* (Diptera)
Total Number of Individuals (counted)	1,140	1,177
Total Number of Individuals (#/m^2)	3,018	3,116
Community Composition: Percent of total		
Amphipoda	17.6	19.6
Coleoptera	0.7	11.8
Diptera	56.0	63.3
Ephemeroptera	0.1	0.1
Gastropoda	4.1	1.7
Odonata	0.5	0.0
Oligochaeta	0.9	0.2
Trichoptera	18.1	1.4
Other	2.0	1.9
Functional Feeding Groups: Percent of total		
Burrowing Deposit Feeders	0.9	0.2
Piercers	0.0	0.0
Predators	4.0	2.8
Scavengers	0.1	0.1
Scrapers	4.4	6.7
Shredders	11.6	24.7
Surface Deposit Feeders	40.5	50.9
Suspension Feeders	36.0	7.3
Unknown	2.5	7.3

Appendix A

Map of Facility



Appendix B

Facility Summary

State of Florida
Department of Environmental Protection
Facility Introduction & Summary

PART I: Information gathered prior to sampling event		
Prepared By: Jacki Champion		Contact Number: 813-632-7600 X133
Facility Name (as it appears on permit): Mosaic Fertilizer, L.L.C. New Wales Concentrates Plant		Former Names: IMC Phosphates Company, New Wales Concentrates Plant
NPDES Permit Number: FL0036421	Permit Expiration Date: 11/7/11	
Physical Address: 3095 State Road 640 Mulberry FL, 33860-1100		
District: Bureau of Mining and Minerals Regulation-Phosphate Management	County: Polk	
Function of Facility: Manufactures ammoniated phosphate fertilizers and animal feed ingredients		
Facility Type: Concentrates Plant	Permitted Capacity (MGD):	
Mean Flow for previous 12 months for all EXTERNAL outfalls listed in permit (list date range including months): From January 2010 to December 2010 the flow averaged 3.5717 MGD		
If applicable, Mean Flow for previous 12 months for REUSE outfall(s) (list date range including months):		
Description of type of Discharge: ☐ Continuous ☒ Intermittent ☐ Seasonal ☐ Rainfall Dependent ☐ Other, please specify		

Description of Sampling Location(s) - actual permit designation of permitted sampling point(s): Eff-006
Description of Permitted Outfall(s): D-006 consists of three spillway structures, each with fourteen 27-inch bays with steel rectangular weir plates.

Description of Treatment Process (if multiple discharge points, include a detailed map or diagram of facility):

WASTEWATER TREATMENT:

The wastewater used in the chemical and fertilizer manufacturing process is cooled as it is circulated in the unlined Cooling Pond System with an average ponded surface area on the order of 280 acres. The Phase I and Phase II 60-acre lined perimeter water return ditch system is connected to the cooling pond system via the east and west flume structures, located south of the main cooling pond.

The unlined cooling pond system includes a 247-acre main cooling pond located south east of the chemical plant and a 33-acre cooling channel that encircles the base of the existing unlined North Phosphogypsum Stack located immediately to the east of the chemical plant.

Operation of this system is described as follows: hot process water from the plant operations is discharged into the west channel and flows south into the main cooling pond. Process water contained in the gypsum slurry is transported to the lined South Phosphogypsum Stack (Phases I and II), located south of the cooling pond and returned into the cooling pond via two decant spillway structures, east and west flumes, located on the south dam of the cooling pond. The combined flow is then directed into the east-cooling channel and is returned to the plant to be reused in the process.

In addition to the 433-acre cooling area, the cooling pond system also includes a 94-acre below-grade unlined Auxiliary Holding Pond (AHP) located at the west end of the main cooling pond. The AHP is designed for short-term emergency storage and capable of containing a rainfall event exceeding the 100-year, 24-hour event.

The process water cooling pond recirculation system also receives treated effluent from a 25,000 GPD domestic waste package treatment plant and wastewater generated from a locomotive wash and vehicle wash stations, and wastes from a railroad car wash station. The wash stations are used to clean vehicles prior to routine maintenance. The railroad car wash station is used to wash railcars prior to these cars being loaded with bulk fertilizer materials. All wastewater contained within the process water cooling pond recirculation system shall be considered Industrial Wastewater under this permit. The New Wales process water cooling pond system is designed for zero discharge.

The transfer of Outfall D-006 from Kingsford Mine to New Wales Concentrates Plant also authorizes the temporary use of an auxiliary portable pH adjustment system exclusively for Outfall D-006. The pH adjustment system at Outfall D-006 is used as needed to control pH spikes at the outfall. Operation and reporting requirements for this treatment system are referenced in Condition VI.10. of this permit.

PART I: Continued										
List current Effluent Limits of Outfall(s) to be Sampled: This should include any AO or CO limits the facility may be under (Leave cell blank if not applicable)										

PARAMETERS (UNITS)	DISCHARGE LIMITATIONS			MONITORING REQUIREMENTS		
	Daily Minimum	Monthly Average	Daily Maximum	Monitoring Frequency	Sample Type	Sample Point
Flow (MGD)	N/A	Report	Report	Continuous	Recorder	EFF 006
pH (standard units)	6.0	Report	8.5	1/Week	Grab	EFF-006
	See I.A.2. & I.A.14.					
Turbidity (NTUs)	N/A	Report	See I.A.12.	1/Week	Grab	EFF-006
Nitrogen, Total (as N) (mg/L)	N/A	Report	2.0 See I.A.17.	1/Week	Grab	EFF-006
Nitrogen, Total (as N) (lbs/day)	N/A	Report	Report	1/Week	Calculated	EFF-006
	See I.A.5.a.					
Phosphate, Ortho (as P) (mg/L)	N/A	Report	Report	1/Week	Grab	EFF-006
Phosphorus, Total (as P) (mg/L)	N/A	3.0	5.0	1/Week	Grab	EFF 006
	See I.A.16.					
Phosphorus, Total (as P) (lbs/day)	N/A	Report	Report	1/Week	Calculated	EFF-006
	See I.A.5.a.					
Ammonia Nitrogen, Total (as N) (mg/L)	N/A	Report	Report	1/Week	Grab	EFF-006
	See I.A.14.					
Ammonia, Unionized (as NH_3) (mg/L)	N/A	Report	0.02 See I.A.14.	1/Week	Calculation	EFF-006
Chlorophyll a (µg/L)	N/A	N/A	Report	1/Month	Grab	EFF-006
Fluoride, Total (as F) (mg/L)	N/A	N/A	10.0	1/Month	Grab	EFF-006
Oxygen, Dissolved (DO) (mg/L)	5.0 See I.A.6.	N/A	N/A	1/Month	Grab	EFF 006
Solids, Total Suspended (TSS) (mg/L)	N/A	30	60	1/Month	Grab	EFF 006
Solids, Fixed (FS) (mg/L)	N/A	15	25	1/Month	Grab	EFF-006
	See I.A.15.					
Specific Conductance (µmhos/cm)	N/A	N/A	See I.A.3.	1/Month	Grab	EFF-006
Sulfate, Total (as SO_4) (mg/L)	N/A	N/A	Report	1/Month	Grab	EFF-006
Temperature (°C)	N/A	Report	Report See I.A.14.	1/Month	Grab	EFF 006
Alpha Particle Activity, Gross (pCi/L)	N/A	N/A	15 See I.A.13.	1/Month	Grab	EFF 006
Radium^{226} + Radium^{228}, Combined (pCi/L)	N/A	N/A	5 See I.A.13.	1/Month	Grab	EFF-006
Phosphorus, Total (as P) (lbs/year)	N/A	Report (See I.A.5.b.&d.)	N/A	Annually	Calculated	EFF-006
Nitrogen, Total (as N) (lbs/year)	N/A	Report (See I.A.5.c.&d.)	N/A	Annually	Calculated	EFF-006
Whole Effluent Toxicity – Chronic	See I.A.4.					

PART I: Continued

Receiving Waters:	Classification (indicate whether fresh or marine):
South Prong Alafia River	Class III Fresh

Toxicity Test Requirements (routine and/or additional test language, test species, salinity adjustment, etc.):
Annual definitive chronic toxicity tests

Administrative or Consent Orders (date executed, specific requirements, interim limit dates-if applicable, etc.): None

Facility Mixing Zone Details (if applicable): None

List Permit Violations (DMR data) and plant upsets that occurred at the plant within the last year:

Date	Parameter and Units	Limit	Result

Describe previous FYI and WQBEL study: Previous outfall sampling resulted in elevated pH due to excessive algal growth in the ponded effluent before discharge.

Describe previous or current Enforcement Actions (including WLs):
No current enforcement actions.

Describe any violations or problems noted in previous inspection: none

Discuss whether DMR trends within previous five years are improving or declining: Not applicable. Used to be operated as a mine outfall.

Additional Comments (this should include a trend of the Effluent, i.e. if the facility is now Reuse):
This outfall was transferred from the Mosaic Kingsford Mine permit (FL0000256) to the New Wales permit in 2009. Previously the mine received waters from New Wales but was operated as a mine outfall. Due to the completion of reclamation in the vicinity of the outfall, it was transferred to the New Wales permit and is now being operated as a chemical plant outfall.

PART II: Sampling Event Information

Date(s) sample collected: 4/4/11	Sampler(s): Jacki Champion, Scott Rose
Temperature (Deg C): 23.61	pH (SU): 7.38
Dissolved Oxygen (mg/L): 9.35	Conductivity (umhos/cm): 1,168
Total Residual Chlorine (mg/L):	Total Residual Chlorine - after Disinfection (mg/L):
Method of Chlorination:	Method of De-chlorination:

Flow During Sample Collection for each outfall(MGD): 7.104 MGD

Mean Flow for each outfall for previous 12 months based on sampling date (If samples are taken on more than one day, indicate Mean Flow for each day): 3.64 MGD April 2010 to March 2011

Describe Discharge during Sampling Event:
☐ Continuous ☒ Intermittent ☐ Seasonal ☐ Rainfall Dependent ☐ Other, please specify

Describe any conditions, difficulties or abnormal events that occurred during the sample collection and any other additional comments here:

The SCI was not possible due to several rain events the week before the sampling date that raised the water level at the in-stream sites.

When the Hester-Dendys were deployed on March 7 the downstream site in the South Prong had visible aquashade from the discharged effluent. The Hester Dendys were deployed March 7 to April 4 during which time the outfall stopped discharging March 17 through the 18 and March 24 thorough the 28.

The chronic toxicity test was not possible due to multiple issues that arose during sampling/testing.

Appendix C

Discharge Monitoring Report Information

Summary Results

The date range you specified is: 4/4/2010 to 4/3/2011

Permit Number: FL0036421
Facility Name: Mosaic Fertilizer, LLC - New Wales
Outfall Indicator: 006-1
Monitoring Location Code: 1

Parameter Code	Description	Limit	Limit Effective Dates	Statistical Base	Units	Concentration	Monitoring Date	Violation Code
P 00600	NITROGEN, TOTAL	3	11/1/2009 to 11/7/2011	DAILY MX	mg/L	3.2	4/30/2010	E90
P 00600	NITROGEN, TOTAL	Report	11/1/2009 to 11/7/2011	MO AVG	mg/L	2.1	4/30/2010	

Appendix D

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.dep.state.fl.us/labs/library/lab_sops.htm and/or http://www.dep.state.fl.us/water/sas/sop/index.htm.

(2) Chemical Analyses of the Effluent

The effluent was analyzed for nutrients and metals following FDEP SOPs. The results from these analyses were compared with Water Quality Criteria (62-302 F.A.C.) and facility permit limits. Exceedances of Water Quality Criteria may constitute violations of specific provisions of Chapter 62-302 (F.A.C.) and/ or facility permit limits.

(3) Toxicity Bioassays

Greater than 50% mortality in an acute toxicity test may constitute an exceedance of 62-302.500(1)a and/or a violation of facility permit limits. An inhibition concentration greater than 25% in a chronic test may constitute exceedances of 62-302.530(20), 62-302.530(61) and/or a violation of facility permit limits. Standard reference toxicant (SRT) tests are conducted monthly to ensure quality in toxicity testing.

(4) 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).

(5) Algal Growth Potential (AGP)

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 an exceedance of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C. and/or 62-302.530(47)(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 constitute an exceedance of 62-302.530(61) F.A.C.

(6) Algal Phytoplankton and Periphyton Assemblages

Qualitative periphyton are sampled by taking subsamples of algae from natural substrates throughout the sample reach. Phytoplankton were sampled from the water column using a 1 L grab sample. Periphyton and phytoplankton are subsampled and identified to the lowest practical level, usually species. Wet taxa and diatoms are identified separately. In the wet taxa analysis, soft algae are identified to the lowest practical level, and diatoms are identified only to order level (diatom). In the diatom analysis, diatoms are identified to the lowest practical level.

Chlorophyll *a* Content: Chlorophyll *a* content is an estimate of algal biomass . High algal biomass implies nutrient stress (Stevenson and Bahls 1999) and may be constitute exceedances of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C. and/or 62-302.530(47)(b) F.A.C..

Algal Density: Algal density is estimated as number of natural units/ml for phytoplankton 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 exceedances of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C., 62-302.530(47)(b) F.A.C. and/or 62-302.530(61) F.A.C.

(7) Benthic Macroinvertebrate Assemblages

Benthic macroinvertebrates were collected using two methods. Quantitative samples were collected from Hester-Dendy multi-plate samplers incubated for 28 days. 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.

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 exceedances of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C., 62-302.530(47)(b) F.A.C. and/or 62-302.530(61) 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 exceedances of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C. and/or 62-302.530(47)(b) 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 (Fore et. al. 2007, Karr and Chu 1998). Shifts in community composition related to a facility's effluent may constitute exceedances of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C., 62-302.530(47)(b) F.A.C. and/or 62-302.530(61) 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 and shredders (Fore et. al. 2007). Changes in the proportions of functional feeding groups related to a facility's effluent may constitute exceedances of 62-302.530(46) F.A.C., 62-302.530(47)(a) F.A.C., 62-302.530(47)(b) F.A.C. and/or 62-302.530(61) 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 constitute exceedances of 62-302.530(10) F.A.C..

Appendix E

Chain of Custody

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2011-04-04-22
Mosaic New Wales FYI5

Requester: Jacquelyn M. Champion
Field Report Prepared By: Jacki Champion
Collected By: Jacki Champion / Scott Rose
Send Final Report To: Jacki Champion
Sampling Agency: FDEP

Customer: BMR-TAMPA
Project ID: FYI5
PMAS:

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Mosaic New Wales	☐ Comp ☒ Grab Date 4/4/11 Time 10:00 Eastern/Central	Date Time Eastern/Central	A
	Field ID: Outfall D-006	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L): 9.35	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc): Fresh Water	Temp (C): 23.61	pH: 7.38	Sample Depth ☐ m ☐ ft: 1168 ☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm)	NPDES Number: FL0036421
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Mosaic New Wales	☒ Comp ☐ Grab Date 4/4/11 Time 10:00 Eastern/Central	Date 4/4/11 Time 10:20 Eastern/Central	A
	Field ID: Outfall D-006	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L): 9.35	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc): Fresh Water	Temp (C): 23.61	pH: 7.38	Sample Depth ☐ m ☐ ft: 1168 ☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm)	NPDES Number: FL0036421
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments: Bioassay Tests	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Mosaic New Wales	☐ Comp ☒ Grab Date 4/4/11 Time 9:45 Eastern/Central	Date Time Eastern/Central	D
	Field ID: Equipment Blank	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 ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments: Deionized water	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
		☐ Comp ☐ Grab Date Time Eastern/Central	Date Time Eastern/Central	
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number
	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments: 2 bioassay Rec'd in Tox by JD 4.5.11 2:10	

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[illegible]	4/4/11	FedEx	[illegible]	4-5-11 13:50				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Page 1 of 4

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2011-04-04-22
Mosaic New Wales FYI5

Requester: Jacquelyn M. Champion
Field Report Prepared By: Jacki Champion

Customer: BMR-TAMPA
Project ID: FYI5
PMAS:

Collected By: Jacki Champion / Scott Rose
Send Final Report To: Jacki Champion

Sampling Agency: FDEP

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Mosaic New Wales Field ID: Test Site	☐ Comp ☒ Grab; Date 4/4/11 Time 11:35 ☐ Eastern ☐ Central	Date / Time ☐ Eastern ☐ Central	B
	Matrix (include type e.g. Salt, Fresh, etc): Fresh Water; Temp (C): 23.04; pH: 7.41	Tot Res Chlorine (mg/L): ; Diss Oxygen (mg/L): 5.68	Storet Station Number:	
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Sample Depth: 0.3 ☒ m ☐ ft; 816 ☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm)	NPDES Number:
			Comments:	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Mosaic New Wales Field ID: Test Site	☒ Comp ☐ Grab; Date 3/7/11 Time 10:00 ☐ Eastern ☐ Central	Date 4/4/11 Time 11:35 ☐ Eastern ☐ Central	C
	Matrix (include type e.g. Salt, Fresh, etc): Fresh Water HD's; Temp (C): 23.04; pH: 7.41	Tot Res Chlorine (mg/L): ; Diss Oxygen (mg/L): 5.68	Storet Station Number:	
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Sample Depth: 0.3 ☒ m ☐ ft; 816 ☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm)	NPDES Number:
			Comments: Hester Dendy 1	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Mosaic New Wales Field ID: Test Site	☒ Comp ☐ Grab; Date 3/7/11 Time 10:00 ☐ Eastern ☐ Central	Date 4/4/11 Time 11:35 ☐ Eastern ☐ Central	C
	Matrix (include type e.g. Salt, Fresh, etc): Fresh Water HD's; Temp (C): 23.04; pH: 7.41	Tot Res Chlorine (mg/L): ; Diss Oxygen (mg/L): 5.68	Storet Station Number:	
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Sample Depth: 0.3 ☒ m ☐ ft; 816 ☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm)	NPDES Number:
			Comments: Hester Dendy 2	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Mosaic New Wales Field ID: Test Site	☒ Comp ☐ Grab; Date 3/7/11 Time 10:00 ☐ Eastern ☐ Central	Date 4/4/11 Time 11:35 ☐ Eastern ☐ Central	C
	Matrix (include type e.g. Salt, Fresh, etc): Fresh Water HD's; Temp (C): 23.04; pH: 7.41	Tot Res Chlorine (mg/L): ; Diss Oxygen (mg/L): 5.68	Storet Station Number:	
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Sample Depth: 0.3 ☒ m ☐ ft; 816 ☐ Salinity (PPTh) ☒ Sp Conductance (umho/cm)	NPDES Number:
			Comments: Hester Dendy 3	

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
	2:30 4/4/11	Fed Ex	ABJ	4-5-11 1350				

* Shaded Areas for Lab use only

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2011-04-04-22
Mosaic New Wales FYI5

Requester: Jacquelyn M. Champion
Field Report Prepared By: Jacki Champion

Customer: BMR-TAMPA
Project ID: FYI5
PMAS:

Collected By: Jacki Champion/Scott Rose
Send Final Report To: Jacki Champion

Sampling Agency: FDEP

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Mosaic New Wales	☐ Comp ☒ Grab Date 4/4/11 Time 12:30 Eastern Central	Date Time Eastern Central	B/C
	Field ID: Control Site	Tot Res Chlorine (mg/L):	Diss Oxygen (mg/L): 2.07	Storet Station Number:
	Matrix (include type e.g. Salt, Fresh, etc): Fresh Water	Temp (C): 22.55	pH: 7.27	Sample Depth: 0.3 ☒ m ☐ ft
			Salinity (PPTh):	☒ Sp Conductance (umho/cm): 614
			NPDES Number:	
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments:	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Mosaic New Wales	☒ Comp ☐ Grab Date 3/7/11 Time 11:30 Eastern Central	Date 4/4/11 Time 12:30 Eastern Central	C
	Field ID: Control Site	Tot Res Chlorine (mg/L):	Diss Oxygen (mg/L): 2.07	Storet Station Number:
	Matrix (include type e.g. Salt, Fresh, etc): Fresh Water - HD's	Temp (C): 22.55	pH: 7.27	Sample Depth: 0.2 ☒ m ☐ ft
			Salinity (PPTh):	☒ Sp Conductance (umho/cm): 614
			NPDES Number:	
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments: Hester Dendy 1	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Mosaic New Wales	☒ Comp ☐ Grab Date 3/7/11 Time 11:30 Eastern Central	Date 4/4/11 Time 12:30 Eastern Central	C
	Field ID: Control Site	Tot Res Chlorine (mg/L):	Diss Oxygen (mg/L): 2.07	Storet Station Number:
	Matrix (include type e.g. Salt, Fresh, etc): Freshwater HD's	Temp (C): 22.55	pH: 7.27	Sample Depth: 0.2 ☒ m ☐ ft
			Salinity (PPTh):	☒ Sp Conductance (umho/cm): 614
			NPDES Number:	
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments: Hester Dendy 2	

Lab ID *	Location	Collection (begin)	Collection (end)	Bottle Group(s)**
	Mosaic New Wales	☒ Comp ☐ Grab Date 3/7/11 Time 11:30 Eastern Central	Date 4/4/11 Time 12:30 Eastern Central	C
	Field ID: Control Site	Tot Res Chlorine (mg/L):	Diss Oxygen (mg/L): 2.07	Storet Station Number:
	Matrix (include type e.g. Salt, Fresh, etc): Fresh Water HD's	Temp (C): 22.55	pH: 7.27	Sample Depth: 0.2 ☒ m ☐ ft
			Salinity (PPTh):	☒ Sp Conductance (umho/cm): 614
			NPDES Number:	
	Latitude ☐ dd ☐ dms	Longitude ☐ dd ☐ dms	Comments: Hester Dendy 3	

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
JMC	4/4/11 2:30	Fed Ex		4-5-11 13:50				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Appendix F

Physical/Chemical and Habitat Assessment field sheets

DEP-SOP-001/01: Form FD 9000-3

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SAMPLE ID: Polk | ORG ID: | Latitude: M 27 46 9.17 | Longitude: W 81 59 26.4

COUNTY: | STORET #: | (degrees) (minutes) (seconds) | (degrees) (minutes) (seconds)

DATE: 3/7/11 | TIME:

SITE NAME: Control Site New Water D-006 | SAMPLE COMPLETE ?

FIELD ID/NAME: South Prong @ 37 bridge | RECEIVING BODY OF WATER: South Prong Alafia

RIPARIAN ZONE / STREAM FEATURES

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

Forest/Natural: X | Silviculture | Field/Pasture | Agricultural | Residential | Commercial | Industry | Other (Specify)

Local Watershed Erosion (select one): ☐ None ☒ Slight ☐ Moderate ☐ Heavy

Local Watershed NPS Pollution: ☐ No evidence ☐ Slight ☒ Moderate ☐ Heavy

Width of Riparian Vegetation (m) on Each Buffer Side

Left Bank: >18 Right Bank: >18

High Water Mark: 1.0 (m) + 0.4 (above present water level) = 1.4 (present depth) (above bed)

Artificially Impounded ☐ Yes ☐ No

Typical Width (m) Depth (m)/Velocity (m/sec) Transect

4 m wide

0.2 m/s | 0.2 m/s | 0.1 m/s

0.2 m deep | 0.4 m deep | 0.2 m deep

Artificially Channelized: ☒ No ☐ Some recovery ☐ Mostly recovered, more sinuous ☐ Recent, severe

Canopy Cover %: ☐ Open ☐ Lightly Shaded (11-45%) ☐ Heavily Shaded ☒ Moderate Shaded (46-80%)

SEDIMENT / SUBSTRATE

Sediment Oils: ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Sediment Odors: ☐ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☒ Anaerobic ☐ Other (Specify):

Sediment Deposition: ☐ Sludge | Sand Smothering: None Slight Moderate Severe | Silt Smothering: None Slight Moderate Severe | ☐ Other (Specify):

SUBSTRATE TYPE

Assessment Tool: ☒ SCI Recon ☐ BioRecon ☐ LCI ☐ LVI

	% Coverage	INVERT # Times Sampled	PERI # Times Sampled
Woody Debris (Snags)	10		
Undercut Banks / Roots	5		
Leaf Packs or Mat	7		
Aquatic Vegetation	8		
Rock or Shell Rubble			
Sand	70		
Mud / Muck / Silt			
Other			
Other			

WATER QUALITY

	Depth (M)	Temp. (°C)	pH (SU)	D.O. (MG/L)	Cond. (UMHO/CM)	Salinity (PPT)	SECCHI (M)
Top:							
Mid-Depth:	0.2	18.42	7.61	4.12	964		☐ VOB
Bottom:							

Water Surface Oils: ☒ None ☐ Sheen ☐ Globs ☐ Slick

Water Odors: ☒ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Other (Specify):

Water Sample Taken ? ☐ Yes ☒ No

Algae Sample Taken ? ☐ Yes ☒ No

SYSTEM TYPE ☒ Stream ☐ Lake ☐ Wetland ☐ Estuary ☐ Other (Specify):

Clarity: ☒ Clear ☐ Slightly Turbid ☐ Turbid ☐ Opaque

Color: ☒ Tannic ☐ Green (Algae) ☐ Clear ☐ Other (Specify):

WEATHER CONDITIONS / NOTES:

ABUNDANCE

	Absent	Rare	Common	Abundant
Periphyton:	☐	☐	☒	☐
Fish:	☐	☐	☒	☐
Aquatic Macrophytes:	☐	☐	☒	☐
Iron/Sulfur Bacteria:	☒	☐	☐	☐

☐ The antecedent hydrologic conditions have been met to my best knowledge.

Water samples preserved ? ☐ Yes ☐ pH<2 ☐ No Algae samples preserved ? ☐ Yes ☐ No

SAMPLING TEAM: Jackie Champion | Melani Dickenson | SIGNATURE: | DATE: 3/7/11

Revision Date: September 5, 2008

DEP-SOP-001/01: Form FD 9000-5
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): 3/7/11	RECEIVING BODY OF WATER: South Prong Alafia
REMARKS:	COUNTY: Polk	LOCATION: Control Site New Wales Dr.		FIELD ID/NAME: South Prong @37 bridge

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 18	Four or more productive habitats present [snags, tree roots, 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 20	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 20 Primary Score ~~20~~ 70	Adequate number of pools (1-2 per 12 times width) and <25% of habitats affected by sand or silt accumulation. 20 19 18 17 16	Adequate number of pools (1-2 per 12 times width) and >25% of habitats affected by sand or silt accumulation. 15 14 13 12 11	Does not have required number of pools (1-2 per 12 times width) and/or has shallow pools (<2 times prevailing depth). 10 9 8 7 6	Pools are absent. Most habitats affected by sand or silt accumulation. 5 4 3 2 1
Secondary Habitat Components **Artificial Channelization** 20	Good sinuosity. No evidence of dredging or artificial straightening. No spoil banks. Diversity of depths. 20 19 18 17 16	Good sinuosity within old channelized area and a diversity of depths. Evidence of dredging in the past (>10 yrs) but mostly recovered. 15 14 13 12 11	Some sinuosity developed within channelized area or some diversity of depth, but typically no pools (>2 times prevailing depth) present. 10 9 8 7 6	Straightened with spoil banks. Box-cut, monotypic depth. 5 4 3 2 1
Bank Stability Right Bank 9 Left Bank 9	Bankfull > 60% of bank height. Slope of bank < 60°. Bankfull is within or above the root zone with few raw, eroded areas. 10 9	Only meets 2 of the 3 requirements for optimal bank stability. 8 7 6	Only meets 1 of the 3 requirements for optimal bank stability. 5 4	Bankfull < 60% of bank height. Slope of bank > 60°. Bankfull is below the root zone with raw, eroded areas. 3 2 1
Riparian Buffer Zone Width Right Bank 10 Left Bank 10	Width of vegetation greater than 18 m 10 9	Width of vegetation >12 to 18m 8 7 6	Width of vegetation 6 to 12 m. human activities still close to system 5 4	Less than 6 m of buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 10 Left Bank 10 Secondary Score 78	Over 80% of riparian surfaces consist of normal, expected plant community for given sunlight & habitat conditions (e.g., native plants, trees, understory shrubs, or non-woody macrophytes). Minimal disturbance. 10 9	>50% to 80% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Some disruption in community observed. 8 7 6	25% to 50% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). 3 2 1

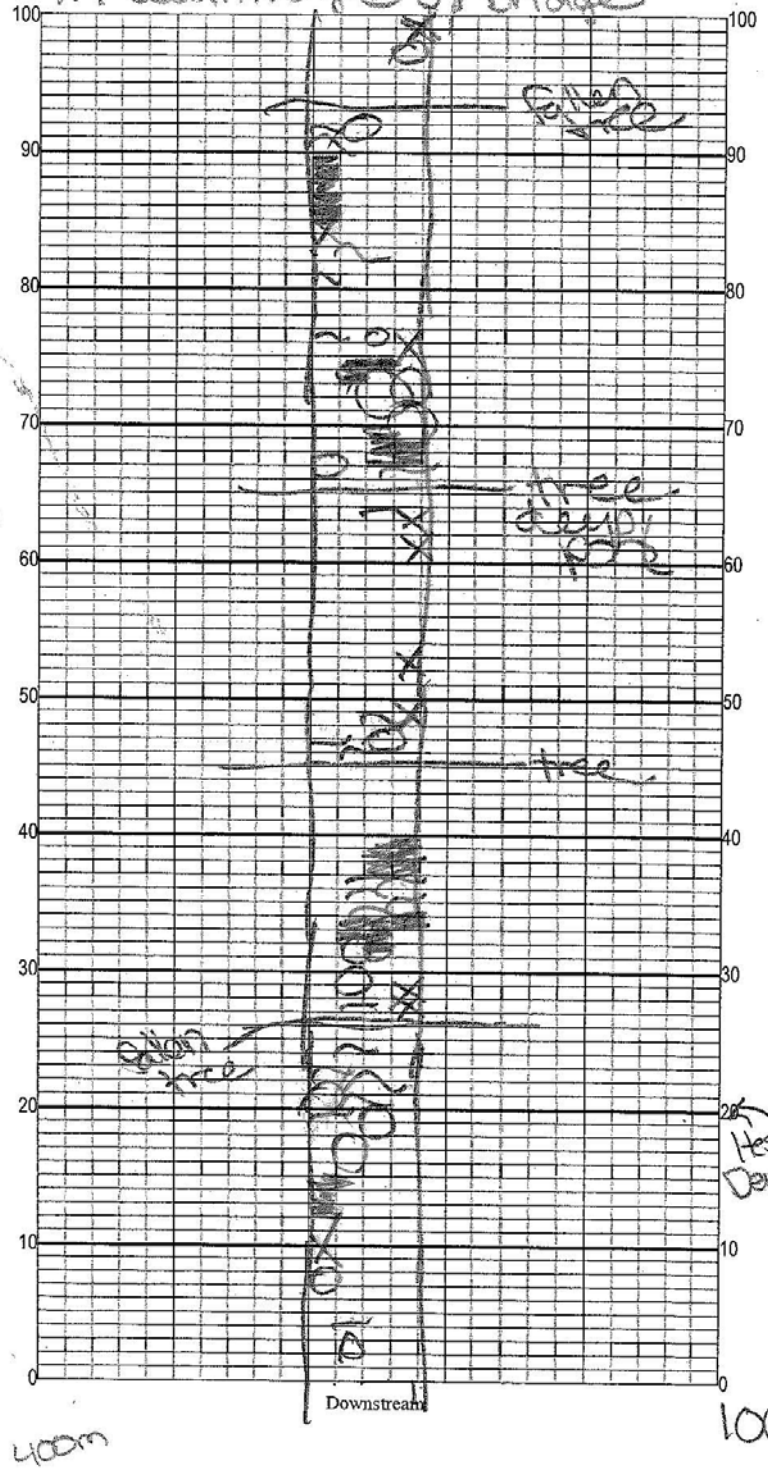
148 **TOTAL SCORE**

Date: 3/7/11	Analyst: Jachi Champion	Signature: Jachi Champion

Form FD 9000-5 Revision Date: June 6, 2008

New Wales D-006
Control Site
in South Prong @ 37 bridge

DEP-SOP-001/01 Form FD 9000-4
Stream/River Habitat Sketch Sheet



Substrates: Code key, draw proportionate habitat abundance.	
Snags	$\frac{40}{400} = 10$
Roots/undercut banks	$\frac{19}{400} = 5$
Leaf Packs (or mats)	$\frac{27}{400} = 7$
Aquatic Macrophytes hydrilla	$\frac{30}{400} = 8$
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.	

0m-
N27°46'01.4"
W 81°59'25.3"
HD's
N27°46'02.7"
W81°59'26.4"
100m- N27°46'04.4"
W81°59'25.5"

Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).

Revision Date: September 10, 2008

DEP-SOP-001/01: Form FD 9000-3

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SAMPLE ID : _____ ORG ID : _____

COUNTY : Polk STORET # : _____

DATE : 3/7/11 TIME : _____

Latitude : N 27 (degrees) 45 (minutes) 32.2 (seconds) | Longitude : W 82 (degrees) 00 (minutes) 17.3 (seconds)

SITE NAME : P-006 New Woles SAMPLE COMPLETE ? _____

FIELD ID/NAME : Downstream-S.P. Alafia RECEIVING BODY OF WATER : South Prong Alafia

RIPARIAN ZONE / STREAM FEATURES

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

Forest/Natural | silviculture | Field/Pasture X | Agricultural | Residential | Commercial | Industry | Other (Specify) reclaimed mine areas

Local Watershed Erosion (select one) : ☐ None ☐ Slight ☐ Moderate ☐ Heavy

Local Watershed NPS Pollution : ☐ No evidence ☐ Slight ☐ Moderate ☐ Heavy

Width of Riparian Vegetation (m) on Each Buffer Side

Left Bank : 718 Right Bank : 718

High Water Mark: 1.5 (m) + 0.5 (above present water level) = 2.0 (present depth) (above bed)

Artificially Impounded ☐ Yes ☒ No

Typical Width (m) Depth (m)/Velocity (m/sec) Transect

5 m wide

0.7 m/s | 0.5 m/s | 0.7 m/s

0.2 m deep | 0.5 m deep | 0.2 m deep

Artificially Channelized : ☒ No ☐ Some recovery ☒ Mostly recovered, more sinuous ☐ Recent, severe

Canopy Cover % : ☐ Open ☒ Lightly Shaded (11-45%) ☐ Heavily Shaded ☐ Moderate Shaded (46-80%)

SEDIMENT / SUBSTRATE

Sediment Oils ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Sediment Odors ☒ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other (Specify) :

Sediment Deposition ☐ Sludge Sand Smothering : None / Slight / Moderate / Severe Silt Smothering : None / Slight / Moderate / Severe ☐ Other (Specify) :

SUBSTRATE TYPE

Assessment Tool: ☒ SCI ☐ BioRecon ☐ LCI ☐ LVI

	% Coverage	INVERT # Times Sampled	PERI # Times Sampled
Woody Debris (Snags)	6		
Undercut Banks / Roots	3		
Leaf Packs or Mat			
Aquatic Vegetation			
Rock or Shell Rubble	30		
Sand.....	5		
Mud / Muck / Silt			
Other ..Rock	10		
Other			

WATER QUALITY

	Depth (M)	Temp. (°C)	pH (SU)	D.O. (MG/L)	Cond. (UMHO/CM)	Salinity (PPT)	SECCHI (M)
Top :							
Mid-Depth :	0.5	19.68	7.21	8.56	1,096		☐ VOB
Bottom :							

Water Surface Oils : ☒ None ☐ Sheen ☐ Globs ☐ Slick

Water Odors : ☒ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Other (Specify) :

Water Sample Taken ? ☐ Yes ☐ No

Algae Sample Taken ? ☐ Yes ☐ No

SYSTEM TYPE ☒ Stream ☐ Lake ☐ Wetland ☐ Estuary ☐ Other (Specify) :

Clarity ☒ Clear ☐ Slightly Turbid ☐ Turbid ☐ Opaque — Aquashade from sunscreen

Color ☐ Tannic ☐ Green (Algae) ☒ Clear ☐ Other (Specify) :

WEATHER CONDITIONS / NOTES :

ABUNDANCE

	Absent	Rare	Common	Abundant
Periphyton :	☐	☐	☒	☐
frogs Fish :	☐	☐	☒	☐
Aquatic Macrophytes :	☐	☒	☐	☐
Iron/Sulfur Bacteria :	☒	☐	☐	☐

☐ The antecedent hydrologic conditions have been met to my best knowledge.

Water samples preserved ? ☐ Yes ☐ pH<2 ☐ No Algae samples preserved ? ☐ Yes ☐ No

SAMPLING TEAM : Jacki Champion / Melani Dickerson SIGNATURE : Jacquelyn Champion DATE : 3/7/11

Revision Date: September 5, 2006

DEP-SOP-001/01: Form FD 9000-5
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): 3/7/11	RECEIVING BODY OF WATER: South Prong Alafia
REMARKS:	COUNTY: Polk	LOCATION: New Wales Test Site		FIELD ID/NAME: Downstream D-006

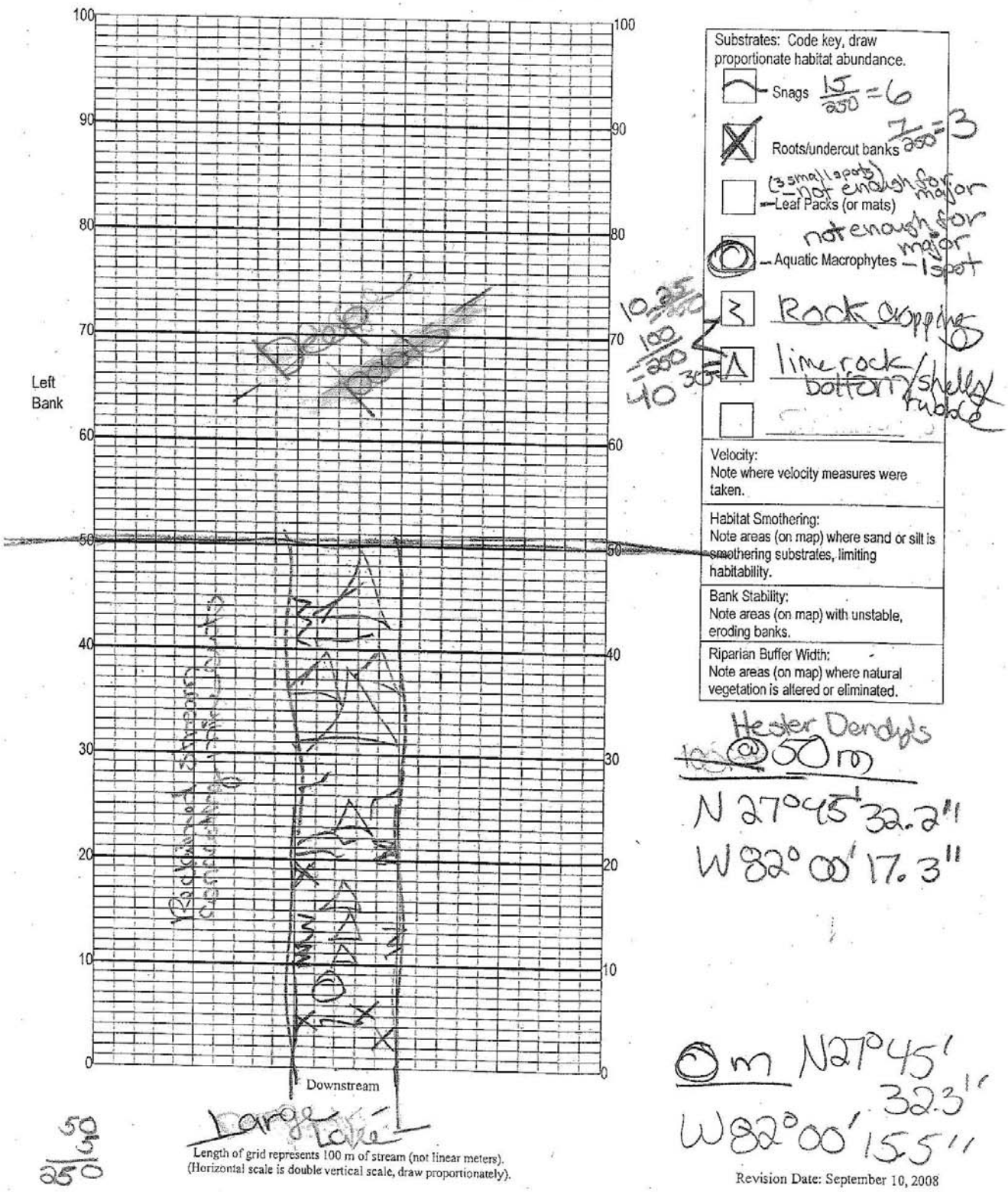
Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** 15	Four or more productive habitats present [snags, tree roots, aquatic vegetation, leaf packs (partially decayed), rock] 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates 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 20	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 18	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 18 Primary Score 71	Adequate number of pools (1-2 per 12 times width) and <25% of habitats affected by sand or silt accumulation. 20 19 18 17 16	Adequate number of pools (1-2 per 12 times width) and >25% of habitats affected by sand or silt accumulation. 15 14 13 12 11	Does not have required number of pools (1-2 per 12 times width) and/or has shallow pools (<2 times prevailing depth). 10 9 8 7 6	Pools are absent. Most habitats affected by sand or silt accumulation. 5 4 3 2 1
Secondary Habitat Components **Artificial Channelization** 13	Good sinuosity. No evidence of dredging or artificial straightening. No spoil banks. Diversity of depths. 20 19 18 17 16	Good sinuosity within old channelized area and a diversity of depths. Evidence of dredging in the past (>10 yrs) but mostly recovered. 15 14 13 12 11	Some sinuosity developed within channelized area or some diversity of depth, but typically no pools (>2 times prevailing depth) present. 10 9 8 7 6	Straightened with spoil banks. Box-cut, monotypic depth. 5 4 3 2 1
Bank Stability Right Bank 9 Left Bank 6	Bankfull > 60% of bank height. Slope of bank ≤ 60°. Bankfull is within or above the root zone with few raw, eroded areas. 10 9	Only meets 2 of the 3 requirements for optimal bank stability. 8 7 6	Only meets 1 of the 3 requirements for optimal bank stability. 5 4	Bankfull < 60% of bank height. Slope of bank > 60°. Bankfull is below the root zone with raw, eroded areas. 3 2 1
Riparian Buffer Zone Width Right Bank 10 Left Bank 10	Width of vegetation greater than 18 m 10 9	Width of vegetation >12 to 18m 8 7 6	Width of vegetation 6 to 12 m. human activities still close to system 5 4	Less than 6 m of buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 6 Left Bank 6 Secondary Score 60	Over 80% of riparian surfaces consist of normal, expected plant community for given sunlight & habitat conditions (e.g., native plants, trees, understory shrubs, or non-woody macrophytes). Minimal disturbance. 10 9	>50% to 80% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Some disruption in community observed. 8 7 6	25% to 50% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). 3 2 1

131 **TOTAL SCORE**

Date: 3/7/11	Analyst: Jodi Champion	Signature: Jacquelyn Champion

Form FD 9000-5 Revision Date: June 6, 2008

DEP-SOP-001/01 Form FD 9000-4
Stream/River Habitat Sketch Sheet



Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).

Revision Date: September 10, 2008

Appendix G
Chemical analysis of effluent and receiving water

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units_Word_Result	MDL	PQL
4/4/2011 12:35	Control Site	AGP/LN	Algal Growth Potential	19.2		mg DryWt/L	0.3	0.9
4/4/2011 12:35	Control Site	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	21		ug/L	0.55	1.7
4/4/2011 12:35	Control Site	Chlorophyll/Grain Size/BOD	Phaeophytin-a	4.4		ug/L	0.4	1.2
4/4/2011 12:35	Control Site	Field Parameter	Dissolved Oxygen	2.07		mg/L		
4/4/2011 12:35	Control Site	Field Parameter	pH	7.27				
4/4/2011 12:35	Control Site	Field Parameter	Sample Depth	0.3		m		
4/4/2011 12:35	Control Site	Field Parameter	Specific Conductance	614		umhos/cm		
4/4/2011 12:35	Control Site	Field Parameter	Temperature	22.55		C		
4/4/2011 12:35	Control Site	Nutrients	Ammonia-N	0.19		mg N/L	0.01	0.02
4/4/2011 12:35	Control Site	Nutrients	Fluoride	2.2		mg F/L	0.035	0.1
4/4/2011 12:35	Control Site	Nutrients	Kjeldahl Nitrogen	2.4		mg N/L	0.08	0.2
4/4/2011 12:35	Control Site	Nutrients	NO2NO3-N	0.028		mg N/L	0.004	0.01
4/4/2011 12:35	Control Site	Nutrients	O-Phosphate-P	1.8		mg P/L	0.08	0.2
4/4/2011 12:35	Control Site	Nutrients	Sulfate	110		mg SO4/L	1	2.5
4/4/2011 12:35	Control Site	Nutrients	Total-P	2.3		mg P/L	0.025	0.25
4/4/2011 10:00	Effluent	AGP/LN	Algal Growth Potential	20.2	A	mg DryWt/L	0.3	0.9
4/4/2011 10:00	Effluent	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	6.4	A	mg/L	0.2	2
4/4/2011 10:00	Effluent	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	90		ug/L	0.92	2.8
4/4/2011 10:00	Effluent	Chlorophyll/Grain Size/BOD	Phaeophytin-a	9.3		ug/L	0.67	2
4/4/2011 10:00	Effluent	Field Parameter	Dissolved Oxygen	9.35		mg/L		
4/4/2011 10:00	Effluent	Field Parameter	pH	7.38				
4/4/2011 10:00	Effluent	Field Parameter	Specific Conductance	1168		umhos/cm		
4/4/2011 10:00	Effluent	Field Parameter	Temperature	23.61		C		
4/4/2011 10:00	Effluent	Metals	Aluminum	138		ug/L	5	20
4/4/2011 10:00	Effluent	Metals	Arsenic	1.02		ug/L	0.25	1
4/4/2011 10:00	Effluent	Metals	Cadmium	0.05	U	ug/L	0.05	0.2
4/4/2011 10:00	Effluent	Metals	Calcium	102		mg/L	0.075	0.3
4/4/2011 10:00	Effluent	Metals	Chromium	0.3	U	ug/L	0.3	1.2
4/4/2011 10:00	Effluent	Metals	Copper	0.5	U	ug/L	0.5	1
4/4/2011 10:00	Effluent	Metals	Iron	34	I	ug/L	30	120
4/4/2011 10:00	Effluent	Metals	Lead	0.2	U	ug/L	0.2	0.8
4/4/2011 10:00	Effluent	Metals	Magnesium	50		mg/L	0.04	0.16
4/4/2011 10:00	Effluent	Metals	Nickel	0.52	I	ug/L	0.25	1
4/4/2011 10:00	Effluent	Metals	Selenium	0.22	I	ug/L	0.2	0.8
4/4/2011 10:00	Effluent	Metals	Silver	0.025	U	ug/L	0.025	0.1
4/4/2011 10:00	Effluent	Metals	Sodium	99.4		mg/L	0.5	2
4/4/2011 10:00	Effluent	Metals	Zinc	5	U	ug/L	5	20
4/4/2011 10:00	Effluent	Nutrients	Alkalinity	188		mg CaCO3/L	0.65	2.5
4/4/2011 10:00	Effluent	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units_Word_Result	MDL	PQL
4/4/2011 10:00	Effluent	Nutrients	Chloride	24		mg Cl/L	2	5
4/4/2011 10:00	Effluent	Nutrients	Fluoride	3.6		mg F/L	0.035	0.1
4/4/2011 10:00	Effluent	Nutrients	Kjeldahl Nitrogen	1.9		mg N/L	0.08	0.2
4/4/2011 10:00	Effluent	Nutrients	NO2NO3-N	0.029		mg N/L	0.004	0.01
4/4/2011 10:00	Effluent	Nutrients	O-Phosphate-P	0.35		mg P/L	0.02	0.05
4/4/2011 10:00	Effluent	Nutrients	Sulfate	410		mg SO4/L	2	5
4/4/2011 10:00	Effluent	Nutrients	TDS	787		mg/L	15	60
4/4/2011 10:00	Effluent	Nutrients	Total-P	0.57		mg P/L	0.005	0.05
4/4/2011 10:00	Effluent	Nutrients	TSS	12	I	mg/L	4	16
4/4/2011 10:00	Effluent	Nutrients	Turbidity	6.8		NTU	0.1	0.1
4/4/2011 10:00	Effluent	Overflow	Alpha, Total	2.6	U	pCi/L	2.6	
4/4/2011 10:00	Effluent	Overflow	Alpha-Counting Error	1.7		pCi/L		
4/4/2011 10:00	Effluent	Overflow	Oil and Grease	1.4	U	mg/L	1.4	5
4/4/2011 10:00	Effluent	Overflow	Radium 226	0.6		pCi/L	0.2	
4/4/2011 10:00	Effluent	Overflow	Radium 226-Counting Error	0.2		pCi/L		
4/4/2011 10:00	Effluent	Overflow	Radium 228	0.8	U	pCi/L	0.8	
4/4/2011 10:00	Effluent	Overflow	Radium 228-Counting Error	0.5		pCi/L		
4/4/2011 10:00	Effluent	Toxicology	Bioassay-Acute-Def-FW-C.dubia, LC50	100	L	LC50		
4/4/2011 10:00	Effluent	Toxicology	Bioassay-Acute-Def-FW-Fish, LC50	100	L	LC50		
4/4/2011 9:45	Equipment Blank	Metals	Aluminum	5	U	ug/L	5	20
4/4/2011 9:45	Equipment Blank	Metals	Arsenic	0.25	U	ug/L	0.25	1
4/4/2011 9:45	Equipment Blank	Metals	Cadmium	0.05	U	ug/L	0.05	0.2
4/4/2011 9:45	Equipment Blank	Metals	Calcium	0.075	U	mg/L	0.075	0.3
4/4/2011 9:45	Equipment Blank	Metals	Chromium	0.3	U	ug/L	0.3	1.2
4/4/2011 9:45	Equipment Blank	Metals	Copper	0.5	U	ug/L	0.5	1
4/4/2011 9:45	Equipment Blank	Metals	Iron	30	U	ug/L	30	120
4/4/2011 9:45	Equipment Blank	Metals	Lead	0.2	U	ug/L	0.2	0.8
4/4/2011 9:45	Equipment Blank	Metals	Magnesium	0.04	U	mg/L	0.04	0.16
4/4/2011 9:45	Equipment Blank	Metals	Nickel	0.25	U	ug/L	0.25	1
4/4/2011 9:45	Equipment Blank	Metals	Selenium	0.2	U	ug/L	0.2	0.8
4/4/2011 9:45	Equipment Blank	Metals	Silver	0.025	U	ug/L	0.025	0.1
4/4/2011 9:45	Equipment Blank	Metals	Sodium	0.5	U	mg/L	0.5	2
4/4/2011 9:45	Equipment Blank	Metals	Zinc	5	U	ug/L	5	20
4/4/2011 9:45	Equipment Blank	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
4/4/2011 9:45	Equipment Blank	Nutrients	Chloride	0.2	U	mg Cl/L	0.2	0.5
4/4/2011 9:45	Equipment Blank	Nutrients	Fluoride	0.035	U	mg F/L	0.035	0.1
4/4/2011 9:45	Equipment Blank	Nutrients	Kjeldahl Nitrogen	0.08	U	mg N/L	0.08	0.2
4/4/2011 9:45	Equipment Blank	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
4/4/2011 9:45	Equipment Blank	Nutrients	O-Phosphate-P	0.004	U	mg P/L	0.004	0.01
4/4/2011 9:45	Equipment Blank	Nutrients	Sulfate	0.2	U	mg SO4/L	0.2	0.5
4/4/2011 9:45	Equipment Blank	Nutrients	Total-P	0.004	U	mg P/L	0.004	0.01
4/4/2011 9:45	Equipment Blank	Overflow	Alpha, Total	0.7	U	pCi/L	0.7	

Date_Sampled	UDL	SCH_Group	Component	Value	Qualifier	Units_Word_Result	MDL	PQL
4/4/2011 9:45	Equipment Blank	Overflow	Alpha-Counting Error	0.4		pCi/L		
4/4/2011 9:45	Equipment Blank	Overflow	Oil and Grease	1.4	U	mg/L	1.4	5
4/4/2011 9:45	Equipment Blank	Overflow	Radium 226	0.2	U	pCi/L	0.2	
4/4/2011 9:45	Equipment Blank	Overflow	Radium 226-Counting Error	0.1		pCi/L		
4/4/2011 9:45	Equipment Blank	Overflow	Radium 228	0.9	U	pCi/L	0.9	
4/4/2011 9:45	Equipment Blank	Overflow	Radium 228-Counting Error	0.6		pCi/L		
4/4/2011 11:35	Test Site	AGP/LN	Algal Growth Potential	21.7		mg DryWt/L	0.3	0.9
4/4/2011 11:35	Test Site	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	36		ug/L	0.55	1.7
4/4/2011 11:35	Test Site	Chlorophyll/Grain Size/BOD	Phaeophytin-a	8.3		ug/L	0.4	1.2
4/4/2011 11:35	Test Site	Field Parameter	Dissolved Oxygen	5.68		mg/L		
4/4/2011 11:35	Test Site	Field Parameter	pH	7.41				
4/4/2011 11:35	Test Site	Field Parameter	Sample Depth	0.3		m		
4/4/2011 11:35	Test Site	Field Parameter	Specific Conductance	816		umhos/cm		
4/4/2011 11:35	Test Site	Field Parameter	Temperature	23.04		C		
4/4/2011 11:35	Test Site	Nutrients	Ammonia-N	0.12		mg N/L	0.01	0.02
4/4/2011 11:35	Test Site	Nutrients	Fluoride	2.7		mg F/L	0.035	0.1
4/4/2011 11:35	Test Site	Nutrients	Kjeldahl Nitrogen	2.1		mg N/L	0.08	0.2
4/4/2011 11:35	Test Site	Nutrients	NO2NO3-N	0.06		mg N/L	0.004	0.01
4/4/2011 11:35	Test Site	Nutrients	O-Phosphate-P	1.3		mg P/L	0.08	0.2
4/4/2011 11:35	Test Site	Nutrients	Sulfate	210		mg SO4/L	1	2.5
4/4/2011 11:35	Test Site	Nutrients	Total-P	1.6		mg P/L	0.025	0.25

FDEP Biology Laboratory - Acute Bioassay Bench Sheets

Facility: Mosaic fertilizer, LLC, New Wales Concentrate
Address : 3095 State Road 640, Mulberry, FL 33860-1100
City: Mulberry **County:** Polk
Contact/District: Jacki champion / ~~BPM~~ - South west BMR sm for MF
NPDES Permit #: FL 0036421
LIMS Job #: TLH-2011-04-05-71 **LIMS Sample #:** 1340678
Lims Data Entry: 4-21-11 MF **Data Entry Verification:** 4.22.11 BA

Sample Collection: Date: 4.4.11 Time: 1000
Hold Time Start: Date: 4.4.11 Time: 1000

Comments:
this sample/test collected for chronic freshwater testing. Due to problem with reproduction in C. dubia chronic culture, the chronic test could not be run. An ~~acute~~ MF test was set up after consultation with Ms. champion. 4-5-11 MF
4-6-11 MF Second sample for the chronic tests ~~were~~ was sm for MF not collected due to a problem with the sampler (auto sampler) fish chronic test. ~~4/5/11~~ MF set up as chronic but changed to acute @ 24hrs per communication with Ms. Champion.

Initial sample handling:
Instructions: Check yes or no. If yes is checked, complete blanks

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:
Instructions: Check yes or no. Fill in temperatures.

Temperature: Shipped ≤ 6°C ☑ Yes ☐ No — IF Hand Delivered: Cooling ☐ Yes ☐ No (received ____°C collected____°C)
Holding Time: ≤ 36 Hours ☑ Yes ☐ No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Investigators' Signatures:	Initials:
Kala Cox	KC
Mandy Fairchild	MF
Bruce Akin	BA
James Daniels	JD
REVIEWER: Liz Miller	

Diluent/Control Batch#:	3.28.11								
Water Quality Parameters	20% DMW	Well Water	Moderately Hard Water	Salt Water ASW NSW Test 1	Salt Water ASW NSW Test 2	Other:	Original Sample	Measured by	Verified by
Field Total Residual Cl_2 (mg/L):	N/A	N/A	N/A	N/A	N/A	N/A	not measured		KC
Lab Total Residual Cl_2 (mg/L):	<0.03						0.05	JD/KC	KC
Alkalinity (mg/L as $CaCO_3$):	80						210	KC	KC
Hardness (mg/L as $CaCO_3$):	85						459	KC	KC
Total Ammonia (mg/L as N):	~~<0.03~~ (A)						<0.017	BA	KC
Conductivity: ☑ µmhos ☐ mmhos	174						1191	KC	KC
Salinity (ppth):	—						0.58	JD	KC

V 1.8 1/13/10

(A) <0.017 KC

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample # 1340678 SOP#: TA 07 01 Test # 1 of 1

Test Species:
Batch #: 4.5.11 Age: <24hrs.
- [x] *Ceriodaphnia dubia*
- [ ] *Cyprinella leedsi*
- [ ] *Pimephales promelas*
- [ ] *Menidia beryllina*
- [ ] *Americamysis bahia*
- [ ] Other:_____

Test Validation
Control Survival ≥ 90%: [x] Yes [ ] No
Temperature Range ≤ 3° C: [x] Yes [ ] No

Diluent (Batch # 3.28.11)
[ ] ASW [x] 20% DMW
[ ] MHW [ ] Well

Test Type: [x] Acute [ ] Definitive [x] Static [ ] Static Renewal [ ] Flow-Through

Test Duration: [x] 48 hr [x] 96 hr [ ] ___hr

Test Started: Date 4.5.11 Time 1500

Test Ended: Date 4.7.11 Time 2500PM

Chamber Size 30 ml
Test Volume: 20 ml

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			
6.25%	A	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5	5			
	D	D	5	5	4D			
12.5%	A	A	5	5	3D			
	B	B	5	5	5			
	C	C	5	5	3D			
	D	D	5	5	5			
25%	A	A	5	5	5			
	B	B	5	5	3D			
	C	C	5	5	4D			
	D	D	5	5	4D			
50%	A	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5	4D			
	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	4D			
Checked or Verified by:			KC	MF	KC			

Food
- [x] YCT Batch# 2.11.11 & 11.17.10
- [x] P. subcapitata Batch# 1.25.11
- [ ] Artemia Lot#_____

Feeding and Artemia Batch #
- [x] 0 hr___ [x] Prior to Test
- [ ] 24 hr___
- [ ] 48 hr___ [ ] Prior to Renewal
- [ ] 72 hr___

Temperature Range (°C)
Incubator # 2
min. 25.4 max. 27.4 mean ___
Incubator #___
min.___ max.___ mean___
Waterbath #___
min.___ max.___ mean___
Room B246
min. 22.3 max. 23.0 mean ___
Light intensity (ft. candles): 50-100
Photoperiod (hours): 16 light, 8 dark

Loaded/ Verified by: MF / KC
m = missing, d = dead, BR/AR Before/ After Renewal

Test Results:
Screening Tests: Report LC50 as >100%, =100%, or <100%.
% mortality in 100% sample: 5 LC50: >100%
Calculated LC50 (Definitive) 95% CI_____ Method_____

Comments:

V. 2.5 1-13-10

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

Page 000020

FDEP Biology Laboratory - Bioassay Parameter Sheet

LIMS Sample # 1340678 Test # 1 of 1

Test Species:

☑ *Ceriodaphnia dubia* ☐ *Pimephales promelas* ☐ *Americamysis bahia*
☐ *Cyprinella leedsi* ☐ *Menidia beryllina* ☐ Other:_____

Test aerated: (if DO is < 4.0 mg/L)
☐ Yes ☑ No

Concentration	Replicate	Test Hour	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity ☑ µmhos ☐ mmhos	Salinity* (ppth)
Ctrl.	M	0 hr	8.0	24.1	8.3	174	
		24 hr	—	—	—	—	
	A	48 hr BR	8.0	24.0	8.0	186	
		48 hr AR					
		72 hr					
		96 hr					
6.25%	M	0 hr	8.0	24.6	8.2	248	
		24 hr	—	—	—	—	
	A	48 hr BR	8.2	24.0	8.1	281	
		48 hr AR					
		72 hr					
		96 hr					
12.5%	M	0 hr	8.0	24.5	8.3	320	
		24 hr	—	—	—	—	
	A	48 hr BR	8.3	24.0	8.4	358	
		48 hr AR					
		72 hr					
		96 hr					
25%	M	0 hr	8.0	24.7	8.7	457	
		24 hr	—	—	—	—	
	A	48 hr BR	8.4	24.0	8.4	496	
		48 hr AR					
		72 hr					
		96 hr					
50%	M	0 hr	8.0	24.7	8.8	709	
		24 hr	—	—	—	—	
	A	48 hr BR	8.5	24.0	8.4	723	
		48 hr AR					
		72 hr					
		96 hr					
100%	M	0 hr	7.9	25.1	8.8	1191	
		24 hr	—	—	—	—	
	A	48 hr BR	8.5	24.0	8.4	1296	
		48 hr AR					
		72 hr					
		96 hr					
		0 hr					
		24 hr					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					
		0 hr					
		24 hr					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					

*Measure/ record salinity for marine tests

Comments:

Measured By:
0 hr: KC
24 hr: —
48 hr BR: KC
48 hr AR:
72 hr:
96 hr:

Test ID: New Wales Mosaic Acute Bioassay Dates: 4.5.11 – 4.7.11

METER / DEVICE	ID	SOP	Parameter	Method	v used
YSI Model 58 Dissolved Oxygen Meter	90H018262	TA06_04	Dissolved Oxygen	SM 4500 O G	✓
YSI DO Probe	5905	TA06_04	Dissolved Oxygen	SM 4500 O G	✓
Accumet AR-10 pH Meter	93312105	TA06_23	pH	SM 4500 H+	✓
Mettler-Toledo SevenMulti Conductivity Meter	SN 1225117049 Probe H04257	TA06_25	Conductivity Salinity	SM 2510 B SM 2520 B	✓
Denver Model 225 ISE with ammonia probe	SN K01377	TA06_17	Ammonia	SM 4500 NH3 F	✓
Traceable Thermometer	#1-SN101686412 #2-SN221295527 #3-SN240116020 #4-SN80361795 (#5 SN61990624	TA06_05	Temperature	SM-2530B modified DEP SOP-001/01 FT1400	✓ #5
Hach Pocket Colorimeter II	05050C026378	TA06_22	Total Residual Chlorine	EPA 330.5 SM 4500 CL G	✓
Alkalinity (Hach Kit)	No SN	TA06_08	Alkalinity	SM 2320 B	✓
Hardness (Hach Kit)	No SN	TA06_09	Hardness	SM 2340 C	✓
OHAUS Balance 250D	1125481084	TA06_21 TA06_27	Weight	-	
S-Weights	BIO-S-WEIGHTS-01	NA	Balance check	-	

SM-2530B modified to allow use of electronic and non-mercury filled thermometers.

Insert other device information in blank spaces(if used). Test ID = Facility or SRTs (acute SRT--Chronic SRT)

Kara Cox 4.11.11

V 1.1 9/21/10 MF/jd

000024

FDEP Biology Laboratory - Chronic Bioassay Bench Sheet

Pimphales promelas or Menidia beryllina

Facility: Mosaic Fertilizer LLC. New Wales Constructs, Test Species (circle one)
Address: 3095 State Road 640, Mulberry, FL 33860-1100
County: Polk
NPDES Permit #: FL 0036421
Contact/District: Jacki Champion / BPM - South west

(P. promelas) SOP#: TA07_09 EPA-821-R-02-013 Method 1000.0
M. beryllina SOP#: TA07_14 EPA-821-R-02-014 Method 1006.0

Start Date: 4.5.11 Time: 1315
End Date: ~~4.6.11~~ 4.7.11 Time: ~~1400~~ 1100 KC

Diluent/ Batch:
MHW / 3-30-11 Test Days Used: 0-2
MHW / _____ Test Days Used: _____
ASW / _____ Test Days Used: _____
ASW / _____ Test Days Used: _____

Organism age : <24 hrs. ~~days~~ KC
Feeding Prior to Test and Daily
Artemia Lot # : 23613
Chamber size : 1000 ml
Test volume : 500 ml

Artemia Batch #	Day 3
Day 0 4-3-11	Day 4
Day 1 4-4-11	Day 5
Day 2	Day 6

Lims Entry 4-21-11 MF Verified: 4-21-11 BA

Sample Received	Lab Sample #	LIMS Job #	LIMS Sample #	Collection Date/Time	Received Date/Time
Test Day 0	1	TLH- 2011-04-05-71	1340678	4.4.11/1000	4.5.11/~~2.10.11~~ 13:50
Test Day 2	2	TLH-			
Test Day 4	3	TLH-			

Lm for KC

Water Quality Parameters	Field Chlorine (mg/L)			Lab Chlorine (mg/L)			Alkalinity (mg/L as $CaCO_3$)			Hardness (mg/L as $CaCO_3$)		
Lab Sample #:	1	2	3	1	2	3	1	2	3	1	2	3
Sample:	~~0.05~~ (A)			0.05			210			459		
Diluent/Control:				<0.03			79			88		
Method:	n/a			Hach	Hach	Hach	Hach	Hach	Hach	Hach	Hach	Hach
Measured by:	~~JD~~ KC			JD/KC			KC			KC		
Verified by:	KC			KC			KC			KC		

	Conductivity (circle one) (umhos-cm / mmhos-cm)			Ammonia (mg/L)			Salinity (ppth)		
Lab Sample#:	1	2	3	1	2	3	1	2	3
Sample:	1251			<0.017			0.58		
Diluent/Control:	~~325~~			<0.017			—		
Method:	Mettler	Mettler	Mettler	Denver	Denver	Denver	Mettler	Mettler	Mettler
Measured by:	JD			BA			JD		
Verified by:	KC			KC			KC		

Statistics	
Growth NOEC:	
Growth LOEC:	
Growth IC_{20}:	
Growth IC_{25}:	
Ctrl % CV:	
Dunnetts PMSD:	
Survival NOEC:	
Survival LOEC:	

Light Intensity : 50 - 100 ft. candles
Photoperiod : 16 light 8 dark
Temperature Range °C:
Incubator # 5 min. 24.2 max 26.3 mean —
Water bath # ____ min. _____ max. _____ mean _____
Room B246 min. 22.3 max. 23.0 mean —

Results entered as Acute Definitive 48 hour,
LC50 = >100%
No mortality in any concentration.
MF 4-21-11

Investigators' signatures
Jamie Daniel
Marshall Faircloth
Kara Coy
Bruce Neely
Liz Miller
REVIEWER

Comments: Second sample not collected due to auto sampler problem, test converted to a 48 hour duration ~~chronic~~ acute test per communication with Ms. Champion MF 4-6-11

(A) not measured -KC-

revised 08/24/06 MF/SP

Chronic Bioassay Survival Benchsheet

Facility: Mosaic New Wales

LIMS Sample Number: 1340678
(for Lab Sample # 1)

Department of Environmental Protection
Biology Laboratory Chronic Screening Bioassay
***P. promelas* SOP TA07_09 *M. beryllina* SOP TA07_14**

Organism: (*P. promelas*) *M.beryllina* (circle one)

		TEST DAY							
Concentration	Replicate	0	1	2	3	4	5	6	7
Control	A	10	10	10					
	B	10	10	10					
	C	10	10	10					
	D	10	10	10					
Sample 6.25 %	A	10	10	10					
	B	10	10	10					
	C	10	10	10					
	D	10	10	10					
Sample 12.5 %	A	10	10	10					
	B	10	10	10					
	C	10	10	10					
	D	10	10	10					
Sample 25 %	A	10	10	10					
	B	10	10	10					
	C	10	10	10					
	D	10	10	10					
Sample 50 %	A	10	10	10					
	B	10	10	10					
	C	10	10	10					
	D	10	10	10					
Sample 100 %	A	10	10	10					
	B	10	10	10					
	C	10	10	10					
	D	10	10	10					
Sample %	A	10							
	B	10							
	C	10							
	D	10							
Loaded by: JD	Checked by:		JD	JD					
Verified by: KC									

Comments:

Chronic Bioassay Parameters Benchsheet

P. promelas and M. beryllina SOP TA07_09 and TA-07_15 parameter pg. 1

Sample Source: MoSaic New Wales — Start Date: 4.5.11 — End Date: 4.7.11

LIMS Sample #: 1340678 (for Lab sample #1) — Start Time: 1315 — End Time: 1100

conc = concentration — rep = replicate — circle umhos or mmhos

Test Day			Before Renewal						After Renewal					
		Conc.	Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity (umhos) mmhos	Salinity ppth	Test Rep.	pH (su)	Temp (°C)	DO (mg/L)	Conductivity umhos mmhos	Salinity ppth
Day 0	sample:	Control	A	8.0	24.0	8.3	325							
	1	6.25%	A	8.0	24.0	8.4	394							
	1	12.5%	A	8.0	24.0	8.5	442							
	1	25%	A	8.0	24.0	8.6	569							
	1	50%	A	7.9	24.0	8.8	798							
	1	100%	A	7.8	24.0	8.9	1251							
	1		A											
	Measured by:			JD	JD	JD	JD							
	Recorded by:			JD	JD	JD	JD							
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 1	sample:	Control	B	7.8	25.4	7.8	343		B					
	1	6.25%	B	7.8	25.0	7.8	407		B					
	1	12.5%	B	7.9	25.0	7.7	451		B					
	1	25%	B	7.9	25.2	7.7	581		B					
	1	50%	B	8.1	25.4	7.8	793		B					
	1	100%	B	8.2	25.3	8.1	1218		B					
	1		B						B					
	Measured by:			JD	JD	JD	JD							
	Recorded by:			JD	JD	JD	JD							
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 2	sample:	Control	C	7.5	25.3	7.2	341		C					
	2	6.25%	C	7.6	25.3	7.2	417		C					
	2	12.5%	C	7.6	25.4	7.0	449		C					
	2	25%	C	7.9	25.4	7.2	572		C					
	2	50%	C	8.1	25.4	7.5	783		C					
	2	100%	C	8.5	25.4	8.5	1189		C					
	2		C						C					
	Measured by:			JD	JD	JD	JD							
	Recorded by:			JD	JD	JD	JD							
			Rep	pH	Temp	DO	Conductivity	Salinity	Rep	pH	Temp	DO	Conductivity	Salinity
Day 3	sample:	Control	D						D					
	2		D						D					
	2		D						D					
	2		D						D					
	2		D						D					
	2		D						D					
	2		D						D					
	2		D						D					
	Measured by:													
	Recorded by:													

Comments:

For salinity <1 ppth insert <1. For salinity > 1 ppth, conductivity measurement is not required if salinity probe is functional.

New Wales
KC

Test ID: Mosaic ~~ACUTE~~ ACUTE Dates: 4.5.11 - 4.7.11

METER / DEVICE	ID	SOP	Parameter	Method	v used
YSI Model 58 Dissolved Oxygen Meter	90H018262	TA06_04	Dissolved Oxygen	SM 4500 O G	✓
YSI DO Probe	5905	TA06_04	Dissolved Oxygen	SM 4500 O G	✓
Accumet AR-10 pH Meter	93312105	TA06_23	pH	SM 4500 H+	✓
Mettler-Toledo SevenMulti Conductivity Meter	SN 1225117049 Probe H04257	TA06_25	Conductivity Salinity	SM 2510 B SM 2520 B	✓
Denver Model 225 ISE with ammonia probe	SN K01377	TA06_17	Ammonia	SM 4500 NH3 F	✓
Traceable Thermometer	#1-SN101686412 #2-SN221295527 #3-SN240116020 #4-SN~~80361795~~ (#5) SN61990624	TA06_05	Temperature	SM-2530B modified DEP SOP-001/01 FT1400	✓ #5
Hach Pocket Colorimeter II	05050C026378	TA06_22	Total Residual Chlorine	EPA 330.5 SM 4500 CL G	✓
Alkalinity (Hach Kit)	No SN	TA06_08	Alkalinity	SM 2320 B	✓
Hardness (Hach Kit)	No SN	TA06_09	Hardness	SM 2340 C	✓
OHAUS Balance 250D	1125481084	TA06_21 TA06_27	Weight	-	✓ KC
S-Weights	BIO-S-WEIGHTS-01	NA	Balance check	-	

SM-2530B modified to allow use of electronic and non-mercury filled thermometers.

Insert other device information in blank spaces(if used). Test ID = Facility or SRTs (acute SRT--Chronic SRT)

V 1.1 9/21/10 MF/jd Kara Cox 4/11/11

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Appendix I

Standard Reference Toxicant Data

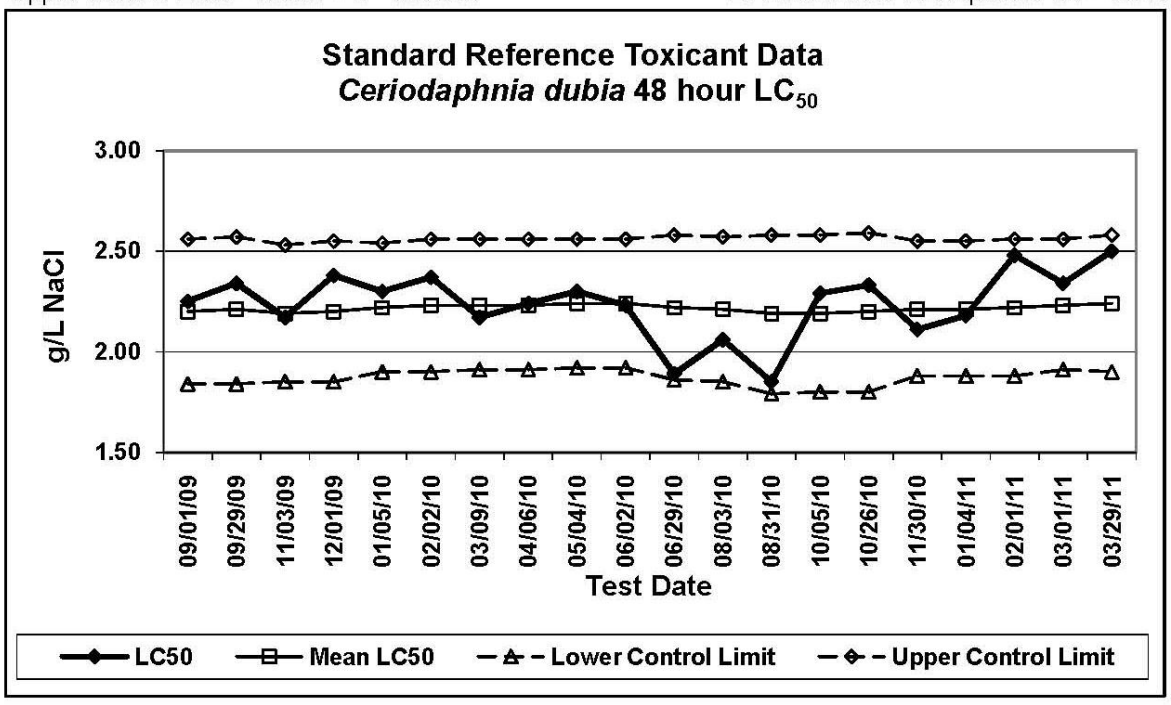
Florida Department of Environmental Protection
Bureau of Laboratories

Standard Reference Toxicant (SRT) Test Data - 48-hour Acute Toxicity
Ceriodaphnia dubia (water flea) - Sodium Chloride (NaCl)

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
09/01/09	2.25	2.20	0.18	1.84	2.56
09/29/09	2.34	2.21	0.18	1.84	2.57
11/03/09	2.17	2.19	0.17	1.85	2.53
12/01/09	2.38	2.20	0.17	1.85	2.55
01/05/10	2.30	2.22	0.16	1.90	2.54
02/02/10	2.37	2.23	0.17	1.90	2.56
03/09/10	2.17	2.23	0.16	1.91	2.56
04/06/10	2.24	2.23	0.16	1.91	2.56
05/04/10	2.30	2.24	0.16	1.92	2.56
06/02/10	2.23	2.24	0.16	1.92	2.56
06/29/10	1.89	2.22	0.18	1.86	2.58
08/03/10	2.06	2.21	0.18	1.85	2.57
08/31/10	1.85	2.19	0.20	1.79	2.58
10/05/10	2.29	2.19	0.20	1.80	2.58
10/26/10	2.33	2.20	0.20	1.80	2.59
11/30/10	2.11	2.21	0.17	1.88	2.55
01/04/11	2.18	2.21	0.17	1.88	2.55
02/01/11	2.48	2.22	0.17	1.88	2.56
03/01/11	2.34	2.23	0.16	1.91	2.56
03/29/11	2.50	2.24	0.17	1.90	2.58

Means are of the last 20 SRT tests.
Lower Control Limit = mean - 2 * Std Dev
Upper Control Limit = mean + 2 * Std Dev

CV = 7.51
EPA reference 75th quartile CV = 29%



FDEP Biology Laboratory - Acute SRT Bench Sheet

Method from EPA-821-R-02-012 except *H. azteca*

Test Organism: (check one)
- ☐ *Americamysis bahia* Method 2007.0 TA07.03
- ☐ *Menidia Beryllina* Method 2006.0 TA07.04
- ☐ *Hyalella azteca* Method 100.1 EPA-600-R-99-064
- ☑ *Ceriodaphnia dubia* Method 2002.0 TA07.01
- ☐ *Cyprinella leedsi* Method 2000.0 TA07.02
- ☐ *Pimephales promelas* Method 2000.0 TA07.02

Test Type: ☐ non-renewal ☑ renewal

Test Page 1 of 2

Diluent/ Batch #: DMW 13.19.11 **Organism Batch:** #3.29.11 **Test Beginning:** Date: 3.29.11 Time: 1000

Toxicant/ Batch#: NaCl 13.28.11 Age: <24hrs **Test Ending:** Date: 4.2.11 Time: 12:00

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	<0.03	TA06_22	JD
Alkalinity (mg/L as $CaCO_3$):	86	TA06_08	KC
Hardness (mg.L as $CaCO_3$):	92	TA06_09	KC
Total Ammonia (mg/L as N):	<0.017	TA06_17	MF
Conductivity (µmhos) mmhos	174	TA06_25	KC
Salinity (ppth):	—	TA06_25	—

Food:	Batch
☑ YCT	2.11.11
☑ *P. subcapitata*	1.25.11
☐ Artemia Lot #	

Artemia Batch:

0 hr:	
24 hr:	
48 hr:	
72 hr:	

Chamber size: 30 mL

Test volume: 20 mL per replicate

Concentrations prepared by: BA

Test Incubated in: Incubator # 2 Waterbath # ___

Temperature Range °C:(if used)

Incubator # 2 min. 26.6 max. 27.4 mean —

Waterbath # ___ min. ___ max. ___ mean ___

Room B246 min. 22.4 max. 24.4 mean —

Light Intensity: 50-100 Ft. candles

Photoperiod: 16 hours Light / 8 hours dark

Feeding: √ as needed
☑ Before test
☑ 0 hr
☐ 24 hr
☑ 48 hr
☐ 72 hr

all species 2 hrs prior to test

mysids daily

all species except *H. azteca* 2 hr prior to renewal

H. azteca 0 hr and 48 hr

Concentration µg/L mg/L (g/L)	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Control	A	A	5	5	5	5	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
1.5	A	A	5	5	5	5	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
2.0	A	A	5	5	4 1D	4	4	4
	B	B	5	5	5	5	5	5
	C	C	5	5	5	5	5	5
	D	D	5	5	5	5	5	5
2.5	A	A	5	5	4 1D	4	2 2D	1 1D
	B	B	5	5	4 1D	4	2 2D	1 1D
	C	C	5	5	3 2D	3	3	1 2D
	D	D	5	5	0 5D	—	—	—
3.0	A	A	5	4 1D	0 5DMF	—	—	—
	B	B	5	5	1 4D	1	1	0 1D
	C	C	5	3 2D	0 3DMF	—	—	—
	D	D	5	5	0 5D	—	—	—
4.0	A	A	5	2 3D	0 2D	—	—	—
	B	B	5	1 4D	0 1D	—	—	—
	C	C	5	1 4D	0 1D	—	—	—
	D	D	5	1 4D	0 1D	—	—	—
Organisms loaded by: KC	Checked by:		MF	BA	MF	MF	BA	BA

H. azteca		
0 hr	Alk	Hrd
Well		
100%		
96 hr	Alk	Hrd
Well		
100%		

Loading Verified by: MF AR = after renewal

m = missing d = dead BR = before renewal hr = hour

Comments:

Investigators' Signatures

Kala Coy

Marshall Faircloth

Beau Allen

James Daniels

Reviewer: Kiy Miller

Method: TSK

Statistics: LC50

	95% confidence intervals Lower	Upper
48 hour: 2.50	2.36	2.64
96 hour: 2.28	2.18	2.37

Revised 7/15/2008 mf

FDEP Biology Laboratory - Acute SRT Bench Sheet
0-96 hour parameters

Methods from EPA-821-R-02-012 except *H. azteca*

Test Page 2 of 2

Test Organism: (check one)
- ☐ *Americamysis bahia* Method 2007.0 TA07.03
- ☐ *Menidia Beryllina* Method 2006.0 TA07.04
- ☐ *Hyalella azteca* Method 100.1 EPA-600-R-99-064
- ☑ *Ceriodaphnia dubia* Method 2002.0 TA07.01
- ☐ *Cyprinella leedsi* Method 2000.0 TA07.02
- ☐ *Pimephales promelas* Method 2000.0 TA07.02

Test Beginning: Date: 3.29.11 Time: 1000
Test Ending: Date: 4.2.11 Time: 1200

Test Type: ☐ non-renewal ☑ renewal

hr = hour AR = after renewal BR = before renewal

Concentration µg/L mg/L g/L	Replicate	Test Hour	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity ☑ µmhos ☑ mmhos	Salinity (ppth)
Control	M	0 hr	8.3	24.1	7.9	0.174	
		24 hr	—	—	—	—	
	A	48 hr BR	8.2	24.1	7.6	0.184	
	M	48 hr AR	8.0	25.7	8.1	0.184	
		72 hr	—	—	—	—	
	A	96 hr	8.1	24.0	7.1	0.193	
1.5	M	0 hr	8.3	24.3	7.8	2.94	
		24 hr	—	—	—	—	
	A	48 hr BR	8.1	24.0	7.6	3.10	
	M	48 hr AR	8.0	25.7	8.2	2.95	
		72 hr	—	—	—	—	
	A	96 hr	8.1	24.2	7.0	3.07	
2.0	M	0 hr	8.2	24.3	7.8	3.83	
		24 hr	—	—	—	—	
	A	48 hr BR	8.1	24.2	7.6	4.09	
	M	48 hr AR	8.0	25.4	8.0	3.88	
		72 hr	—	—	—	—	
	A	96 hr	8.1	24.2	7.1	4.03	
2.5	M	0 hr	8.2	24.1	7.9	4.75	
		24 hr	—	—	—	—	
	A	48 hr BR	8.2	24.2	7.6	5.01	
	M	48 hr AR	8.0	25.7	7.9	4.69	
		72 hr	—	—	—	—	
	A	96 hr	8.2	24.5	7.0	4.67	
3.0	M	0 hr	8.2	24.3	7.9	5.57	
		24 hr	—	—	—	—	
	A	48 hr BR	8.2	24.3	7.6	5.90	
	M	48 hr AR	8.0	24.7	7.8	5.49	
		72 hr	—	—	—	—	
	B	96 hr	8.2	24.1	7.2	5.47	
4.0	M	0 hr	8.2	24.4	7.9	7.34	
		24 hr	—	—	—	—	
	A	48 hr BR	8.2	24.3	7.5	7.60	
	M	48 hr AR	8.0	24.7	7.7	7.36	
		72 hr					
		96 hr					

Investigators Signatures
Kara Cap
Marshall Faircloth
Bree Hoosier
James Daniels

Reviewed By: Liz Miller

Measured by:
0 hr: KC
24 hr: —
48 hr BR: MF
48 hr AR: MF
72 hr: —
96 hr: BH

Measure/record salinity for marine tests

Comments:

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Revised 07/15/2008 MF

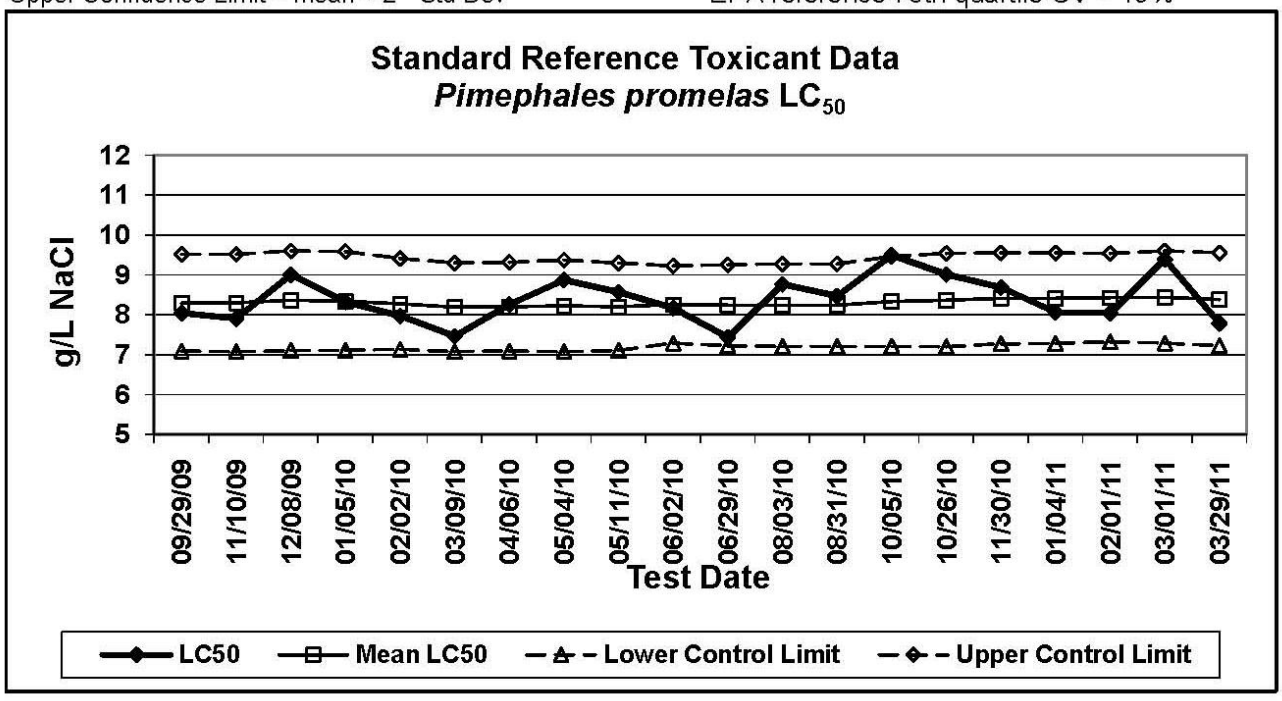
Florida Department of Environmental Protection
Bureau of Laboratories

Standard Reference Toxicant (SRT) Test Data - 48-hour Acute Toxicity
Pimephales promelas (fathead minnow) - Sodium Chloride (NaCl)

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
09/29/09	8.04	8.30	0.61	7.09	9.52
11/10/09	7.90	8.30	0.61	7.08	9.52
12/08/09	9.00	8.36	0.62	7.11	9.60
01/05/10	8.32	8.34	0.62	7.11	9.58
02/02/10	7.97	8.27	0.57	7.13	9.41
03/09/10	7.46	8.19	0.56	7.08	9.30
04/06/10	8.26	8.20	0.55	7.09	9.31
05/04/10	8.87	8.22	0.57	7.08	9.37
05/11/10	8.57	8.20	0.55	7.11	9.30
06/02/10	8.17	8.26	0.48	7.29	9.22
06/29/10	7.44	8.24	0.51	7.22	9.25
08/03/10	8.76	8.24	0.51	7.21	9.27
08/31/10	8.47	8.24	0.51	7.21	9.27
10/05/10	9.49	8.33	0.56	7.21	9.46
10/26/10	9.01	8.36	0.58	7.20	9.53
11/30/10	8.68	8.41	0.57	7.27	9.55
01/04/11	8.06	8.41	0.57	7.28	9.55
02/01/11	8.04	8.43	0.55	7.32	9.53
03/01/11	9.39	8.44	0.58	7.29	9.60
03/29/11	7.78	8.38	0.58	7.22	9.55

Means are of the last 20 SRT tests.
Lower Confidence Limit = mean - 2 * Std Dev
Upper Confidence Limit = mean + 2 * Std Dev

CV = 6.94
EPA reference 75th quartile CV = 19%



FDEP Biology Laboratory - Acute SRT Bench Sheet

Method from EPA-821-R-02-012 except *H. azteca*

Test Organism: (check one)
- ☐ *Americamysis bahia* Method 2007.0 TA07.03
- ☐ *Menidia Beryllina* Method 2006.0 TA07.04
- ☐ *Hyalella azteca* Method 100.1 EPA-600-R-99-064
- ☐ *Ceriodaphnia dubia* Method 2002.0 TA07.01
- ☐ *Cyprinella leedsi* Method 2000.0 TA07.02
- ☑ *Pimephales promelas* Method 2000.0 TA07.02

Test Type: ☐ non-renewal ☑ renewal

Test Page 1 of 2

Diluent/ Batch #: MHD / 3.24.11 **Organism Batch:** 3.29.11 **Test Beginning:** Date: 3.29.11 Time: 12:30

Toxicant/ Batch#: NaCl 13.28.11 Age: 10 days **Test Ending:** Date: 4.2.11 Time: 12:05

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	<0.03	TA06_22	KC
Alkalinity (mg/L as $CaCO_3$):	75	TA06_08	KC
Hardness (mg.L as $CaCO_3$):	86	TA06_09	KC
Total Ammonia (mg/L as N):	<0.017	TA06_17	MF
Conductivity: µmhos mmhos	315	TA06_25	KC
Salinity (ppth):	—	TA06_25	—

Food:	Batch
☐ YCT	
☐ *P. subcapitata*	
☑ Artemia Lot #	23613

Artemia Batch:
- 0 hr: 59.11
- 24 hr:
- 48 hr: 61-11
- 72 hr:

Chamber size: 1000 mL

Test volume: 400 mL per replicate

Concentrations prepared by: BA

Temperature Range °C:(if used)

Test Incubated in: Incubator # 2 Waterbath # ___ Incubator # 2 min. 26.6 max. 27.4 mean —

Light Intensity: 50-100 Ft. candles Waterbath # ___ min. ___ max. ___ mean ___

Photoperiod: 16 hours Light / 8 hours dark Room B246 min. 22.4 max. 24.4 mean —

Feeding: √ as needed
- ☑ Before test
- ☐ 0 hr
- ☐ 24 hr
- ☑ 48 hr
- ☐ 72 hr

all species 2 hrs prior to test

mysids daily

all species except *H. azteca* 2 hr prior to renewal

H. azteca 0 hr and 48 hr

Concentration µg/L mg/L (a/d)	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Control	A	A13	10	10	10	10	10	10
	B	A14	10	10	10	10	10	10
6	A	A15	10	9 1D	9	9	9	9
	B	A16	10	10	10	10	9 1D	9
7	A	A17	10	10	9 1D	9	9	8 1D
	B	A18	10	10	10	10	9 1D	8 1D
8	A	A19	10	4 6D	2 2D	2	2	0 2D
	B	A20	10	6 4D	5 1D	5	4 1D	2 2D
9	A	A21	10	2 8D	0 2D	—	—	—
	B	A22	10	1 9D	0 1D	—	—	—
10	A	A23	10	0 10D	—	—	—	—
	B	A24	10	0 10D	—	—	—	—
Organisms loaded by: BA		Checked by:	BA	KC	BA	BA	BA	BA

Loading Verified by: KC AR = after renewal

m = missing d = dead BR = before renewal hr = hour

H. azteca		
0 hr	Alk	Hrd
Well		
100%		
96 hr	Alk	Hrd
Well		
100%		

Comments:

Investigators' Signatures

Kala Coy

Marshall Faibish

Becc Alexander

Jana Dvornich

Reviewer: Liz Nelson

Method: TSK

Statistics: LC50

	95% confidence intervals Lower	Upper
48 hour:	7.78	7.55 8.02
96 hour:	7.35	7.09 7.62

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Revised 7/15/2008 mf

FDEP Biology Laboratory - Acute SRT Bench Sheet
0-96 hour parameters

Methods from EPA-821-R-02-012 except *H. azteca*

Test Page 2 of 2

Test Organism: (check one)
- ☐ *Americamysis bahia* Method 2007.0 TA07.03
- ☐ *Menidia Beryllina* Method 2006.0 TA07.04
- ☐ *Hyalella azteca* Method 100.1 EPA-600-R-99-064
- ☐ *Ceriodaphnia dubia* Method 2002.0 TA07.01
- ☐ *Cyprinella leedsi* Method 2000.0 TA07.02
- ☑ *Pimephales promelas* Method 2000.0 TA07.02

Test Beginning: Date: 3.29.11 Time: 12:30
Test Ending: Date: 4.2.11 Time: 1205

Test Type: ☐ non-renewal ☑ renewal

hr = hour AR = after renewal BR = before renewal

Concentration µg/L mg/L g/L	Replicate	Test Hour	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity ☑ µmhos ☐ mmhos	Salinity (ppth)
Control	A	0 hr	8.2	24.2	8.0	315	
	B	24 hr	8.1	25.2	7.2	324	
	A	48 hr BR	7.8	26.0	7.0	336	
	A	48 hr AR	8.1	24.0	7.1	320	
	B	72 hr	8.2	25.1	6.4	323	
	A	96 hr	8.1	25.2	6.8	333	
6	A	0 hr	8.0	24.4	8.1	10,970	
	B	24 hr	8.0	25.0	7.5	10,910	
	A	48 hr BR	7.7	25.9	6.1	11,100	
	A	48 hr AR	8.0	24.0	6.7	11,330	
	B	72 hr	8.0	25.1	6.8	11,360	
	A	96 hr	8.0	25.2	6.7	11,590	
7	A	0 hr	8.1	24.4	7.9	12,870	
	B	24 hr	7.9	25.4	7.4	12,750	
	A	48 hr BR	7.8	26.0	6.1	13,230	
	A	48 hr AR	8.0	24.0	6.7	13,170	
	B	72 hr	8.0	25.2	6.7	13,330	
	A	96 hr	8.0	25.7	6.7	13,390	
8	A	0 hr	8.1	24.4	7.9	14,670	
	B	24 hr	7.9	25.0	7.6	14,660	
	A	48 hr BR	7.8	25.6	6.1	14,690	
	A	48 hr AR	8.0	24.0	6.9	14,820	
	B	72 hr	8.0	25.3	6.4	14,920	
	A	96 hr	8.0	25.7	6.5	14,990	
9	A	0 hr	8.0	24.4	7.9	16,380	
	B	24 hr	7.9	25.0	7.6	16,020	
	A	48 hr BR	7.8	25.5	6.5	16,410	
		48 hr AR					
		72 hr					
		96 hr					
10	A	0 hr	8.1	24.3	8.0	18,290	
	B	24 hr	7.9	25.1	7.4	17,940	
	~~A~~	48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					

Investigators Signatures
Kara Cox
Marshall Faircloth
Bruce Alexander
James Durnell

Reviewed By: Liz Miller

Measured by:
0 hr: KC
24 hr: KC
48 hr BR: BA
48 hr AR: BA
72 hr: BA
96 hr: ~~BA~~

Measure/record salinity for marine tests

Comments:

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Revised 07/15/2008 MF

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Shipping Date: 4/4/11

Ship to: FDEP

P.O. No: _____

Species	Quantity	Age	Brood/Lot Number	Temp. (°C)	pH (S.U.)	Salinity (‰)
Mysidopsis bahia						
Menidia beryllina						
						Hardness mg/L
Cyprinella leedsi						
Pimephales promelas	700	<24 HRS	FM 110403-1545	25	7.8	80
Ceriodaphnia dubia						
Daphnia magna						
YCT						
P. subcapitata						

Packed by: PM

Shipped Via: Fed Ex

Notes: _____

Thank you for your order.

4569 Samuel Street · Sarasota, FL 34233 · Tel: 941-925-3594 · Fax: 941-922-3874 · Web: www.biologylab.com

Appendix J-1

Wet ID taxa list and density (number/mL) for quantitative phytoplankton collected from the Mosaic Fertilizer, L.L.C. New Wales Concentrates Plant on 4/4/11.

	Outfall	Control Site	Test Site
Bacillariophyta			
Bacillariophyta	1,414	1,859	1,540
Chlorophycota			
Ankistrodesmus sp.	-	-	770
Ankistrodesmus falcatus	808	581	577
Chlamydomonas sp.	202	349	-
Chlorella sp.	4,040	813	3,849
Chlorococcum humicola	-	349	-
Coelastrum microporum	-	-	192
Crucigenia tetrapedia	202	232	-
Nannochloris sp.	-	232	-
Oocystis sp.	404	581	-
Scenedesmus abundans	606	232	192
Scenedesmus bicaudatus	202	-	1,540
Scenedesmus bijuga	404	-	962
Scenedesmus dimorphus	2,222	-	1,925
Scenedesmus quadricauda	-	-	385
Selenastrum sp.	202	22,776	13,857
Tetraedron gracile	-	-	192
Tetraedron minimum	3,434	581	1,155
Tetraedron muticum	-	-	385
Westella botryoides	606	-	192
Cryptophycophyta			
Cryptomonas sp.	4,646	813	962
Cyanophycota			
Anabaena circinalis	4,646	-	2,117
Anabaenopsis circularis	-	-	385
Cyanobium parvum	-	349	-
Cylindrospermopsis raciborskii	17,374	-	12,317
Jaaginema gracile	6,061	930	3,079
Merismopedia tenuissima	404	-	192
Merismopedia warmingiana	404	-	577
Microcystis aeruginosa	-	-	577
Myxosarcina amethystina	202	-	-
Planktolyngbya limnetica	404	-	-
Planktolyngbya microspira	-	-	770
Planktothrix sp.	202	-	-
Rhabdogloea sp.	4,242	1,743	4,619
Snowella sp.	202	-	-
Synechocystis sp.	6,465	2,324	5,196
Euglenophycota			
Euglena sp.	-	-	192
Euglena acus	-	-	192

Appendix J-1 (continued)

	Outfall	Control Site	Test Site
Lepocinclis sp.	-	-	192
Phacus horridus	-	116	-
Pyrrophycophyta			
Glenodinium sp.	1,010	-	-

Appendix J-2

Diatom taxa list and number of valves counted to a target of 500 valves for quantitative phytoplankton collected from the Mosaic Fertilizer, L.L.C. New Wales Concentrates Plant on 4/4/11.

	Effluent	Control Site	Test Site
Bacillariophyta			
Bacillariophyceae			
Achnanthidium exiguum	1	18	13
Achnanthidium sp.	-	5	-
Lemnicola hungarica	-	7	-
Planothidium sp.	-	-	2
Planothidium delicatulum	-	5	7
Planothidium frequentissimum	-	13	3
Planothidium rostratum	-	20	22
Cocconeis placentula	-	15	1
Nitzschia sp.	171	78	62
Nitzschia acicularis	29	-	27
Nitzschia amphibia	-	16	4
Nitzschia clausii	-	-	1
Nitzschia gracilis	7	-	-
Nitzschia palea	-	84	25
Nitzschia reversa	1	-	-
Nitzschia subacicularis	16	-	-
Cymbella sp.	-	1	-
Encyonema neomesianum	-	1	-
Placoneis gastrum	-	1	-
Gomphonema sp.	-	7	-
Gomphonema parvulum	1	18	4
Diadesmis confervacea	-	2	-
Luticola mutica	-	1	-
Diploneis parma	-	1	-
Hippodonta capitata	-	4	4
Hippodonta hungarica	-	53	10
Mayamaea atomus	-	13	10
Navicula sp.	2	15	8
Navicula gregaria	-	2	1
Navicula kotschyi	-	2	-
Navicula minima	-	7	1
Navicula rostellata	-	-	1
Navicula sanctaecrucis	-	-	1
Navicula symmetrica	-	3	-
Sellaphora pupula	-	3	1
Naviculaceae	-	11	6
Nupela sp.	-	-	1
Neidium sp.	-	1	-
Caloneis sp.	-	-	1
Fallacia sp.	-	4	-
Craticula cuspidata	-	1	-

Appendix J-2 (continued)

	Effluent	Control Site	Test Site
Stauroneis smithii	-	-	1
Amphora sp.	-	-	1
Amphora copulata	-	7	-
Amphora veneta	-	11	1
Coscinodiscophyceae			
Aulacoseira sp.	10	2	-
Fragilariophyceae			
Fragilaria capucina	1	-	-
Fragilariaceae	-	11	-
Opephora sp.	-	17	5
Staurosira construens	-	8	-
Staurosira elliptica	-	1	-
Staurosirella pinnata	-	26	6
Synedra ulna	-	1	-
Mediophyceae			
Cyclostephanos invisitatus	-	-	1
Cyclotella atomus	121	-	150
Cyclotella meneghiniana	9	5	4
Discostella pseudostelligera	4	-	-
Stephanodiscus sp.	124	1	114
Thalassiosira sp.	3	-	-

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 Fertilizer, L.L.C. New Wales Concentrates Plant and collected on 4/4/11. See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site	Test Site
Annelida		
Hirudinea		
Mooreobdella sp.	5	3
Helobdella stagnalis	53	50
Oligochaeta		
Bratislavia unidentata	-	3
Dero vaga	3	-
Enchytraeidae	8	-
Nais communis complex	16	3
Arthropoda		
Crustacea		
Amphipoda		
Hyalella azteca	531	611
Insecta		
Coleoptera		
Dineutus sp.	8	5
Hydrocanthus sp.	3	-
Peltodytes sp.	3	-
Scirtes sp.	8	-
Stenelmis sp.	-	363
Diptera		
Asheum beckae	122	30
Atrichopogon sp.	-	3
Chironomus sp.	6	10
Corynoneura sp.	184	7
Cricotopus bicinctus	6	-
Cricotopus or orthocladius sp.	-	10
Dasyhelea sp.	3	-
Dicrotendipes neomodestus	-	59
Dicrotendipes simpsoni	29	3
Glyptotendipes sp.	-	10
Goeldichironomus cf. natans	49	-
Goeldichironomus holoprasinus	-	23
Nanocladius cf rectinervis	-	136
Nanocladius crassicornus/rectinervis	20	227
Nanocladius distinctus	-	227
Parachironomus carinatus	-	30
Parachironomus directus	3	-
Paratanytarsus sp.	40	-
Pentaneura inconspicua	40	3

Appendix K-1 (continued)

	Control Site	Test Site
Polypedilum flavum	11	634
Polypedilum illinoense grp.	91	54
Polypedilum scalaenum grp.	31	189
Polypedilum tritum	-	10
Psectrocladius sp.	9	-
Rheocricotopus robacki	9	-
Rheotanytarsus exiguus grp.	40	-
Rheotanytarsus pellucidus	29	17
Tanytarsus sp. A Epler	24	11
Tanytarsus sp. C Epler	68	-
Tanytarsus sp. G Epler	9	-
Tanytarsus sp. L Epler	6	-
Tanytarsus sp. T Epler	694	211
Tanytarsus sp. V Epler	77	57
Tanytarsus sp. Y Epler	3	-
Thienemanniella sp.	-	10
Thienemanniella sp. C Epler	54	-
Thienemanniella xena	36	-
Ephemeroptera		
Caenis sp.	3	3
Heteroptera		
Pelocoris sp.	3	-
Megaloptera		
Corydalus cornutus	-	8
Odonata		
Ischnura sp.	16	-
Trichoptera		
Cernotina sp.	-	3
Cheumatopsyche sp.	545	24
Cyrnellus fraternus	-	15
Mollusca		
Gastropoda		
Ancylidae	124	8
Hydrobiidae	-	27
Physa sp.	-	19

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 Fertilizer, L.L.C. New Wales Concentrates Plant for 28 days and collected on 4/4/11.

	Control Site	Test Site
Annelida		
Hirudinea		
Mooreobdella sp.	2	1
Helobdella stagnalis	20	19
Oligochaeta		
Bratislavia unidentata	-	1
Dero vaga	1	-
Enchytraeidae	3	-
Nais communis complex	6	1
Arthropoda		
Crustacea		
Amphipoda		
Hyalella azteca	201	231
Insecta		
Coleoptera		
Dineutus sp.	3	2
Hydrocanthus sp.	1	-
Peltodytes sp.	1	-
Scirtes sp.	3	-
Stenelmis sp.	-	137
Diptera		
Asheum beckae	43	9
Atrichopogon sp.	-	1
Chironomidae	42	151
Chironomus sp.	2	3
Corynoneura sp.	65	2
Cricotopus bicinctus	2	-
Cricotopus or orthocladius sp.	-	3
Dasyhelea sp.	1	-
Dicrotendipes sp.	3	-
Dicrotendipes neomodestus	-	18
Dicrotendipes simpsoni	7	1
Glyptotendipes sp.	-	3
Goeldichironomus sp.	6	-
Goeldichironomus cf. natans	11	-
Goeldichironomus holoprasinus	-	7
Nanocladius sp.	4	165
Nanocladius cf rectinervis	-	3
Nanocladius crassicornus/rectinervis	3	5
Nanocladius distinctus	-	5
Parachironomus sp.	-	7
Parachironomus carinatus	-	2
Parachironomus directus	1	-
Paratanytarsus sp.	14	-

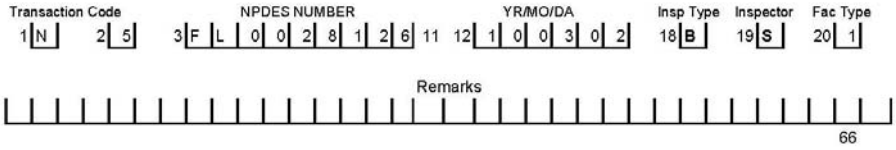
Appendix K-2 (continued)

	Control Site	Test Site
Pentaneura inconspicua	14	1
Polypedilum flavum	4	191
Polypedilum illinoense grp.	32	16
Polypedilum scalaenum grp.	11	57
Polypedilum tritum	-	3
Psectrocladius sp.	3	-
Rheocricotopus robacki	3	-
Rheotanytarsus exiguus grp.	14	-
Rheotanytarsus pellucidus	10	5
Tanytarsus sp.	13	6
Tanytarsus sp. A Epler	8	3
Tanytarsus sp. C Epler	23	-
Tanytarsus sp. G Epler	3	-
Tanytarsus sp. L Epler	2	-
Tanytarsus sp. T Epler	235	59
Tanytarsus sp. V Epler	26	16
Tanytarsus sp. Y Epler	1	-
Thienemanniella sp.	7	3
Thienemanniella sp. C Epler	15	-
Thienemanniella xena	10	-
Ephemeroptera		
Caenis sp.	1	1
Heteroptera		
Pelocoris sp.	1	-
Megaloptera		
Corydalus cornutus	-	3
Odonata		
Coenagrionidae	5	-
Ischnura sp.	1	-
Trichoptera		
Cernotina sp.	-	1
Cheumatopsyche sp.	76	8
Cyrnellus fraternus	-	5
Hydropsychidae	130	-
Undetermined Trichoptera	-	2
Mollusca		
Gastropoda		
Ancylidae	47	3
Hydrobiidae	-	10
Physa sp.	-	7

EPA Endsheet

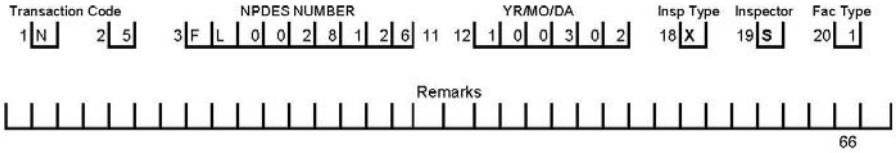
The Bioassay of the Mosaic Fertilizer LLC New Wales New Wales Concentrates Plant effluent sampled on April 4, 2011, NPDES #FL0036421

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 Fertilizer LLC New Wales Concentrates Plant effluent sampled on April 4, 2011, NPDES #FL0036421

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



Biological Analyses of the Mosaic Fertilizer LLC New Wales Concentrates Plant effluent sampled on April 4, 2011, NPDES #FL0036421

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

