Attachment 3

Ammonia Nitrogen Sampling Results from Illinois River at Diffuser Ammonia Nitrogen (mg/l)

Date	Result
03-28-07	0.23
09-28-07	0.20
12-07-07	<0.20
03-14-08	0.27
06-19-08	<0.10
09-28-08	<0.20
12-13-08	<0.20
03-20-09	<0.20
06-18-09	<0.20
09-28-09	<0.10
11-20-09	<0.20
03-31-10	<0.20
06-30-10	<0.20
09-23-10	< 0.20
No Sample Frozen	
03-31-11	< 0.10
06-30-11	<0.10
09-23-11	<0.10
12-15-11	< 0.10
03-28-12	< 0.10
06-22-12	<0.10
09-28-12	1,1
11-16-12	< 0.10



RESULTS OF ACUTE AND CHRONIC TOXICITY TESTING WITH Ceriodaphnia dubia AND Pimephales promelas ON SEPTEMBER/OCTOBER 2006 EFFLUENT SAMPLES FROM EMERALD PERFORMANCE MATERIALS

Prepared for:

Emerald Performance Materials, LLC 1550 County Road 1450N Henry, Illinois 61537

Prepared by:

EA Engineering, Science, and Technology, Inc. 15 Loveton Circle Sparks, Maryland 21152 For questions, please contact Wayne McCulloch ph: 410-771-4950

Results relate only to the items tested or to the samples as received by the laboratory.

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This report contains 16 pages plus 2 attachments.

Wayne L. McCullock Laboratory Director

EA Project Number 70005.08



20 2006

EA Report Number 5133

INTRODUCTION

At the request of Emerald Performance Materials, EA Engineering, Science, and Technology performed acute and chronic toxicity tests on samples of Outfall 001 final effluent from Emerald Performance Material's Henry, Illinois facility. The acute and chronic toxicity tests were conducted with the water flea (*Ceriodaphnia dubia*) and the fathead minnow (*Pimephales promelas*). A suite of three 24-hour composite samples was collected on 26-27, 28-29 September and 1-2 October 2006. Additionally, grab samples of Upstream Illinois River (at Mile Marker 198.1) were collected on 27, 29 September and 2 October 2006. The acute and chronic toxicity test organisms were exposed to 100, 64, 32, 8, 2 and 0.5 percent Outfall 001 effluent. The *C. dubia* and *P. promelas* acute toxicity tests utilized only the 26-27 September Outfall 001 and the 27 September Upstream Illinois River samples for testing. The acute and chronic tests included a dilution water control of Upstream Illinois River water. The *C. dubia* and *P. promelas* acute toxicity tests also included a moderately hard laboratory control water. This testing was conducted under the biomonitoring requirements of the discharge permit number IL0001392.

The toxicity testing was conducted following EA's standard operating procedures (EA 2006), which are in accordance with Illinois EPA and US EPA guidance (US EPA 2002a, 2002b). The results of the chronic toxicity tests were statistically analyzed according to US EPA guidance (2002a) to determine if any effluent concentration was significantly different from the control with respect to survival, reproduction (*C. dubia*), or biomass (*P. promelas*). For the acute toxicity tests, the median lethal concentration (LC50) was calculated if there was at least 50 percent mortality in the 100 percent effluent concentration. The short-term chronic toxicity test endpoints are expressed as the No Observed Effect Concentration (NOEC), the Lowest Observed Effect Concentration (LOEC), and the Chronic Value (ChV). The median lethal concentration (LC50) was also calculated for each test species. The Chronic Toxic Units (TU_e) were calculated for *C. dubia* and *P. promelas* based on the IC25 (TU_c=100/IC25). The Acute Toxic Units (TU_a) were calculated based on the 48-hour (*C. dubia*) and 96-hour (*P. promelas*) LC50s (TU_a=100/LC50). The test data were analyzed using the ToxCalc statistical software package (Version 5.0, Tidepool Scientific Software).

Summaries of sample and *C. dubia* and *P. promelas* acute toxicity test information are presented on pages 7-10, and the chronic toxicity test information is presented on pages 11-14. Table 1 summarizes the collection and receipt data for the effluent samples, and selected water quality parameters of the samples are reported in Table 2. Copies of raw data sheets with statistical analyses, and the Report Quality Assurance Record are included in Attachments I and II, respectively.

SUMMARY OF RESULTS

The results of the *Ceriodaphnia dubia* and *Pimephales promelas* acute and chronic toxicity testing conducted for Emerald Performance Materials comply with current NELAC standards, except as noted in the report.

The results of the *C. dubia* acute toxicity test on the 26-27 September 2006 Outfall 001 sample are presented on page 8. After 48 hours, there were no surviving organisms in the 100, 64 and 32 percent Outfall 001 concentrations. The remaining test concentrations had 100 percent survival. The upstream dilution water control and the lab control had 100 percent survival at test termination. The 48-hour LC50 for *C. dubia* was 16.0 percent effluent (6.25 TU_a).

The *P. promelas* acute toxicity test results are summarized on page 10. There were no surviving organisms in the 100, 64 and 32 percent Outfall 001 concentrations, and there was 100 percent survival in the remaining Outfall 001 concentrations, the upstream dilution water control, and the laboratory control. The 96-hour *P. promelas* LC50 was also 16.0 percent effluent (6.25 TU_a).

The results of the *C. dubia* chronic toxicity test on the 26 September – 2 October 2006 Outfall 001 samples are presented on page 12. After 48 hours of exposure, there were no surviving organisms in the 100, 64 and 32 percent effluent concentrations. The remaining effluent concentrations had 100 percent survival. The upstream control and laboratory control also had 100 percent survival at 48 hours. The resulting 48-hour LC50 value was 16.0 percent effluent (6.25 TU_a).

After six days, percent survival was the same as the 48-hour results. Mean young production in the 8 percent effluent concentration (23.9 neonates/organism) was statistically different (p=0.05) from the upstream control (29.0 young per female). The 2 and 0.5 percent effluent treatments were not statistically different from the upstream control. Based on reproduction as the most sensitive chronic endpoint, the NOEC for this test is 2 percent effluent. The LOEC is 8 percent effluent, and the ChV is 4 percent effluent. The IC25 for this test is 10.2 percent effluent. The TU_c, based on the IC25, is 9.8. The laboratory control had 100 percent survival at test termination and mean young production of 22.6 young per female, respectively.

The *P. promelas* chronic toxicity test results are summarized on page 14. After 96 hours, there were no surviving organisms in the 100, 64 and 32 percent effluent concentrations, and there was 48 percent survival in the 8 percent effluent concentration. There was a minimum of 98 percent survival in the remaining effluent concentrations, upstream river control and laboratory control. The resulting 96-hour *P. promelas* LC50 value was 7.4 percent effluent (13.5 TU_a). After seven days, there was 38 percent survival in the 8 percent effluent concentration, which was significantly different (p=0.05) from the upstream river control survival of 83 percent. Survival in the 2 and 0.5 percent effluent concentrations was 85 and 98 percent, both of which were greater than the dilution water control. There was 100 percent survival in the laboratory water control. Biomass in the 2 and 0.5 percent effluent concentrations was 0.547 and 0.649 mg/organism, and were not significantly different than the river water control biomass of 0.582 mg/organism. Biomass in the laboratory control was 0.756 mg/organism. The 7-day NOEC for this test was 2 percent effluent, the LOEC was 8 percent and the ChV was 4 percent effluent. The 7-day IC25 was 3.3 percent effluent, and chronic toxic units based on the IC25 was 30.3 TU_c.

In conformance with EA's quality assurance/quality control program, monthly acute and chronic reference toxicant tests were conducted on the test species. The results of reference toxicant test were within acceptable control chart limits, and are summarized on pages 7 and 9 for the *C. dubia* and *P. promelas* acute toxicity tests, and on pages 11 and 13 for the *C. dubia* and *P. promelas* chronic toxicity tests.

REFERENCES

- EA. 2006. EA Ecotoxicology Laboratory Quality Assurance and Standard Operating Procedures Manual. EA Manual ATS-102. Internal document prepared by EA's Ecotoxicology Laboratory, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.
- US EPA. 2002a. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. Fourth Edition. EPA-821-R-02-013. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.
- US EPA 2002b. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fifth Edition. EPA-821-R-02-012. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

SUMMARY OF SAMPLE/TEST INFORMATION

Test: Ceriodaphnia dubia 48-hour static non-renewal acute LC50 assay

Test Procedure: EA Protocol ATS-SAI-CD-08 Acute assay with *Ceriodaphnia dubia*

Client Name: Emerald Performance Materials

Sample Description: Outfall 001 Effluent

EA Accession Number: AT6-537

Collection time and date: 0030, 26 September to 0030, 27 September 2006 Receipt time and date: 1050, 28 September 2006

EA Test Number: **TN-06-432**

Test initiation time and date: 1420, 28 September 2006^(a) Test completion time and date: 1348, 30 September 2006

Dilution Water Description: Illinois River Water

EA Accession Number: AT6-538

Collection time and date: 0816, 27 September 2006 Receipt time and date: 1050, 28 September 2006

Test Chamber: **30-ml cup** Volume per Test Chamber: **15 ml** Number of Replicates: **4** Number of Organisms per Replicate: **5**

Organism Lot Information

Lot Number: Not applicable Source: EA's Culture Facility (Sparks, Maryland) Age: <24 hours

Reference Toxicant Test Information

Reference Toxicant: Sodium chloride (NaCl) EA Test Number: RT-06-114 48-hour LC50: 2,018 mg/L NaCl Laboratory control chart acceptability range for LC50: 1,289-2,465 mg/L NaCl

⁽a) Sample was 34.3 hours old at receipt, and was 37.8 hours old at test initiation.

SUMMARY OF SAMPLE/TEST INFORMATION (continued)

Test Species:	Ceriodaphnia dubia
Sample Description:	Outfall 001 effluent – Emerald Performance Materials
Sample Dates:	26-27 September 2006
EA Test Number:	TN-06-432

Test Concentration (percent effluent)	48-Hour Survival (percent)
Upstream Control	100
0.5	100
2	100
8	100
32	0
64	0
100	0
Lab Control	100
Test Results	
48-Hour LC50 (as percent effluent): TU _a :	16.0 (Not calculable) ^(a) 6.25

Selected Test Water Quality Parameters	Range
Temperature (°C):	19.8 - 21.0
pH:	7.9 - 8.5
Dissolved Oxygen (mg/L):	8.5 - 9.0
Conductivity (µS/cm):	317 - 8,850

(a) 95 percent confidence limits were not calculable.

SUMMARY OF SAMPLE/TEST INFORMATION

Test: Pimephales promelas 96-hour static non-renewal acute LC50 assay

Test Procedure: **EA Protocol ATS-SAF-FM-08** Acute assay with fathead minnows (*Pimephales promelas*)

Client Name: Emerald Performance Materials

Sample Description: Outfall 001 Effluent

EA Accession Number: AT6-537

Collection time and date: 0030, 26 September to 0030, 27 September 2006 Receipt time and date: 1050, 28 September 2006

EA Test Number: TN-06-433

Test initiation time and date: 1500, 28 September 2006^(a) Test completion time and date: 1450, 2 October 2006

Dilution Water Description: Illinois River Water

EA Accession Number: AT6-538

Collection time and date: 0816, 27 September 2006 Receipt time and date: 1050, 28 September 2006

Test Chamber: **1L-beaker** Volume per Test Chamber: **250 ml** Number of Replicates: **2** Number of Organisms per Replicate: **10**

Organism Lot Information

Lot Number: FH6-9/19-20 Source: EA's Culture Facility (Sparks, Maryland) Age: 8–9 days (hatched within a 24-hour window)

Reference Toxicant Test Information

Reference Toxicant: Potassium Chloride (KCl) EA Test Number: RT-06-112 48-hour LC50: 903 mg/L KCl Laboratory control chart acceptability range for LC50: 502-1,034 mg/L KCl

⁽a) Sample was 34.3 hours old at receipt, and was 38.5 hours old at test initiation.

SUMMARY OF SAMPLE/TEST INFORMATION (continued)

Test Species:	Pimephales promelas
Sample Description:	Outfall 001 effluent – Emerald Performance Materials
Sample Dates:	26-27 September 2006
EA Test Number:	TN-06-433

Test Concentration (percent effluent)	96-Hour Survival (percent)
Upstream Control (801)	100
0.5	100
2	100
8	100
32	0
100	0
64	0
Lab Control	100

Test Results

96-Hour LC50 (as percent effluent):	16.0 (not calculable) ^(a)
TU _a :	6.25

Selected Test Water Quality Parameters	Range
Temperature (°C):	19.8 - 20.8
pH:	7.9 - 8.7
Dissolved Oxygen (mg/L):	$7.3 - 13.2^{(b)}$
Conductivity (µS/cm):	317 - 8,850

⁽a) 95 percent confidence limits were not calculable.

(b) Elevated dissolved oxygen in river water could be due to algae.

SUMMARY OF SAMPLE/TEST INFORMATION

Test: Ceriodaphnia dubia daily renewal chronic toxicity test

Test Procedure: EA Protocol ATS-STC-CD-09

Survival and reproduction test with cladoceran (Ceriodaphnia dubia)

Client Name: Emerald Performance Materials

Sample Description	EA Accession Numbers ^(a)
Outfall 001 Effluent	AT6-537, AT6-539, AT6-544
Upstream Control	AT6-538, AT6-540, AT6-543

Dilution Water Description: Upstream Illinois River

EA Test Number: TN-06-434

Test initiation time and date: 1210, 28 September 2006

Test completion time and date: 1215, 4 October 2006

Test Vessel: 30-ml cup

Test Volume: 15 ml

Number of Organisms per Replicate: 1

Number of Replicates per Concentration: 10

Photoperiod: 16-hour light/8-hour dark

Organism Lot Information Lot Number: Not applicable Source: EA's Culture Facility (Sparks, Maryland) Age: 24 hours old (released within an 8-hour period)

Reference Toxicant Test Information Reference Toxicant: Sodium chloride (NaCl) EA Test Number: RT-06-113 6-Day IC25: 1,025 mg/L NaCl Laboratory control chart acceptability range for chronic IC25: 175-1,468 mg/L NaCl

(a) Due to time of sample collection (0030 hours) sample age was slightly >36 hours at first use.

SUMMARY OF SAMPLE/TEST INFORMATION (continued)

Test Species: Test: Client Name: Sample Description: Sample Dates: EA Test Number:	Survival and Emerald Perf Outfall 001 e	<i>Ceriodaphnia dubia</i> (water flea) Survival and reproduction test Emerald Performance Materials Outfall 001 effluent 26-27, 28-29 September, 1-2 October 2006 TN-06-434		
Test Concentration (percent effluent)	48-Hour % Survival	6-Day % Survival	Mean Young Production as Neonates/Organism (±SD)	
Upstream Control	100	100	29.0 (±4.9)	
0.5	100	100	28.8 (±6.0)	
2	100	100	29.2 (±2.7)	
8	100	100	23.9 (±4.6) ^(a)	
32	0	0 ^(a)	0 ^(b)	
64	0	0 ^(a)	0 ^(b)	
100	0	0 ^(a)	0 ^(b)	
Lab Control	100	100	22.6 (±3.1)	
Endpoints as percent Outfall		(-)		
48-Hour LC50:	16.0 (not calc	-		
TU _a :	6.25			
NOEC: LOEC: ChV:	<u>Survival</u> 8 32 16	Reproduction 2 8 4		
IC25: TU _c (100/IC25):	10.2 (7.0- 9.8	.12.4)		
Selected Test Water Quality Temperature (°C): pH: Dissolved Oxygen (mg/L Conductivity (µS/cm):		Range 23.7 – 25.9 7.7 – 8.4 8.0 – 8.7 317 – 8,880		

(a) Significantly different (p=0.05) from Upstream Control.

(b) Concentrations with no surviving test organisms are omitted from hypothesis testing for reproduction, per EPA guidance.

(c) 95 percent confidence limits were not calculable.

SUMMARY OF SAMPLE/TEST INFORMATION

Test: Pimephales_promelas daily_renewal_chronic_toxicity_test

Test Procedure: EA Protocol ATS-STC-FH-09 Larval survival and growth test with fathead minnows (*Pimephales promelas*)

Client Name: Emerald Performance Materials

Sample Description	EA Accession Numbers ^(a)
Outfall 001 Effluent	AT6-537, AT6-539, AT6-544
Upstream Control	AT6-538, AT6-540, AT6-543

Dilution Water Description: Upstream Illinois River

EA Test Number: TN-06-435

Test initiation time and date: 1345, 28 September 2006

Test completion time and date: 1330, 5 October 2006

Test Vessel: 1-L beaker

Test Volume: 250 ml

Number of Organisms per Replicate: 10

Number of Replicates per Concentration: 4

Photoperiod: 16-hour light/8-hour dark

Organism Lot Information Lot Number: FH6-9/27-28 Source: EA's Culture Facility (Sparks, Maryland) Age: <24 hours old

Reference Toxicant Test Information Reference Toxicant: Potassium chloride (KCl) EA Test Number: RT-06-111 7-Day IC25: 594 mg/L KCl Laboratory control chart acceptability range for chronic IC25: 511-721 mg/L KCl

(a) Due to time of sample collection (0030 hours) sample age was slightly >36 hours at first use.

SUMMARY OF SAMPLE/TEST INFORMATION (continued)

Test Species: Test: Client Name: Sample Description: Sample Dates: EA Test Number:	<i>Pimephales promelas</i> (fathead minnow) Survival and growth test Emerald-Performance-Materials Outfall 001 effluent 26-27, 28-29 September, 1-2 October 2006 TN-06-435			Survival and growth test Emerald-Performance-Materials Outfall 001 effluent 26-27, 28-29 September, 1-2 October 2006		Survival and growth test Emerald Performance Materials Outfall 001 effluent	
Test Concentration (percent effluent) Upstream Control 0.5 2 8 32 64	96-Hour <u>% Survival</u> 100 100 98 48 0 0	7-Day % Survival 83 98 85 38 ^(a) 0 ^(a) 0 ^(a)	Mean Biomass as mg/Organism (\pm SD) 0.582 (\pm 0.122) 0.649 (\pm 0.077) 0.547 (\pm 0.066) 0.147 (\pm 0.037) ^(b) 0 ^(b) 0 ^(b) 0 ^(b)				
100 Laboratory Control <u>Endpoints as percent Outfal</u> 96-Hour LC50: TU _a :	0 100 <u>1 001 effluent</u> 7.4 (5.9 – 13.5	0 ^(a) 100 9.2) ^(c)	0 ^(b) 0.756 (±0.050)				
NOEC: LOEC: ChV: IC25: TU _c (100/IC25):	<u>Survival</u> 2 8 4 3.3 (1.6 – 4 30.3	Biomass 2 8 4 4.5) ^(c)					
Selected Test Water Quality Temperature (°C): pH: Dissolved Oxygen (mg/I Conductivity (µS/cm):		Range 23.3 – 25.9 7.5 – 8.2 4.4 – 8.6 318 – 8,910					

(a) Significantly different (p=0.05) from the Upstream Control.

(b) Concentrations with significant mortality are omitted from hypothesis testing for biomass.

(c) Value in parentheses represents 95 percent confidence limits.

TABLE 1 SUMMARY OF COLLECTION AND RECEIPT DATA FOR SEPTEMBER/OCTOBER 2006 SAMPLES FROM EMERALD PERFORMANCE MATERIALS

EA Accession Number	Collection Time and Date	Receipt Time and Date	Sample Usage
Outfall 001:			
AT6-537	0030, 26 September 2006 to 0030, 27 September 2006	1050, 28 September 2006	Test Initiation & Day 1 Renewal
AT6-539	0030, 28 September 2006 to 0030, 29 September 2006	1100, 30 September 2006	Days 2, 3 & 4 Renewals
AT6-544	0030, 01 October 2006 to 0030, 02 October 2006	1100, 03 October 2006	Days 5 & 6 Renewals
Upstream Illinois River:			
AT6-538	0816, 27 September 2006	1050, 28 September 2006	Test Initiation & Day 1 Renewal
AT6-540	0815, 29 September 2006	1100, 30 September 2006	Days 2, 3 & 4 Renewals
AT6-543	0802, 02 October 2006	1100, 03 October 2006	Days 5 & 6 Renewals



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Emerald Performance Materials 1550 County Rd 1450 N Henry, IL 61537 Attn: Jim Hastings Date Received: 06/14/11 8:15 Report Date: 07/15/11 Customer #: 202011 PO#: HE-40014063-UB

Collect Date: 06/13/11 17:30

Matrix: Waste Water Grab

Sample No: **1061342-01** Sample Description: **PLANT**

Parameters	Result	Qual	Analysis Date	Analyst	Method
Miscellaneous - Environmental Analy	rsis South				
WET Testing Single Dilution - subcontracted	See Attached		06/15/11 00:00	Subco	Subcontracted



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Emerald Performance Materials 1550 County Rd 1450 N Henry, IL 61537 Attn: Jim Hastings

Date Received: 06/14/11 8:15 Report Date: 07/15/11 Customer #: 202011 PO#: HE-40014063-UB

Notes

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Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553 Drinking Water Certifications: Kansas (E-10338); Missouri (870); Wisconsin (998284430); Indiana (C-IL-040); Iowa (240) Wastewater Certifications: Arkansas (88-0677); Wisconsin (998284430); Iowa (240); Kansas (E-10335) Hazardous/Solid Waste Certifications; Arkansas (88-0677); Wisconsin (998284430); Iowa (240); Kansas (E-10335) UST Certification; Iowa (240)

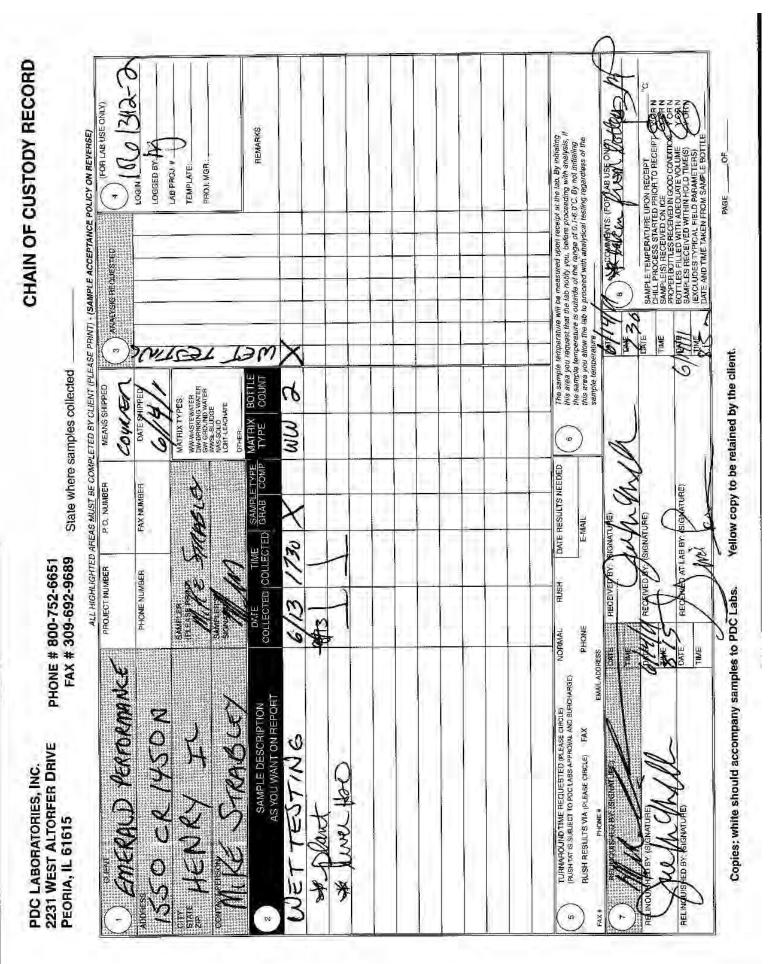
SPM PDC Laboratories - Springfield, MO

EPA DMR-QA Program

STL PDC Laboratories - St. Louis, MO

NELAC Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS EPA Lab No. E-10389

Certified by: Kurt C. Stepping, Senior Project Manager



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Page 4 of 15

Environmental Analysis South, Inc.

4000 East Jackson Blvd. + Jackson, MO 63755 + 573-204-8817 • Fax 573-204-8818



REPORT OF ACUTE TOXICITY TESTING City of Emerald, IL Plant Effluent, AEC = 100%

EAS LOG# 1311712 June 15, 2011 through June19, 2011

Tests performed by:

John P. Clippard / Chemical Analyst at Environmental Analysis South (EAS) Kelly J. Ray / Biologist at Environmental Analysis South (EAS) Sara C. Shields / Lab Supervisor - Chemist at Environmental Analysis South (EAS) David F. Warren / Lab Director - Chemist at Environmental Analysis South (EAS)

- 1. Report Summation
 - 1.1. Data Summation
 - 1.2. Conclusion
- 2. Method Summation
 - 2.1. Test Conditions and Methods
 - 2.2. Potassium chloride Reference Salt Test
 - 2.2.1. Pimephales promelas data
 - 2.2.2. Ceriodaphnia dubia data
 - 2.3. Literature Cited
- 3. Raw Data Bench Sheets
 - 3.1. Initial observations (page 1)
 - 3.2. Zero hour Observations (page 1)
 - 3.3. Twenty-four (24) Forty-eight (48) hour Observations (page 1)
 - 3.4. Seventy-two (72) Ninety-six (96) hour Observations (page 2)
 - 3.5. Survival Data Table (page 3-4)
 - 3.6. Test Comments (page 5)
- 4. Chain of Custody

Page 1 of 4

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REPORT OF ACUTE TOXICITY TESTING City of Emerald, IL Plant Effluent, AEC = 100%

EAS LOG# 1311712 June 15, 2011 through June19, 2011

1. REPORT SUMMATION:

1.1. Multiple Dilution Data Summation

Test Solution	Pimephales promelas Acute Toxicity Test 96 Hour Survival	Ceriodaphnia dubia Acute Toxicity Test 48 Hour Survival
Reconstituted Control (RC)	100%	100%
Upstream Control (UC)	100%	100%
6.25% Effluent	90%	100%
12.5% Effluent	0%*	35%*
25% Effluent	0%*	0%*
50% Effluent	0%*	0%*
100% Effluent	0%*	0%*
Estimated LC ₅₀ Value	8.50% Effluent	11.27% Effluent

* Indicates a significant difference at alpha = 0.5 between effluent and control survival data.

Conclusion:

Pimephales promelas 96 hour WET results:

Ceriodaphnia dubia 48 hour WET results:

LC 50 =8.50% using Trimmed Spearman-Karber NOAEC = 6.25% using Steel's Many-One Rank Test LC 50 =11.27% using Trimmed Spearman-Karber NOAEC = 6.25% using Steel's Many-One Rank Test

Approved by Sara C. Shields, Chemist

Page 2 of 4

Environmental Analysis South, Inc.





REPORT OF ACUTE TOXICITY TESTING City of Emerald, IL Plant Effluent, AEC = 100%

EAS LOG# 1311712 June 15, 2011 through June19, 2011

2. TEST METHOD SUMMARY

2.1. TEST CONDITIONS AND METHODS:

	Ceriodaphnia dubia:	Pimephales promelas:
Test duration:	48 hours	96 hours
Temperature:	24 - 26 degree Celsius	24 - 26 degree Celsius
Light quality:	Ambient laboratory illumination	Ambient laboratory illumination
Photoperiod:	16 hour light, 8 hours dark	16 hour light, 8 hours dark
Control Water:	Moderately Hard Reconstituted Water	Moderately Hard Reconstituted Water
Dilution Water:	Upstream Water - If unavailable or toxic, then control water will be used.	Upstream Water - If unavailable or toxic, then control water will be used.
Size of test vessel:	30 milliliters	250 milliliters
Volume of test solution:	15 milliliters	200 milliliters
Age of test organisms:	<24 hours	1 -14 days (all same age)
Number of organisms/test vessel:	5	10
Number of replicates/concentration:	4	2
Number of organisms/concentration:		40 for a single dilution test and 20 for a multiple dilution test
Feeding regime:		None (fed prior to test)
Aeration:		None
Test acceptability criterion:	90% or greater survival in controls	90% or greater survival in controls

The methodology used for the chemistry data was taken from the *Standard Methods for the Examination* of Water and Wastewater, 18th edition (1992). The exception was hardness, which was determined using a Hach EDTA titration test kit. The toxicity tests follow guidelines laid out in the permittee's NPDES permit and were conducted according to EPA approved methods (USEPA 2002).

All test organisms were cultured according to EPA approved methods (USEPA 2002). The *Ceriodaphnia dubia* and the *Pimephales promelas* were obtained from C-K Associates Inc. located in Baton Rouge, Louisiana and shipped overnight for use in the whole effluent toxicity test.

Page 3 of 4

Environmental Analysis South, Inc.





REPORT OF ACUTE TOXICITY TESTING City of Emerald, IL Plant Effluent, AEC = 100%

EAS LOG# 1311712 June 15, 2011 through June19, 2011

2.2. REFERENCE TOXICITY TEST:

Environmental Analysis South performs monthly reference toxicity tests. The most recent reference test was initiated on June 8, 2011 using KCL Lot #41713. Following are the results:

2.2.1. *P. promelas* - 48 hr. Acute Test – $LC_{50} = 1.071 \text{ g/l} 95\%$ Cl (0.736-1.405 g/l) EAS %CV = 15.6% National Warning Limits (75th percentile) = 19%CV National Control Limits (90th percentile) = 33%CV 2.2.2. *C. dubia* - 48 hr. Acute Test – $LC_{50} = 0.467 \text{ g/l} 95\%$ Cl (0.303-0.631g/l) EAS %CV = 17.5% National Warning Limits (75th percentile) = 29%CV National Control Limits (90th percentile) = 34%CV

2.3. LITERATURE CITED:

- 1. APHA. 1992. Standard methods for the examination of water and wastewater, 18th Ed. American Public Health Association, Washington, D.C.
- 2. USEPA. 2002. Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms, 5th Ed. EPA-821-R-02-012
- USEPA 2000. Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications under the National Pollutant Discharge Elimination System, (Table B-2). June 2000. EPA 833-R-00-003.

Page 4 of 4

WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027

Fifth Edition October 2002

CLUENT NAME: Construction NPPE SNUMER: Upster Type of METHOD: multiple dividion, 9b hrs PP 44 SCD, AEC+100% DATE & TIME OF SUBMISSION: OBJINT 1100 hrs by UPS Collecter: Objint 1100 hrs by UPS Colspan="2">Colspan="2">Colspan="2">Objint 1100 hrs by UPS Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Objint 1102 hrs by UPS THE OF MUMBER / ID NUMBER / ID NUM						Fifth Edit	on October 200	2						, age	1010
TYPE OF METHOD: multiple allution: 98 hrs PP & 48 CD, AEC-100% Upste Time DATE & TIME OF SUBMISSION: OR15111 1030 hrs yUPE Collected: 06/13111 200 hrs Collected: 06/13111 200 hrs LOG NUMBER / ID 08 hrs, SCS BS114 (8.8-2) 90.8 7.68 7.60 7.83 SPECIFIC CONDUCTANCE Unlog 06/1511 1036 hrs SCS BS114 (8.8-2) 90.8 7.68 7.60 7.83 SPECIFIC CONDUCTANCE Unlog 06/1511 1036 hrs SCS BS114 (8.8-2) 90.8 7.68 7.60 7.83 SPECIFIC CONDUCTANCE Unlog 06/1511 1036 hrs SCS BS114 (8.8-2) 90.8 7.66 7.63 3.64 UNITIAL AMMONA: -ppm 06/1511 1036 hrs SCS BCS EPA P165-00(70.843.7) 7.4 406 1.41 61.7 TOTAL ALXINITY: -pm 06/1511 1036 hrs SCS BER P164.60.70.843.7) 7.4 406 0.41 61.7 TOTAL DISOLVED OXY0EN - ppm 06/1511 106 hrs SCS BER P164.60.70.843.7) 7.4 406 0.41 61.7 TOTAL ALSOLVED OXY0EN - ppm 06/15111 100 hrs				erald, IL (P	lant)										-
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TEMPERATURE °C 06/17/11 1100 hrs SCS EAS 106 8.53 8.60 8.52 8.72 8.70 8.64 8.59 8.57 OF CIFIC CONDUCTANCE umbos 06/17/11 1100 hrs SCS EAS 106 24.4	_	11 011	06/17/11												X %AEC
O DISSOLVED OXYGEN - ppm 06/17/11 1100 hrs SCS cal@840 7.5 8.1 7.6 7.9 7.8 8.1 FINAL AMMONIA - ppm	٩	TEMPERATURE °C					0.90							8.57	
O DISSOLVED OXYGEN - ppm 06/17/11 1100 hrs SCS cal@840 7.5 8.1 7.6 7.9 7.8 8.1 FINAL AMMONIA - ppm							274						24.4		
FINAL AMMONIA - ppm	0	DISSOLVED OVVCEN					3/1							1282	
5		FINAL AMMONIA - ppm				04.0010		7.5	8.1	7.6	7.9	7.8	7.8	8.1	
	C		/	1											

Approved by: Alul

Date: 0/ 130/2011

Page 1 of 5

WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027

Fifth Edition October 2002

CLIENT NAME	City of Em	erald, IL (P	lant)	- Har Ear	ion October 200								-
NPDES NUMBER:													
TYPE OF METHOD:	multiple dil	lution, 96 h	rs PP & 48 C	D, AEC=100%				1					
DATE & TIME OF COLLECTION:	06/16/11 0	030 hrs by	City of Emer	ald				Lineter					
DATE & TIME OF SUBMISSION:	06/17/11 1	030 hrs by	UPS			_		Upstream					
INITIAL OBSERVATIONS		TIME	ANALYST	QC LOT	QC EXP VALUE	INT FEEL	INTUC	Lonected:	06/15/11	1900 hrs	by City of E	merald	
LOG NUMBER / ID NUMBER	The second		The Article		AS EA TALOL		1311920A	INT RC					
pH - SU	06/17/11	1045 hrs	JPC	SB114 (8.8-9.2)	8.95			RC4014					
TEMPERATURE °C RECEIVED		1045 hrs	JPC	EAS 106	0.95	7.61	7.76	7.93					
SPECIFIC CONDUCTANCE umhos	06/17/11	1045 hrs	JPC	ERA P185-506(359-407)	371	1	1	24					
HARDNESS - ppm		1045 hrs		ERA P170-507(107-134)		13330	624	239					
CHLORINE - ppm		1045 hrs	JPC	tap water	120	340	260	80					
DISSOLVED OXYGEN - ppm		1045 hrs	JPC		+	<.04	<.04	<0.04					
TOTAL ALKALINITY - ppm		1200 hrs	SCS	cal@840		6.7	7.1	8.3					
INITIAL AMMONIA - ppm		1245 hrs	JPC	Q029-506 (35.4-48.1)	37.6	460	148	52.8					
TOTAL DISSOLVED SOLIDS -ppm	00/21/11	1240 1115	JPC	EAS #1981 (8-12)	10.4	88.8	<0.050	< 0.050					
0 HOUR OBSERVATIONS		TIME	ANALYOF										
pH - SU	-	TIME	ANALYST	QC LOT	QC EXP VALUE	RC	UC	100%	50%	25%	12.50%	6.25%	X %AE
TEMPERATURE °C			SCS	SB114 (8.8-9.2)	8.95	8.02	8.06				7.96	8.00	A TOME
SPECIFIC CONDUCTANCE umhos		1200 hrs		EAS 106		24.2	24.2				24.2	24.2	
		1200 hrs		ERA P185-506(359-407)	371	263	621				2370		-
DISSOLVED OXYGEN - ppm	06/17/11	1200 hrs	SCS	cal@840		7.3	7.9		-		7.7	1464	
72 10110 00050111510110											1.1	7.5	
72 HOUR OBSERVATIONS - PP		TIME		QC LOT	QC EXP VALUE	RC	UC	100%	50%	25%	12 509/	0.050/	1
pH - SU			SCS	SB114 (8.8-9.2)	9.07	7.57	8.06		0070	2370	12.50%	6.25%	X %AEC
TEMPERATURE °C		1200 hrs		EAS 106		24.2	24.2				8.30	8.18	
SPECIFIC CONDUCTANCE umhos				ERA P185-506(359-407)	370	255	621				24.2	24.2	
DISSOLVED OXYGEN - ppm	06/18/11	1200 hrs	SCS	cal@840	-	7.9	7.9				2430	1484	
96 HOUR OBSERVATIONS - PP		TIME	ANALYST	QC LOT	QC EXP VALUE	RC	UC	100%	50%	0.50/	7.6	7.6	
pH - SU			SCS	SB114 (8.8-9.2)	9.07	7.72	8.31	100%	50%	25%	12.50%	6.25%	X %AEC
TEMPERATURE °C	06/19/11	1200 hrs	SCS	EAS 106		24.4	24.4				8.45	8.35	
SPECIFIC CONDUCTANCE umhos	06/19/11	1200 hrs	SCS	ERA P185-506(359-407)	399	261	641				24.4	24.4	
DISSOLVED OXYGEN - ppm	06/19/11	1200 hrs	SCS	cal@840	000	7.6					2440	1491	
FINAL AMMONIA - ppm						1.0	7.6				7.5	7.6	
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Page 10 of 15													
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Approved by:	11				- n/4.	1					1		

Approved by: Mildy

Date: 06/30/2011

Page 2 of 5

WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027 Fifth Edition October 2002

City of Emerald, IL (Plant) EAS LOG# 1311712

Date Test Began: June 15, 2011

Time Test Began: 1100 hrs

Date Test Finished: 06/19/11PP&06/17/11CD

Time Test Finished: 1200 hrs

Analyst 1: DFW Analyst 2: KJR Analyst 3: SCS

P. promelas (PP)

AGE: 5 days

	RC	UC	100%	50%	25%	12.50%	6.25%	X% AEC
PERIOD	ALIVE	ALIVE	ALIVE	ALIVE	ALIVE	ALIVE	ALIVE	ALIVE
0 HR-PP	10,10	10,10	10,10	10,10	10,10	10,10	10,10	
24 HR-PP	10,10	10,10	0,0	0,0	0,0	10,10	10,10	
48 HR-PP	10,10	10,10	0,0	0,0	0,0	1.0	10,10	

Ceriodaphnia dubia (CD)

AGE: <24 hours

HATCH NUMBER: 2338 c-k

HATCH NUMBER: 8636 c-k

	RC	UC	100%	50%	25%	12.50%	6.25%	X% AEC
PERIOD	ALIVE	ALIVE						
0 HR-CD	5,5,5,5	5,5,5,5	5,5,5,5	5,5,5,5	5,5,5,5	5,5,5,5	5,5,5,5	
24 HR-CD	5,5,5,5	5,5,5,5	0,0,0,0	0,0,0,0	5,2,5,2	5,5,5,5	5,5,5,5	
48 HR-CD	5,5,5,5	5,5,5,5	0,0,0,0	0,0,0,0	0,0,0,0	3,1,0,3	5,5,5,5	

Approved by Alitak

Date: 06/30/2011

Page 3 of 5

WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027 Fifth Edition October 2002

City of Emerald, IL (Plant) EAS LOG# 1311712

Date Test Began: June 15, 2011

Time Test Began: 1100 hrs

Date Test Finished: 06/19/11PP&06/17/11CD

Time Test Finished: 1200 hrs

Analyst 1:	DFW
Analyst 2:	KJR
Analyst 3:	SCS

P. promelas (PP)

AGE: 5 days

RC UC 100% 50% 25% 12.50% 6.25% X% AEC PERIOD ALIVE ALIVE ALIVE ALIVE ALIVE ALIVE ALIVE ALIVE **48 HR-PP** 10,10 10,10 0,0 0,0 0,0 1,0 10,10 72 HR-PP 10,10 10,10 0,0 0,0 0,0 1,0 10,10 96 HR-PP 10,10 10,10 0,0 0,0 0,0 0,0 9,9



HATCH NUMBER: 8636 c-k

 Image: Sector of the sector

Page 12 of 15

Approved by: Aludo

Date: 06/20/2011

Page 4 of 5

WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027 Fifth Edition October 2002

City of Emerald, IL (Plant) EAS#: 1311712

Notes & Comments

Page 13 of 15

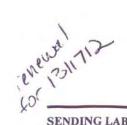
Prepared by:

Date: 00/30/2011

Page 5 of 5

Hipe CHONN IL		PDC Lab	TRACT ORDER poratories, Inc. 061342	11366
SENDING LABORATOR PDC Laboratories, Inc. 2231 W. Altorfer Drive Peoria, IL 61615 Project Manager: Kurt (kstepping@pdclab.com	C. Stepping	-1719	RECEIVING LABORATORY: Environmental Analysis South 4000 East Jackson Blvd Jackson, MO 63755 Phone :573-204-8817	Sample Origin (State) <u>エー</u> PO# <u>L</u> イロ(ふう)
Analysis	Due	Expires	Comme	nts
Sample ID: 1061342-01 01-Wet Single	Water Samp 06/24/11 16:00	06/13/11 17:30	Plant #1311	712 Jempres d=
Sample ID: 1061342-02 D1-Wet Single	Water Samp 06/24/11 16:00	led:06/13/11 17:30 06/15/11 17:30	River # 13117	12 A temprece

	1. 5				Sample Temperature Upon Receipt	C
	lila S.	1	1 10.00		Sample(s) Received on Ice	Y or N
	Relinquished By) Date/Time	Received, By	Date/Time	Proper Bottles Received in Good Condition	Y or N
-	- Al		-A war	1) 6/15/11	Bottles Filled with Adequate Volume	Y or N
7	Relinquished By	Date/Time	Received By	Date/Timeo C	Samples Received Within Hold Time	Y or N
- 1			0	1030 US	Date/Time Taken From Sample Bottle	VorN
					Page 14	4 of 15



SUBCONTRACT ORDER

PDC Laboratories, Inc.

SENDING LABORATOR	<u>Y:</u>		RECEIVING LABORATOR	<u>Y:</u>
PDC Laboratories, Inc. 2231 W. Altorfer Drive Peoria, IL 61615			Environmental Analysis So 4000 East Jackson Blvd Jackson, MO 63755	outh
Project Manager: Kurt (C. Stepping		Phone :573-204-8817	Sample Origin (State)
kstepping@pdclab.com	Phone: 309-683	-1719		PO# 240621
Analysis	Due	Expires	Con	nments
Sample ID: 1061342-01	Water Sam	pled:06/13/11 17:30	Sent (c-14-11
01-Wet Single	06/24/11 16:00	06/15/11 17:30		
Sample ID: 1061342-02	Water Sam	oled:06/13/11 17:30	50.7 6	-19-11
01-Wet Single	06/24/11 16:00	06/15/11 17:30		
Sample ID: 1061342-03	Water Samp	oled:06/16/11 00:30	Plant 111	311920 temprer 4=1
01-Wet Single	06/24/11 16:00	06/18/11 00:30		STISED icmpto
Sample ID: 1061342-04	Water Samp	led:06/15/11 19:00	Upstream	1311920-A
01-Wet Single	06/24/11 16:00	06/17/11 19:00		temprard=1°C
				SS

(1. 31	1 - C-11-1	1 13:57		Sample Temperature Upon Receipt Sample(s) Received on Ice	1.3 c
Relinquished By	,Date/Time	Received By	Date/Time	Proper Bottles Received in Good Condition Bottles Filled with Adequate Volume	Øor N
Relinquished By	Date/Time	Received By	Date/Time	Samples Received Within Hold Time Date/Time Taken From Sample Bottle Page 1	Or N For N 5 of 15
				Pag	ge l of l



PDC Laboratories, Inc. P.O. Box 9071 • Peoria, IL 61612-9071 (309) 692-9688 • (800) 752-6651 • FAX (309) 692-9689



Emerald Performance Materials 1550 County Rd 1450 N Henry, IL 61537 Attn: Jim Hastings Date Received: 07/26/11 11:49 Report Date: 08/31/11 Customer #: 202011 PO#: HE-40014063-UB

Sample No: **1072876-01** Sample Description: **UPSTREAM**

Collect Date: 07/25/11 16:00 Matrix: Waste Water Regular Sample

Parameters	Result	Qual	Analysis Date	Analyst	Method
Miscellaneous - Environmental Analysis South					
WET Testing Single Dilution - subcontracted	1		07/25/11 00:00	Subco	Subcontracted
Sample No: 1072876-02 Sample Description: EFFLUENT			Collect Date: 07/25/11 Matrix: Waste Water R		
Parameters	Result	Qual	Analysis Date	Analyst	Method
Miscellaneous - Environmental Analysis South					
WET Testing Single Dilution - subcontracted	1		07/25/11 00:00	Subco	Subcontracted



PDC Laboratories, Inc. P.O. Box 9071 • Peoria, IL 61612-9071 (309) 692-9688 · (800) 752-6651 · FAX (309) 692-9689



Emerald Performance Materials 1550 County Rd 1450 N Henry, IL 61537 Attn: Jim Hastings

Date Received: 07/26/11 11:49 Report Date: 08/31/11 Customer #: 202011 PO#: HE-40014063-UB

Notes

This report shall not be reproduced, except in full, without the written approval of the laboratory.

PDC Laboratories participates in the following accreditation/certification and proficiency programs at the following locations. Endorsement by Federal or State Governments or their agencies is not implied.

PIA PDC Laboratories - Peoria, IL

NELAC Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100230

Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553 Drinking Water Certifications: Kansas (E-10338); Missouri (870); Wisconsin (998284430); Indiana (C-IL-040); Iowa (240) Wastewater Certifications: Arkansas (88-0677); Wisconsin (998284430); Iowa (240); Kansas (E-10335) Hazardous/Solid Waste Certifications; Arkansas (88-0677); Wisconsin (998284430); Iowa (240); Kansas (E-10335) UST Certification; Iowa (240)

SPM PDC Laboratories - Springfield, MO

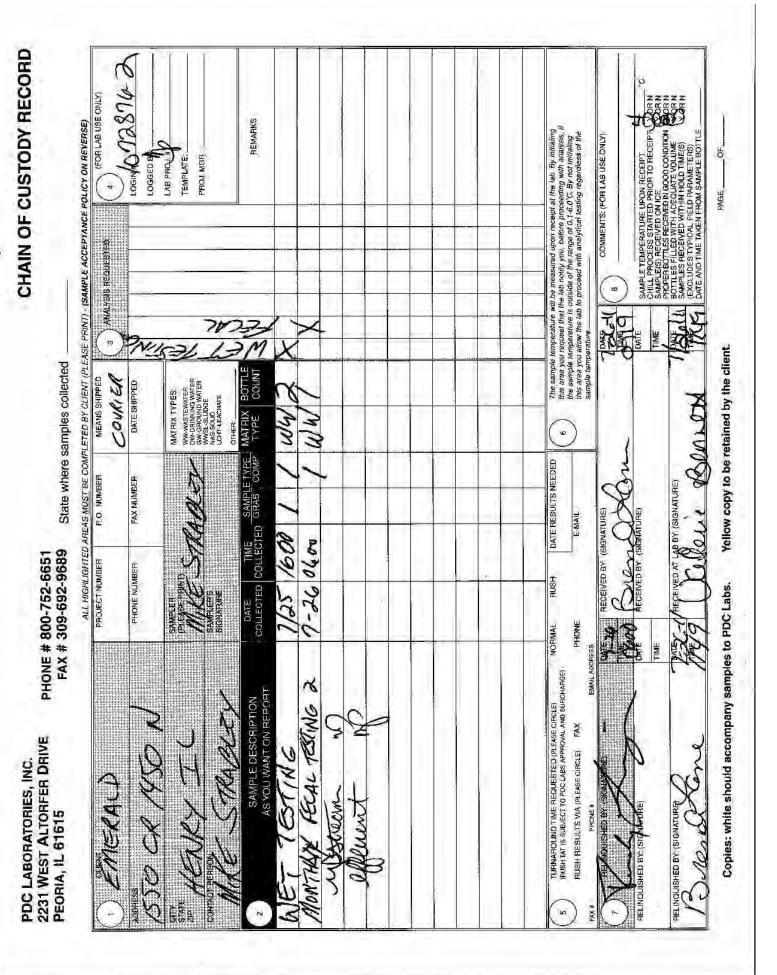
EPA DMR-QA Program

NELAC Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS EPA Lab No. E-10389

WET analysis subcontracted, report attached.

Certified by: Kurt C. Stepping, Senior Project Manager

STL PDC Laboratories - St. Louis, MO



Page 3 of 15

4000 East Jackson Blvd Jackson, MO 63755	
Phone: (573) 204-8817 Fax: (573	1) 204-8818 eas
	FFLUENT TOXICITY TESTING CHAIN OF CUSTODY
	uald
NPDES PERMIT NUMBER: 7	(000/392
EFFLUENT NAME:	GRAB 24 HR COMPOSITE
	(LEGAL NAME) / CINABLE 24 HK COMPOSITE OF
COLLECTION DATA: START	DATE: 1/25 START TIME: 1000000
	7/5 1000
FINISH	DATE: 1/00 FINISH TIME: 1600
UPSTREAM NAME: ILL 1	(LEGAL WAME) (GRAB SAMPLE)
COLLECTION DATA: DATE:	7/25/11 TIME: 1600
MIL	TIME: 1000
SAMPLER NAME: //// C	CARRIER:
Disclaimer: Environmental Analysis test (WET) or shipping charges resu • Sampling & holding time e	s South, Inc. shall not be held financially liable for invalid whole effluent toxicity ulting from the following reasons: errors (Will results in a setup charge of \$100 to the client)
Disclaimer: Environmental Analysis test (WET) or shipping charges resu • Sampling & holding time e • Commercial carrier deliver	s South, Inc. shall not be held financially liable for invalid whole effluent toxicity liting from the following reasons:
Disclaimer: Environmental Analysis test (WET) or shipping charges resu • Sampling & holding time e • Commercial carrier deliver • Problems with health or de	s South, Inc. shall not be held financially liable for invalid whole effluent toxicity liting from the following reasons: errors (Will results in a setup charge of \$100 to the client) y problems or errors (Will results in a setup charge of \$100 to the client) livery of test organisms by vendor (No setup charge to client)
Disclaimer: Environmental Analysis test (WET) or shipping charges resu • Sampling & holding time e • Commercial carrier deliver • Problems with health or de • NO HEADSPACE IN BOTTLES D • STILLES BY NEXT DAY C	s South, Inc. shall not be held financially liable for invalid whole effluent toxicity liting from the following reasons: arrors (Will results in a setup charge of \$100 to the client) y problems or errors (Will results in a setup charge of \$100 to the client) livery of test organisms by vendor (No setup charge to client) SAMPLER CHECK LIST
 Disclaimer: Environmental Analysistest (WET) or shipping charges resu Sampling & holding time e Commercial carrier deliver Problems with health or de NO HEADSPACE IN BOTTLES IN SAMPLES BY NEXT DAY CONTINUES AND TO BE HAND DELIVE 	s South, Inc. shall not be held financially liable for invalid whole effluent toxicity ulting from the following reasons: arrors (Will results in a setup charge of \$100 to the client) y problems or errors (Will results in a setup charge of \$100 to the client) livery of test organisms by vendor (No setup charge to client) SAMPLER CHECK LIST CARRIER OR DELIVER TO LAB ON 7,27,44,00 RED TO LABORATORY SAME DAY AS TEST SETUR.
Disclaimer: Environmental Analysis test (WET) or shipping charges resu • Sampling & holding time e • Commercial carrier deliver • Problems with health or de • Problems with health or de • NO HEADSPACE IN BOTTLES I SHIP SAMPLES BY NEXT DAY C SAMPLES TO BE HAND DELIVE SUFFICIENT ICE TO COOL SAM	s South, Inc. shall not be held financially liable for invalid whole effluent toxicity liting from the following reasons: arrors (Will results in a setup charge of \$100 to the client) y problems or errors (Will results in a setup charge of \$100 to the client) livery of test organisms by vendor (No setup charge to client) SAMPLER CHECK LIST CARRIER OR DELIVER TO LAB ON 7, 27, 4 CRED TO LABORATORY SAME DAY AS TEST SETUP D PLES TO A RANGE OF 0 - 6°C WHEN SHIPPING OVERNIGHT D
 Disclaimer: Environmental Analysistest (WET) or shipping charges resu Sampling & holding time e Commercial carrier deliver Problems with health or de NO HEADSPACE IN BOTTLES IN SAMPLES BY NEXT DAY CONTINUES AND TO BE HAND DELIVE 	s South, Inc. shall not be held financially liable for invalid whole effluent toxicity ulting from the following reasons: arrors (Will results in a setup charge of \$100 to the client) y problems or errors (Will results in a setup charge of \$100 to the client) livery of test organisms by vendor (No setup charge to client) SAMPLER CHECK LIST CARRIER OR DELIVER TO LAB ON 7,27,44,00 RED TO LABORATORY SAME DAY AS TEST SETUR.
NO HEADSPACE IN BOTTLES D SAMPLES BY NEXT DAY C SAMPLES TO BE HAND DELIVE SUFFICIENT ICE TO COOL SAM RELINQUISHED BY:	AME) as South, Inc. shall not be held financially liable for invalid whole effluent toxicity alting from the following reasons: errors (Will results in a setup charge of \$100 to the client) by problems or errors (Will results in a setup charge of \$100 to the client) by problems or errors (Will results in a setup charge of \$100 to the client) bivery of test organisms by vendor (No setup charge to client) SAMPLER CHECK LIST CARRIER OR DELIVER TO LAB ON 7, 27, 4, 50 RED TO LABORATORY SAME DAY AS TEST SETUP D PLES TO A RANGE OF 0 - 6° C. WHEN SHIPPING OVERNIGHT D MADDATE: 7-26-11 TIME: DUBY
Disclaimer: Environmental Analysis test (WET) or shipping charges resu • Sampling & holding time e • Commercial carrier deliver • Problems with health or de NO HEADSPACE IN BOTTILES D SHIP SAMPLES BY NEXT DAY C SAMPLES TO BE HAND DELIVE SUFFICIENT ICE TO COOL SAM RELINQUISHED BY:	AME) s South, Inc. shall not be held financially liable for invalid whole effluent toxicity ulting from the following reasons: arrors (Will results in a setup charge of \$100 to the client) y problems or errors (Will results in a setup charge of \$100 to the client) livery of test organisms by vendor (No setup charge to client) SAMPLER CHECK LIST CARRIER OR DELIVER TO LAB ON 7,27,44 ERED TO LABORATORY SAME DAY AS TEST SETUP D PLES TO A RANGE OF 0 - 6°C WHEN SHIPPING OVERNIGHT D MADDLER CHECK LIST DATE: 7-26-11 TIME: DUBY
Disclaimer: Environmental Analysis test (WET) or shipping charges resu • Sampling & holding time e • Commercial carrier deliver • Problems with health or del • Problems with health or de	AME) s South, Inc. shall not be held financially liable for invalid whole effluent toxicity atting from the following reasons: attors (Will results in a setup charge of \$100 to the client) y problems or errors (Will results in a setup charge of \$100 to the client) livery of test organisms by vendor (No setup charge to client) SAMPLER CHECK LIST CARRIER OR DELIVER TO LAB ON 7, 27, 4, 50 RED TO LABORATORY SAME DAY AS TEST SETUP 0 PLES TO A RANGE OF 0 - 6° C WHEN SHIPPING OVERNIGHT 0 MBER:
Disclaimer: Environmental Analysis test (WET) or shipping charges resu • Sampling & holding time e • Commercial carrier deliver • Problems with health or del • Problems with health or del • Problems with health or del • NO HEADSPACE IN BOTTILES I SHIP SAMPLES BY NEXT DAY C SAMPLES TO BE HAND DELIVE SUFFLIENT ICE TO COOL SAM RELINQUISHED BY: LABORATORY USE ONLY EFFLUENT LOG NUM RECEIVED TEMPERATURE:	MME) s South, Inc. shall not be held financially liable for invalid whole effluent toxicity ulting from the following reasons: strors (Will results in a setup charge of \$100 to the client) y problems or errors (Will results in a setup charge of \$100 to the client) livery of test organisms by vendor (No setup charge to client) SAMPLER CHECK LIST CARRIER OR DELIVER TO LAB ON PLES TO A RANGE OF 0 - 6° C WHEN SHIPPING OVERNIGHT 0 MBER:
Commercial Analysis test (WET) or shipping charges resu Sampling & holding time e Commercial carrier deliver Problems with health or de NO HEADSPACE IN BOTTILES G SHIP SAMPLES TO BE HAND DELIVE SUFFICIENT ICE TO COOL SAM RELINQUISHED BY: LABORATORY USE ONLY EFFLUENT LOG NUM RECEIVED TEMPERATURE: HEADSPACE: YES or NO	MME) s South, Inc. shall not be held financially liable for invalid whole effluent toxicity diting from the following reasons: arrors (Will results in a setup charge of \$100 to the client) y problems or errors (Will results in a setup charge of \$100 to the client) livery of test organisms by vendor (No setup charge to client) SAMPLER CHECK LIST SAMPLER OR DELIVER TO LAB ON TARRIER OR DELIVER TO LAB ON PLES TO A RANGE OF 0 - 6°C WHEN SHIPPING OVERNIGHT 0 WHEN DATE: 7-240-11 TIME: DUM MBER: C THERMOMETER ASSIGNED NUMBER: SAMPLES ICED or Delivered or Delivered or Date: THERMOMETER ASSIGNED NUMBER: SAMPLES ICED or Delivered or Delivered or SAMPLES ICED or
Commercial Analysis test (WET) or shipping charges resu Sampling & holding time e Commercial carrier deliver Problems with health or de NO HEADSPACE IN BOTTLES G SHIP SAMPLES BY NEXT DAY C SAMPLES TO BE HAND DELIVE SUFFICIENT ICE TO COOL SAM RELINQUISHED BY: LABORATORY USE ONLY EFFLUENT LOG NUM RECEIVED TEMPERATURE: HEADSPACE: YES or NO UPSTREAM LOG NUM	SME s South, Inc. shall not be held financially liable for invalid whole effluent toxicity ulting from the following reasons: servers (Will results in a setup charge of \$100 to the client) y problems or errors (Will results in a setup charge of \$100 to the client) livery of test organisms by vendor (No setup charge to client) SAMPLER CHECK LIST CARRIER OR DELIVER TO LAB ON RED TO LABORATORY SAME DAY AS TEST SETUP D PLES TO A RANGE OF 0 - 6° C WHEN SHIPPING OVERNIGHT D MBER: °C THERMOMETER ASSIGNED NUMBER: SAMPLES ICED or DELIVERED SAME DAY AS TEST
Problems Disclaimer: Environmental Analysis test (WET) or shipping charges resule Sampling & holding time e Commercial carrier deliver Problems with health or deliver Problems with health or deliver NO HEADSPACE IN BOTTILES of SHIP SAMPLES BY NEXT DAY CONTRACT SAMPLES TO BE HAND DELIVE SUFFICIENT ICE TO COOL SAME RELINQUISHED BY: LABORATORY USE ONLY EFFLUENT LOG NUN RECEIVED TEMPERATURE: HEADSPACE: YES or NO UPSTREAM LOG NUN RECEIVED TEMPERATURE:	MME) s South, Inc. shall not be held financially liable for invalid whole effluent toxicity diting from the following reasons: arrors (Will results in a setup charge of \$100 to the client) y problems or errors (Will results in a setup charge of \$100 to the client) livery of test organisms by vendor (No setup charge to client) SAMPLER CHECK LIST SAMPLER OR DELIVER TO LAB ON TARRIER OR DELIVER TO LAB ON PLES TO A RANGE OF 0 - 6°C WHEN SHIPPING OVERNIGHT 0 WHEN DATE: 7-240-11 TIME: DUM MBER: C THERMOMETER ASSIGNED NUMBER: SAMPLES ICED or Delivered or Delivered or Date: THERMOMETER ASSIGNED NUMBER: SAMPLES ICED or Delivered or Delivered or SAMPLES ICED or

X SAMPLE FOR EVALUATION CHECK REASON FOR SHIPMENT DATE ENTERED 7-20- 1 SALES OF PROPERTY CONTAINERS - RETURNED FOR CREDIT REJECT ED - RETURNED FOR REPLACEMENT ACCOUNT 6100.1014 PLANT LOCATION PURCHASING DEPT. APPROVAL TO BE PREPARED AND RETURNED TO: DEPT, NO. AUTHORIZED BY Mike Strabley LOAN OF PROPERTY REJECT ED - RETURNED FOR CREDIT SHIPPING ORDER 2478 HENRY MATERIAL RECEIVED BY: Name: INSTRUCTION TO VENDOR HAZARDOUS YES X NO F.O.B. DATE SHIPPED OUR PURCHASE HE-40007640 SOLD TO SHIPPED FROM Henry, IL Plant Effluent **Primary Effluent** PDC Lab ſ 26+ 61537 8 + Henry, IL. 61537 Emerald Performance Materials DESCRIPTIONS 1550 County Road 1450 N. a COLLECT PREPAID SHIP VIA TESTING Box No: SHIP TO YOUR INVOICE DATE YOUR INVOICE NO. PDC Lab Date Received: REQUIRED DELIVERY DATE Lab Results: VALUE IF OVER \$250 SAMAS GROSE WT QUANTITY e SHIPPED UNIT SACC 5000 CHECKED BY O.S.D.& R. REPORT NUMBER BILL OF LADING NUMBER P19transportation a and are in proper cond described, packaged, marked and labeled, materials are properly classified, PRICE ein Ba. This is to certify that the above named PLEASE USETHE ABOVE NUMBER WHEN CORRESPONDING SHIPPING ORDER NUMBER TOTAL NCX Ľ the applicable

Electronic Filing - Recived, Clerk's Office : 04/12/2013

Environmental Analysis South, Inc.



4000 East Jackson Blvd. • Jackson, MO 63755 • 573-204-8817 • Fax 573-204-8818

REPORT OF ACUTE TOXICITY TESTING City of Emerald, IL Plant Effluent, AEC = 100%

EAS LOG# 1314124 July 27, 2011 through July 29, 2011

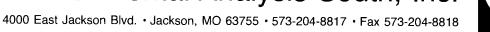
Tests performed by:

John P. Clippard / Chemical Analyst at Environmental Analysis South (EAS) Kelly J. Ray / Biologist at Environmental Analysis South (EAS) Sara C. Shields / Lab Supervisor - Chemist at Environmental Analysis South (EAS) David F. Warren / Lab Director - Chemist at Environmental Analysis South (EAS)

- 1. Report Summation
 - 1.1. Data Summation
 - 1.2. Conclusion
- 2. Method Summation
 - 2.1. Test Conditions and Methods
 - 2.2. Potassium chloride Reference Salt Test
 - 2.2.1. Pimephales promelas data
 - 2.2.2. Ceriodaphnla dubla data
 - 2.3. Literature Cited
- 3. Raw Data Bench Sheets
 - 3.1. Initial observations (page 1)
 - 3.2. Zero hour Observations (page 1)
 - 3.3. Twenty-four (24) Forty-eight (48) hour Observations (page 1)
 - 3.4. Seventy-two (72) Ninety-six (96) hour Observations (page 2)
 - 3.5. Survival Data Table (page 3-4)
 - 3.6. Test Comments (page 5)
- 4. Chain of Custody

Page 1 of 4

Environmental Analysis South, Inc.





REPORT OF ACUTE TOXICITY TESTING City of Emerald, IL Plant Effluent, AEC = 100%

EAS LOG# 1314124 July 27, 2011 through July 29, 2011

1. REPORT SUMMATION:

1.1. Multiple Dilution Data Summation

Test Solution	Pimephales promelas Acute Toxicity Test <u>48</u> Hour Survival	Ceriodaphnia dubia Acute Toxicity Test 48 Hour Survival
Reconstituted Control (RC)	100%	100%
Reconstituted Control + Sodium Thiosulfate (RCT)	100%	100%
Upstream Control (UC)	100%	100%
6.25% Effluent	95%	100%
12.5% Effluent	0%*	50%*
25% Effluent	0%*	0%*
50% Effluent	0%*	0%*
100% Effluent	0%*	0%*
Estimated LC50 Value	8.68% Effluent	12.50% Effluent (10.71% - 14.60%)

* Indicates a significant difference at alpha = 0.5 between effluent and control survival data.

Conclusion:

Pimephales promelas 48 hour WET results:

Ceriodaphnia dubia 48 hour WET results:

LC 50 =8.68% using Trimmed Spearman-Karber NOAEC = 6.25% using Steel's Many-One Rank Test LC 50 =12.50% using Trimmed Spearman-Karber NOAEC = 6.25% using Steel's Many-One Rank Test

Note: Per the method, test duration for the *Pimephales promelas* should have been 96 hrs. However, due to UPS failure to deliver the renewal effluent, the test was terminated at 48 hours. These results were calculated using the 48 hour data.

Approved by Sara C. Shields, Chemist

Page 2 of 4

Environmental Analysis South, Inc.



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REPORT OF ACUTE TOXICITY TESTING City of Emerald, IL Plant Effluent, AEC = 100%

EAS LOG# 1314124 July 27, 2011 through July 29, 2011

2. TEST METHOD SUMMARY 2.1. TEST CONDITIONS AND METHODS:

	Ceriodaphnia dubia:	Pimephales promelas:
Test duration:	48 hours	48 hours
Temperature:	24 - 26 degree Celsius	24 - 26 degree Celsius
Light quality:	Ambient laboratory illumination	Ambient laboratory illumination
Photoperiod:	16 hour light, 8 hours dark	16 hour light, 8 hours dark
Control Water:	Moderately Hard Reconstituted Water	Moderately Hard Reconstituted Water
Dilution Water:	Upstream Water - If unavailable or	Upstream Water - If unavailable or toxic, then control water will be used.
Size of test vessel:	30 milliliters	250 milliliters
Volume of test solution:	15 milliliters	200 milliliters
Age of test organisms:	<24 hours	1 -14 days (all same age)
Number of organisms/test vessel:	5	10
Number of replicates/concentration:	4	2
Number of organisms/concentration:		40 for a single dilution test and 20 for a multiple dilution test
Feeding regime:	None (fed prior to test)	None (fed prior to test)
Aeration:		None
Test acceptability criterion:	90% or greater survival in controls	90% or greater survival in controls

The methodology used for the chemistry data was taken from the *Standard Methods for the Examination* of Water and Wastewater, 18th edition (1992). The exception was hardness, which was determined using a Hach EDTA titration test kit. The toxicity tests follow guidelines laid out in the permittee's NPDES permit and were conducted according to EPA approved methods (USEPA 2002).

All test organisms were cultured according to EPA approved methods (USEPA 2002). The *Ceriodaphnia dubia* and the *Pimephales promelas* were obtained from C-K Associates Inc. located in Baton Rouge, Louisiana and shipped overnight for use in the whole effluent toxicity test.

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REPORT OF ACUTE TOXICITY TESTING City of Emerald, IL Plant Effluent, AEC = 100%

EAS LOG# 1314124 July 27, 2011 through July 29, 2011

2.2. REFERENCE TOXICITY TEST:

Environmental Analysis South performs monthly reference toxicity tests. The most recent reference test was initiated on July 6, 2011 using KCL Lot #41713. Following are the results:

2.2.1. *P. promelas* - 48 hr. Acute Test – LC₅₀ = 1.068 g/l 95%Cl (0.7311-1.405 g/l) EAS %CV = 15.8% National Warning Limits (75th percentile) = 19%CV

National Control Limits (90th percentile) = 33%CV

2.2.2. C. dubia - 48 hr. Acute Test - LC₅₀ = 0.463 g/l 95%Cl (0.294-0.632g/l)

EAS %CV = 18.3%

National Warning Limits (75th percentile) = 29%CV National Control Limits (90th percentile) = 34%CV

2.3. LITERATURE CITED:

- 1. APHA. 1992. Standard methods for the examination of water and wastewater, 18th Ed. American Public Health Association, Washington, D.C.
- 2. USEPA. 2002. Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms, 5th Ed. EPA-821-R-02-012
- USEPA 2000. Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications under the National Pollutant Discharge Elimination System, (Table B-2). June 2000. EPA 833-R-00-003.

Page 4 of 4

			ЭНМ	WHOLE EFFLUENT	⊢	EST conducted in accordance with US EPA 600/4-90/027 Fifth Edition October 2002	with US	EPA 600	/4-90/027				Page 1 of 5	of 5
	CLIENT NAME:	City of Emerald, IL (Plant)	srald, IL (Pl	ant)										
	NPDES NUMBER:													
			ution, 96 hrs	multiple dilution, 96 hrs PP & 48 CD,), AEC=100%									
_			300 hrs by (07/27/11 1600 hrs by City of Emerad	q				Upstream: River	River				
		07/27/11 10	005 hrs by (UPS		- 1			Collected: (07/27/11 0	710 hrs by	Collected: 07/27/11 0710 hrs by Natalie Harris	rris	
	INITIAL OBSERVATIONS	DATE	TIME	ANALYST	QC LOT	QC EXP VALUE	INT EFFL	INT UC	INT RC					
	LOG NUMBER / ID NUMBER						1314124	1314124A	4017					
	DN - Hd		07/27/11 1015 hrs	SCS	SB114 (8.8-9.2)	8.98	7.84	8.50	7.94					
	TEMPERATURE ^o C RECEIVED		07/27/11 1015 hrs	scs	EAS 106		2	1	24					
ŝ	SPECIFIC CONDUCTANCE umhos		07/27/11 1015 hrs	SCS	ERA506-010511(401-457)	434	19350	875	247					
	HARDNESS - ppm		07/27/11 1015 hrs	scs	ERA P170-507(107-134)	120	320	200	80					
	CHLORINE - ppm		07/27/11 1015 hrs	SCS	tap water	+	0.72	≤0.04	<0.04					
	DISSOLVED OXYGEN - ppm		07/27/11 1015 hrs	scs	cal@840		\$	6.2	7.5					
	TOTAL ALKALINITY - ppm		07/28/11 1500 hrs	scs	ERA506-010511(60.1-71.9		949	212	64.7					
	INITIAL AMMONIA - ppm		08/03/11 1400 hrs	JPC	EAS #1981 (8-12)	10.1	99.9	0.227	<0.05					
7	TOTAL DISSOLVED SOLIDS -ppm													
		DATE	TIME	ANALYST	QC LOT	QC EXP VALUE	RC	nc	100%	50%	25%	12.50%	6.25%	RCT
	NS - Hd		07/27/11 1100 hrs		SB114 (8.8-9.2)	8.98	8.22	8.27	8.13	8.19	8.24	8.25	8.22	8.40
	TEMPERATURE °C		07/27/11 1100 hrs	scs	EAS 106		24.1	24.0	24.5	24.5	24.3	24.1	23.9	24.1
S	SPECIFIC CONDUCTANCE umhos		07/27/11 1100 hrs	scs	ERA506-010511(401-457)	434	257	843	18340	10090	5500	3150	1948	306
	DISSOLVED OXYGEN - ppm		07/27/11 1100 hrs	scs	cal@840		7.2	8.7	8.4	8.6	8.6	8.7	8.7	7.4
					· · · · · · · · · · · · · · · · · · ·									
	24 HOUR OBSERVATIONS - PP DATE	DATE	TIME	ANALYST	QC LOT	QC EXP VALUE	RC	Ŋ	100%	50%	25%		6.25%	RCT
	NS - Hd		07/28/11 1100 hrs	scs	SB114 (8.8-9.2)	8.91	7.83	8.17	8.27	8.29	8.26	8.32	8.26	7.93
	TEMPERATURE °C		07/28/11 1100 hrs	scs	EAS 106		25.3	25.3	25.3	25.3	25.3	25.3	25.3	25.3
З,	SPECIFIC CONDUCTANCE umhos		07/28/11 1100 hrs	scs	ERA506-010511(401-457)	427	267	846	18250	0666	5480	_	1938	307
	DISSOLVED OXYGEN - ppm		07/28/11 1100 hrs		cal@840		6.5	6.2	3.4	3.4	4.4	6.2	5.8	6.2
	48 HOUR OBSERVATIONS - PP	ã	TIME	YST	QC LOT	QC EXP VALUE	ň	S	100%	50%			6.25%	RCT
	US - Hq		07/29/11 1100 hrs	scs	SB114 (8.8-9.2)	8.93	7.69	8.08	8.33	8.33	8.32	8.35	8.30	8.11
	TEMPERATURE °C		07/29/11 1100 hrs	scs	EAS 106		24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1
5	SPECIFIC CONDUCTANCE umhos		07/29/11 1100 hrs	scs	ERA506-010511(401-457)	424	277	870	18540	10190	5570	3190	1988	326
	DISSOLVED OXYGEN - ppm		07/29/11 1100 hrs	scs	cal@840		6.5	6.5	2.2	3.1	4.1	5.0	5.5	6.8
	FINAL AMMONIA - ppm													
	24 HOLIB OBSERVATIONS - CD DATE	DATE	TIME	ANA! VST	001.01		u a	5	100%	50%	25%	12 50%	6 25%	ECT.
	US - Ha	07/28/11	07/28/11 1100 hrs	scs	SB114 (8.8-9.2)	8.91	8.48	8.34	8.31	8.38	8.35	╋	8.40	8.16
	TEMPERATURE °C		07/28/11 1100 hrs	scs	EAS 106		25.3	25.3	25.3	25.3	25.3	25.3	25.3	25.3
SF	SPECIFIC CONDUCTANCE umhos		07/28/11 1100 hrs	scs	ERA506-010511(401-457)	427	263	825	17970	9940	5250	3000	1920	280
l	DISSOLVED OXYGEN - ppm		07/28/11 1100 hrs	scs	cal@840		7.1	7.0	6.0	6.6	7.0	7.2	7.2	6.9
	-	DATE	TIME	ANALYST	QC LOT	QC EXP VALUE	RC	nc	100%	50%	25%	12.50%	6.25%	RCT
u			07/29/11 1100 hrs	scs	SB114 (8.8-9.2)	8.93	8.27	8.19	8.26	8.45	8.50	8.48	8.39	8.20
<u>, </u>	TEMPERATURE °C		07/29/11 1100 hrs	scs	EAS 106		24.1	24.5	24.5	24.5	24.5	24.5	24.5	24.5
	<i>(</i>)		07/29/11 1100 hrs	scs	ERA506-010511(401-457)	424	255	795	17620	9770	5190	2980	1880	304
51	DISSOLVED OXYGEN - ppm		07/29/11 1100 hrs	scs	cal@840		6.8	7.3	7.4	7.5	7.5	7.4	7.4	7.5
	Livel AMMONIA - ppm	Ń					ļ							
	(re /	•			•								

Date: C&/04/Du

Approved by:

		M	OLE EFFL	WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027 Eith Edition October 2002	Conducted in accordance	e with US E	EPA 600/	4-90/027				Page 2 of 5	of 5
CLIENT NAME:													
NPDES NUMBER:													
TYPE OF METHOD:													
DATE & TIME OF SUBMISSION:	UPS failure	to deliver	sample										
INITIAL OBSERVATIONS DATE	DATE	TIME	ANALYST	QC LOT	QC EXP VALUE	INT EFFL INT UC		INT RC					
LOG NUMBER / ID NUMBER													
NS-Hd				SB114 (8.8-9.2)									
TEMPERATURE °C RECEIVED				EAS 106									
SPECIFIC CONDUCTANCE umhos				ERA506-010511(401-457)									
HARDNESS - ppm				ERA P170-507(107-134)									
CHLORINE - ppm				tap water									
DISSOLVED OXYGEN - ppm				cal@840									
TOTAL ALKALINITY - ppm				ERA P173-506(42.8-49.6)									
INITIAL AMMONIA - ppm				EAS #1981 (8-12)									
TOTAL DISSOLVED SOLIDS -ppm													
0 HOUR OBSERVATIONS DATE	DATE	TIME	ANALYST	QC LOT	QC EXP VALUE	S	S	100%	50%	25%	12.50%	6.25%	RCT
DR - Hq				SB114 (8.8-9.2)									
TEMPERATURE °C				EAS 106									
SPECIFIC CONDUCTANCE umhos				ERA506-010511(401-457)									
DISSOLVED OXYGEN - ppm				cal@840									
72 HOUR OBSERVATIONS - PP DATE	DATE	TIME	ANALYST	QC LOT	QC EXP VALUE	ßC	с	100%	50%	25%	12.50%	6.25%	RCT
NS - Hd				SB114 (8.8-9.2)									
TEMPERATURE °C													
SPECIFIC CONDUCTANCE umhos				ERA506-010511(401-457)									
DISSOLVED OXYGEN - ppm				cal@840									
96 HOUR OBSERVATIONS - PP DATE	DATE	TIME	ANALYST	QC LOT	QC EXP VALUE	RC	З	100%	50%	25%	12.50%	6.25%	RCT
NS - Hd				SB114 (8.8-9.2)									
TEMPERATURE °C				EAS 106									
SPECIFIC CONDUCTANCE umhos				ERA506-010511(401-457)									
DISSOLVED OXYGEN - ppm				cal@840									
FINAL AMMONIA - ppm													
										ľ			
F									T				T
Pag									┦		T		
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of 1													T
5	10	1			~]

Date: *CS\04\90*/

Approved by:

WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027 Fifth Edition October 2002

EAS LOG# 1314124 City of Emerald, IL (Plant)

Time Test Began: 1100 hrs	Time Test Finished: 1100 hrs
July 27, 2011	July 29, 2011
Date Test Began:	Date Test Finished:

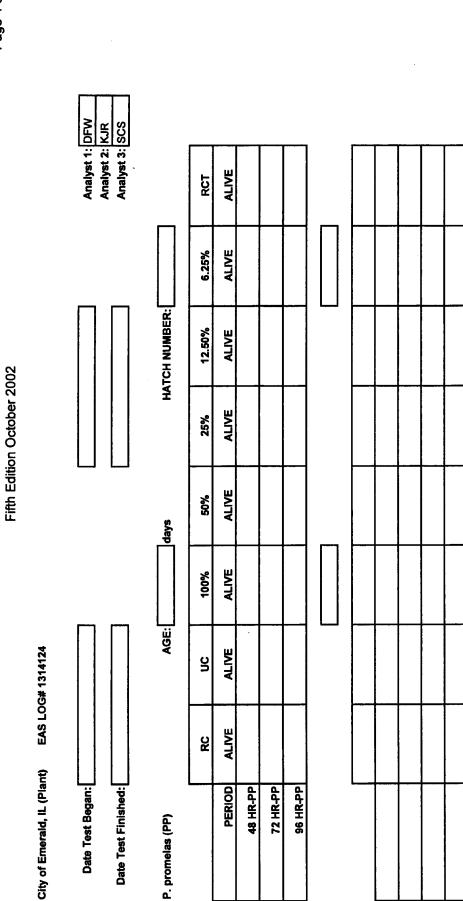
Analyst 1: DFW Analyst 2: KJR Analyst 3: SCS

-		9	6 days	¥1	HATCH NUMBER: 8078 c-K	8078 c-k	
RC	2	100%	50%	25%	12.50%	6.25%	RCT
PERIOD ALIVE	ALIVE	ALIVE	ALIVE	ALIVE	ALIVE	ALIVE	ALIVE
0 HR-PP 10,10	10,10	10,10	10,10	10,10	10,10	10,10	10,10
24 HR-PP 10,10	10,10	0,0	0,0	0'0	5,9	10,10	10,10
48 HR-PP 10,10	10,10	0,0	0,0	0,0	0,0	10,9	10,10

	2	9	10001	700	950	40 506	6 9F8/	1 L
	ž	3	%00L	%nc	4/67	%/NC.71	9/ 67-0	2
PERIOD	ALIVE							
0 HR-CD	5,5,5,5	5,5,5,5	5,5,5,5	5,5,5,5	5,5,5,5	5,5,5,5	5,5,5,5	5,5,5,5
24 HR-CD	5,5,5,5	5,5,5,5	0'0'0'0	0'0'0'0	0,1,2,2	5,5,5,5	5,5,5,5	5,5,5,5
48 HR-CD	5.5.5.5	5.5.5.5	0.0.0.0	0.0.0	0.0.0	2.3.3.2	5.5.5.5	5.5.5.5

Date: 08/04/2011

Approved by: Refler



Page 4 of 5

WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027

Approved by;

Page 13 of 15

Page 5 of 5

WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027 Fifth Edition October 2002

City of Emerald, IL (Plant) EAS#: 1314124

ample aerated prior to test initiation due to low initial DO upon arrival ample and reconstituted control treated with sodium thiosulfate prior to test initiation due to presence of chlorine 6 hour PP test was terminated at 48 hours due to UPS failure to deliver the renewal effluent.	Notes & Comments
ample and reconstituted control treated with scolum thiosulfate prior to test initiation due to presence of chlorine 5 hour PP test was terminated at 48 hours due to UPS failure to deliver the renewal effluent.	ample aerated prior to test initiation due to low initial DO upon arrival
5 hour PP lest was terminated at 48 hours due to UPS failure to deliver the renewal effluent.	ample and reconstituted control treated with sodium thiosulfate prior to test initiation due to presence of chlorine
) hour PP test was terminated at 48 hours due to UPS failure to deliver the renewal effluent.

Page 14 of 15

Prepared by: XXICa

Date: 08/04/2011

	Electronic Fi	ling - Recived	, Clerk's Office : 04/12/2013	11/120
Multiple	•	PDC Lab	IRACT ORDER oratories, Inc. 172876	114130
SENDING LABORATORY: PDC Laboratories, Inc. 2231 W. Altorfer Drive Peona, IL 61615 Project Manager: Kurt C. kstepping@pdclab.com	Stepping	1719	RECEIVING LABORATORY: Environmental Analysis South 4000 East Jackson Blvd Jackson, MO 63755 Phone :573-204-8817 Sample Origin (State PO#39	a) 35/
Analysis	Due	Expires	Comments	tempre
Sample ID: 1072876-01	Water Samp	ed:07/25/11 16:00	Eminald 1314124A	Dec -
Sample ID. 1012010-01		the second se		
01-Wet Single	08/05/11 16:00	07/27/11 16:00		(55)
	08/05/11 16:00	07/27/11 16:00 led:07/25/11 16:00 07/27/11 16:00	Emerald	2°C

	<u> </u>	the second s		
			Sample Temperature Upon Receipt	c
	V	Abelli in	Sample(s) Received on Ice	Y or N
Normall.	Vittop	Received By Date/Time	Proper Bottles Received in Good Condition	Y or N
Relinquished By	Date/Time	(Received By Date/Time,	Bottles Filled with Adequate Volume	Y or N
	\sim	Any Warnen 1005	Samples Received Within Hold Time	Y or N
Relinguished By	Date/Time	Received By Date/Time	00	V or N
		$0 \cdot 0$	Date/Time Taken From Sample Page 1	5 of 15
	a the second			



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Emerald Performance Materials 1550 County Rd 1450 N Henry, IL 61537 Attn: Jim Hastings Date Received: 10/11/11 13:37 Report Date: 10/28/11 Customer #: 202011 PO#: HE-40014063-UB

Collect Date: 10/10/11 16:00

Sample No: **1101004-01** Sample Description: **UPSTREAM**

Sample Description: UPSTREAM			Matrix: Waste Water F		
Parameters	Result	Qual	Analysis Date	Analyst	Method
Miscellaneous - Environmental Analysis South					
WET Testing Single Dilution - subcontracted	SUBCON		10/12/11 00:00		Subcontracted
Sample No: 1101004-02			Collect Date: 10/10/11	16:00	
Sample Description: EFFLUENT			Matrix: Waste Water		
Parameters	Result	Qual	Analysis Date	Analyst	Method
Miscellaneous - Environmental Analysis South					
WET Testing Single Dilution - subcontracted	SUBCON		10/12/11 00:00		Subcontracted
Sample No: 1101004-03			Collect Date: 10/12/11	16:00	
Sample Description: ADDL UP			Matrix: Waste Water F	Regular Sample	
Parameters	Result	Qual	Analysis Date	Analyst	Method
Miscellaneous - Environmental Analysis South					
WET Testing Single Dilution - subcontracted	SUBCON		10/12/11 00:00		Subcontracted
Sample No: 1101004-04			Collect Date: 10/12/11		
Sample Description: ADDL EFF			Matrix: Waste Water F	Regular Sample	

Parameters	Result	Qual	Analysis Date	Analyst Method
Miscellaneous - Environmental Analysis South				
WET Testing Single Dilution - subcontracted	SUBCON		10/12/11 00:00	Subcontracted



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Emerald Performance Materials 1550 County Rd 1450 N Henry, IL 61537 Attn: Jim Hastings

Date Received: 10/11/11 13:37 Report Date: 10/28/11 Customer #: 202011 PO#: HE-40014063-UB

Notes

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PDC Laboratories participates in the following accreditation/certification and proficiency programs at the following locations. Endorsement by Federal or State Governments or their agencies is not implied.

PIA PDC Laboratories - Peoria, IL

NELAC Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100230

Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553 Drinking Water Certifications: Kansas (E-10338); Missouri (870); Wisconsin (998284430); Indiana (C-IL-040); Iowa (240) Wastewater Certifications: Arkansas (88-0677); Wisconsin (998284430); Iowa (240); Kansas (E-10335) Hazardous/Solid Waste Certifications; Arkansas (88-0677); Wisconsin (998284430); Iowa (240); Kansas (E-10335) UST Certification; Iowa (240)

SPM PDC Laboratories - Springfield, MO

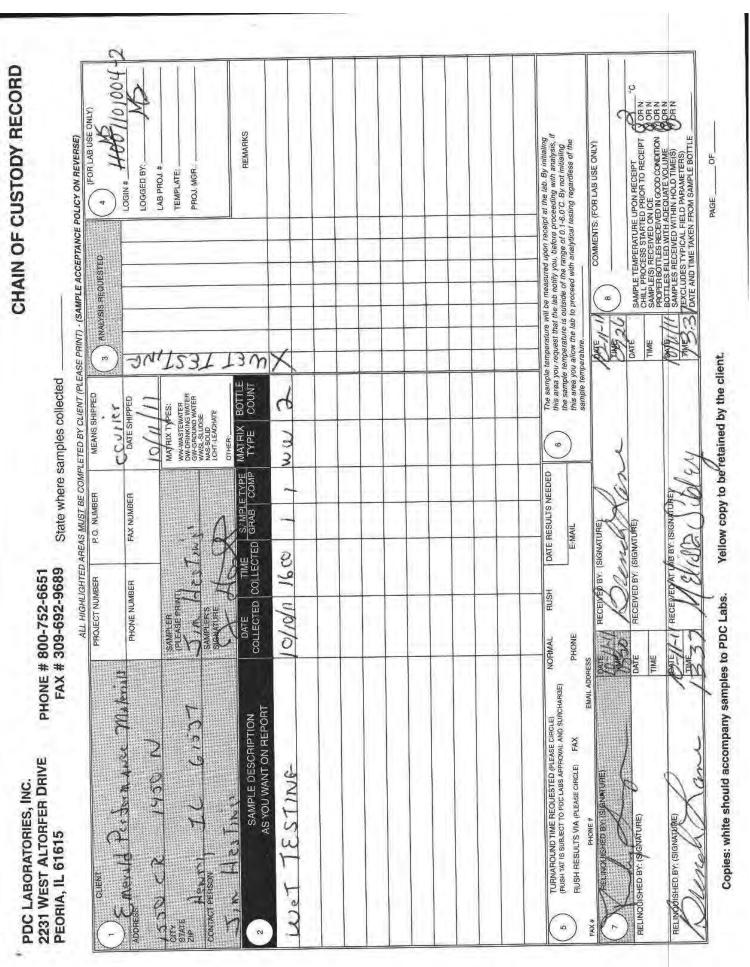
EPA DMR-QA Program

STL PDC Laboratories - St. Louis, MO

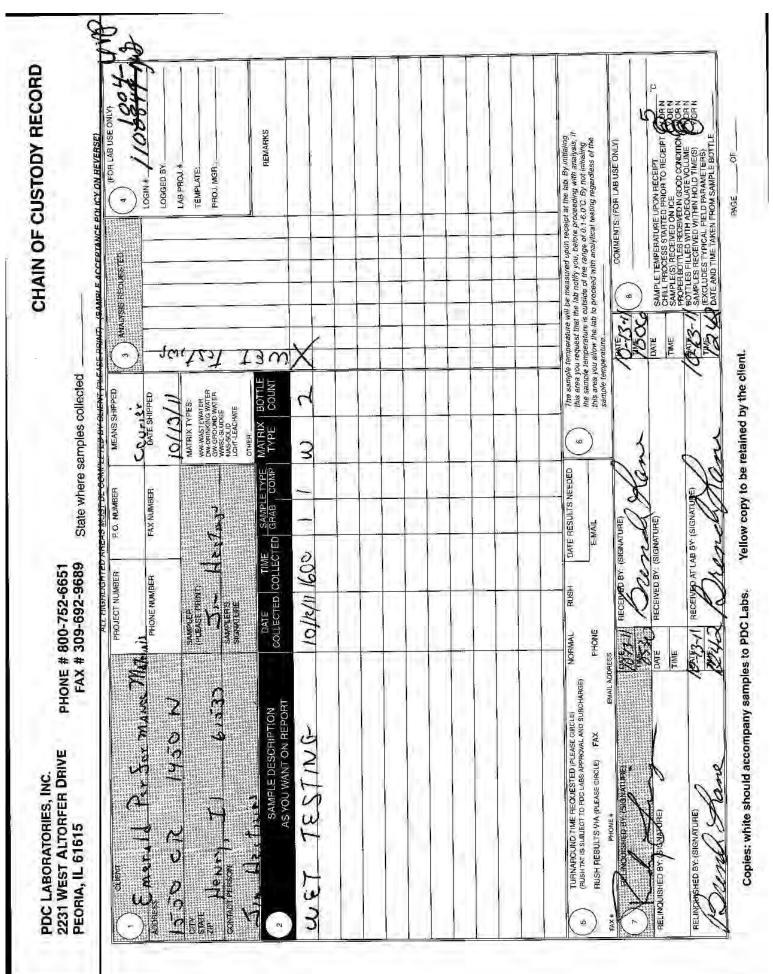
NELAC Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS EPA Lab No. E-10389

Certified by: Kurt C. Stepping, Senior Project Manager

1101004



Page 3 of 16



Page 4 of 16

SHIPPING ORDER	Emerald Performance Materials	ance Materials		
	1550 County Road 1450 N Henry, IL. 61537 DUR PURCHASE HE-40007640	ISO N, Volue involue no		P19- 110392
AUTHORIZED BY	UNUER NO. Lanners rooms Lionner II R1537	YOUR INVOICE DATE		PLEASE USETHE ABOVE NUMBER WHEN CORRESPONDING
NUKE OLI AUTY PURCHASING DEPT. APPROVAL	source room a territy of a construction of the source of t	BHP TO PDC Lab		BILL OF LADING NUMBER
DATE ENTERED 10-13-11				O.S.D.& R. REPORT NUMBER
PLANT LOCATION HENRY				CHECKEU BY This is to certify that the above named materials are properly classified.
bepr. No. 2478 Account 6100.1014	DATE SHIPPED $10-13-11$ SHIP VIA F.O.B.	GROSS WI REQUIRED DEL	GROSS WT REQUIRED DELIVERY DATE	
CHECK REASON FOR SHIPMENT	HAZARDOUS TYES X ND BOX NO:	VALUE IF OVER \$250 Lab Results:	en szeo	Method &
REJECT ED - RETURNED FOR CREDIT			QUANTITY SHIPPED	PRICE TOTAL
TO BE PREPARED AND RETURNED TO.	Primary Effluent			NCX
	Plant Effluent		6	
CONTAINERS - KETURNEU FUR UREUD				
1 CAN OF PROPERTY				
			-	
	NASTRUCTION TO VENDOR			
*		- Lord		
	MATERIAL RECEIVED BY: KA	Data Re	Data Received:	

Environmental Analysis South, Inc.

4000 East Jackson Blvd. • Jackson, MO 63755 • 573-204-8817 • Fax 573-204-8818



REPORT OF ACUTE TOXICITY TESTING City of Emerald, IL Plant Effluent, AEC = 100%

EAS LOG# 1402207 October 12, 2011 through October 16, 2011

Tests performed by:

John P. Clippard / Chemical Analyst at Environmental Analysis South (EAS) Kelly J. Ray / Biologist at Environmental Analysis South (EAS) Sara C. Shields / Lab Supervisor - Chemist at Environmental Analysis South (EAS) David F. Warren / Lab Director - Chemist at Environmental Analysis South (EAS)

- 1. Report Summation
 - 1.1. Data Summation
 - 1.2. Conclusion
- 2. Method Summation
 - 2.1. Test Conditions and Methods
 - 2.2. Potassium chloride Reference Salt Test
 - 2.2.1. Pimephales promelas data
 - 2.2.2. Ceriodaphnia dubia data
 - 2.3. Literature Cited
- 3. Raw Data Bench Sheets
 - 3.1. Initial observations (page 1)
 - 3.2. Zero hour Observations (page 1)
 - 3.3. Twenty-four (24) Forty-eight (48) hour Observations (page 1)
 - 3.4. Seventy-two (72) Ninety-six (96) hour Observations (page 2)
 - 3.5. Survival Data Table (page 3-4)
 - 3.6. Test Comments (page 5)
- 4. Chain of Custody

Page 1 of 4

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REPORT OF ACUTE TOXICITY TESTING City of Emerald, IL Plant Effluent, AEC = 100%

EAS LOG# 1402207 October 12, 2011 through October 16, 2011

1. REPORT SUMMATION:

1.1. Multiple Dilution Data Summation

Test Solution	Pimephales promelas Acute Toxicity Test 96 Hour Survival	Ceriodaphnia dubia Acute Toxicity Test 48 Hour Survival
Reconstituted Control (RC)	100%	100%
Upstream Control (UC)	100%	100%
6.25% Effluent	95%	100%
12.5% Effluent	85%*	100%
25% Effluent	50%*	70%*
50% Effluent	0%*	15%*
100% Effluent	0%*	0%*
Estimated LC50 Value	22.75% Effluent (18.36% - 28.18%)	31.86% Effluent (26.61% - 38.15%)

* Indicates a significant difference at alpha = 0.5 between effluent and control survival data.

Conclusion:

Pimephales promelas 96 hour WET results:

Ceriodaphnia dubia 48 hour WET results:

LC 50 =22.75% using Trimmed Spearman-Karber NOAEC = 6.25% using Steel's Many-One Rank Test LC 50 =31.86% using Trimmed Spearman-Karber NOAEC = 12.5% using Steel's Many-One Rank Test

Approved by

Sara C. Shields, Chemist

Page 2 of 4

Environmental Analysis South, Inc.

4000 East Jackson Blvd. • Jackson, MO 63755 • 573-204-8817 • Fax 573-204-8818



REPORT OF ACUTE TOXICITY TESTING City of Emerald, IL Plant Effluent, AEC = 100%

EAS LOG# 1402207 October 12, 2011 through October 16, 2011

2. TEST METHOD SUMMARY

2.1. TEST CONDITIONS AND METHODS:

	Ceriodaphnia dubia:	Pimephales promelas:
Test duration:	48 hours	96 hours
Temperature:	24 - 26 degree Celsius	24 - 26 degree Celsius
Light quality:	Ambient laboratory illumination	Ambient laboratory illumination
Photoperiod:	16 hour light, 8 hours dark	16 hour light, 8 hours dark
Control Water:	Moderately Hard Reconstituted Water	
Dilution Water:	Upstream Water - If unavailable or	Upstream Water - If unavailable or toxic, then control water will be used.
Size of test vessel:	30 milliliters	250 milliliters
Volume of test solution:	15 milliliters	200 milliliters
Age of test organisms:	<24 hours	1 -14 days (all same age)
Number of organisms/test vessel:	5	10
Number of replicates/concentration:	4	2
Number of organisms/concentration:	20	40 for a single dilution test and 20 for a multiple dilution test
Feeding regime:		None (fed prior to test)
Aeration:		None
Test acceptability criterion:		90% or greater survival in controls

The methodology used for the chemistry data was taken from the *Standard Methods* for the *Examination* of *Water and Wastewater*, 18th edition (1992). The exception was hardness, which was determined using a Hach EDTA titration test kit. The toxicity tests follow guidelines laid out in the permittee's NPDES permit and were conducted according to EPA approved methods (USEPA 2002).

All test organisms were cultured according to EPA approved methods (USEPA 2002). The *Ceriodaphnia dubia* and the *Pimephales promelas* were obtained from C-K Associates Inc. located in Baton Rouge, Louisiana and shipped overnight for use in the whole effluent toxicity test.

Environmental Analysis South, Inc.



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REPORT OF ACUTE TOXICITY TESTING City of Emerald, IL Plant Effluent, AEC = 100%

EAS LOG# 1402207 October 12, 2011 through October 16, 2011

2.2. REFERENCE TOXICITY TEST:

Environmental Analysis South performs monthly reference toxicity tests. The most recent reference test was initiated on October 5, 2011 using KCL Lot #41713. Following are the results:

2.2.1. *P. promelas* - 48 hr. Acute Test - $LC_{50} = 1.021$ g/l 95%Cl (0.708-1.334 g/l) EAS %CV = 15.3% National Warning Limits (75th percentile) = 19%CV National Control Limits (90th percentile) = 33%CV 2.2.2. *C. dubla* - 48 hr. Acute Test - $LC_{50} = 0.460$ g/l 95%Cl (0.297-0.623g/l) EAS %CV = 17.7% National Warning Limits (75th percentile) = 29%CV National Control Limits (90th percentile) = 34%CV

2.3. LITERATURE CITED:

- 1. APHA. 1992. Standard methods for the examination of water and wastewater, 18th Ed. American Public Health Association, Washington, D.C
- 2. USEPA. 2002. Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms, 5th Ed. EPA-821-R-02-012
- 3. USEPA 2000. Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications under the National Pollutant Discharge Elimination System, (Table B-2). June 2000. EPA 833-R-00-003.

Page 4 of 4

US EPA 600/4-90/027	
WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027	

MHOLE	WHOLE EFFLUENT	ENT TEST conducted in accordance with US EPA 600/4-90/027 Fifth Edition October 2002	d in accordance on October 200	e with US	EPA 600	/4-90/02	2			Page 1 of 5	of 5
CLIENT NAME: City of Emerald, IL (Plant)											
DATE & TIME OF COLINECTION: JAMANUA 1 400 Lat.	P & 48 CD	AEC=100%									
DATE & TIME OF SUBMISSION: 10/12/11 0400 hrs by 110S						Upstream:	River				
DATE TIME	AI VST	001.01				Collected:	10/10/11 1	400 hrs by	10/10/11 1400 hrs by City of Emerald	nerald	
			AC EAF VALUE			INT RC					
		SB114 (8.8-9.2)	8.93	7.83	1402207A 8 39	RC4023					
		EAS 106		3 m	200	24					
10/12/11 1000 hrs		ERA506-010511(401-457)	442	7740	823	777					
		ERA P170-507(107-134)	120	420	300	i a					
		tap water	+	20°0	<0.04	20.04					
		cal@840		6.9	7.6	6.7					
10/12/11 1615 hrs		ERA506-010511(60.1-71.9)	68.9	168	175	619					
INFILAMMONIA - ppm 10/17/11 1412 hrs JPC		EAS #1981 (8-12)	9.77	27.1	0.126	40.05					
	T						-				
	-YST	QC LOT	QC EXP VALUE	RC	nc	100%	50%	25%	12.50%	6.25%	X %AEC
		SB114 (8.8-9.2)	8.93	8.01	8.20	8.12	8.18	8.33	8.40	8.39	
10/12/11 1100 hrs		EAS 106		23.8	24.4	23.5	23.6	23.7	24.0	24.2	
10/12/11 1100 hrs		ERA506-010511(401-457)	442	235	277	7360	4350	2570	1630	1183	
UISSOLVED OXYGEN - ppm 10/12/11 1100 hrs SCS		cal@840		7.1	8.4	9.5	6.9	6.6	63	8 5	T
	1										
DATE TIME	-YST	ac LoT	QC EXP VALUE	RC	S	100%	50%	25%	12.50%	6.25%	X %AFC
-		SB114 (8.8-9.2)	9.1	7.35	8.12	8.08	8.14	8.17	8.23		
10/13/11 1100 hrs		EAS 106		25.1	25.1	25.1	25.1	25.1	25.1	25.1	
10/13/11 1100 hrs		ERA506-010511(401-457)	431	252	839	7380	4380	2670	1653	1215	
		0840		6.7	6.6	6.1	6.3	6.3	6.3	6.6	
	-YST	QC LOT	QC EXP VALUE	л С	с Э	100%	50%		12.50%	6.25%	X %AEC
		SB114 (8.8-9.2)	8.97	7.59	7.99	8.13	8.16	ŀ	8.16	8.10	
10/14/11 1100 hrs		EAS 106		24.7	24.7	24.7	24.7	24.7	24.7	24.7	
		ERA506-010511(401-457)	436	280	835	7500	4500	2780	1670	1211	
		cal@840		6.3	6.6	5.8	6.0	5.9	6.1	6.5	
24 HOUR OBSERVATIONS - CD DATE TIME ANA	ANALYST DO	OC LOT			4	10001	1001	ł		— Г	
3/11 1100 hrs		2 8-0 2)		2 8	3 2	%nn1	%06	┥	12.50%		X %AEC
10/13/11 1100 hrs	Ī		-	0.0 1 + 3C	17.0	2 - 2 2 - 2	8.25	8.31	8.32	8.27	
10/13/11 1100 hrs		FRA506-010511(401-457)	121		1.62	707	1.02	1.62	25.1	25.1	
10/13/11 1100 hrs		cal@840		0 1 7	/R/		4250	2560	1636	1216	
DATE TIME	VST			: 2	:	0	0.7	+	7.0	6.9	
10/14/14 1 1 100 hm	5			ž	3	100%	50%		12.50%	6.25%	X %AEC
TEMPERATURE		30114 (8.6-9.2)	8.97	8.09	8.01	8.24	8.28	8.28	8.26	8.16	
10/14/11 1100 IIIS	Ţ			24.7	24.7	24.7	24.7	24.7	24.7	24.7	
DISSOL VED OXYGEN - DBM 10/14/11 11/00 hm	T	EKA506-010511(401-457)	436	276	82	7060	4210	2530	1616	1190	
		cal@o40		6.8	6.7	6.5	6.4	6.6	6.5	6.3	
f 1							_				
Approved by:			Date: 10/2-120	ling							
A A A A A A A A A A A A A A A A A A A				225							

		Ż	WHOLE EFFLUENT		TEST conducted in accordance with US EPA 600/4-90/027 Fifth Edition October 2002	e with US	EPA 600	/4-90/027				Page 2	of 5
CLIENT NAME:	: City of Emerald, IL (Plant)	erald, IL (F	lant)			,							
NPDES NUMBER:													
TYPE OF METHOD:		rtion, 96 h	multiple dilution, 96 hrs PP & 48 CD, AEC=1	D, AEC=100%									
DATE & TIME OF COLLECTION:		SOOhrs						Upstream:	River				
UALE & LIME OF SUBMISSION:	10/14/11 1	025 hrs UI	S					Collected:	10/12/11	600 hrs by	10/12/11 1600 hrs by City of Emerald	merald	
INITIAL OBSERVATIONS DATE	DATE	TIME	ANALYST	QC LOT	QC EXP VALUE	INT EFFL	INT UC	INT RC					
						1402417	1402417A	RC4023					
		1030 hrs		SB114 (8.8-9.2)	8.97	7.29	7.64	7.80					
		10/14/11 1030 hrs		EAS 106		e	2	24					
SPECIFIC CONDUCTANCE umhos		10/14/11 1030 hrs	- T	ERA506-010511(401-457)	436	14850	818	277					
HARDNESS - ppm		10/14/11 1030 hrs		ERA P170-507(107-134)	120	600	260	80					
CHLORINE - ppm		10/14/11 1030 hrs	JPC	tap water	+	<0.04	6 20	\$0 0¥					
DISSOLVED OXYGEN - ppm		10/14/11 1030 hrs	JPC	cal@840		5.4	7.4	7.3					
TOTAL ALKALINITY - ppm	_	10/19/11 1300 hrs	scs	ERA506-010511(60.1-71.9)	71.3	86.3	187	619					
INITIAL AMMONIA - ppm		10/17/11 1412 hrs	JPC	EAS #1981 (8-12)	9.77	59.9	0.174	<0.05					
TOTAL DISSOLVED SOLIDS -ppm													
	21	TIME		QC LOT	QC EXP VALUE	Sc	S	100%	50%	25%	12.50%	6 25%	X %AFC
US - Hq		1100 hrs		SB114 (8.8-9.2)	8.97	7.86	7.93	8.01	8 21	┢	8 26 8	8 24	
TEMPERATURE		1100 hrs		EAS 106		24.7	24.7	24.7	24.7	24.7	247	747	
SPECIFIC CONDUCTANCE umhos		1100 hrs		ERA506-010511(401-457)	436	246	788	14800	8220	4550	2670	1775	
DISSOLVED OXYGEN - ppm	10/14/11 1100 hrs	1100 hrs		cal@840		6.7	10.5	8.0	9 1 6	9 6	202	10.3	
										2	2,5	2	
72 HOUR OBSERVATIONS - PP DATE	DATE	TIME	ANALYST	QC LOT	QC EXP VALUE	ß	S	100%	50%		12.50%	6.25%	X %AFC
Ins - Hd		1100 hrs	scs	SB114 (8.8-9.2)	9.01	8.05	8.10	8.05	8.15	╈	8 27	+	
TEMPERATURE °C	10/15/11	1100 hrs	scs	EAS 106		24.5	24.5	24.5	24.5	24.5	24.5	24.5	
SPECIFIC CONDUCTANCE umhos	10/15/11	1100 hrs	scs	ERA506-010511(401-457)	431	249	802	14910	8120	4480	2600	1720	T
DISSOLVED OXYGEN - ppm	10/15/11	1100 hrs	scs	cal@840		6.2	6.2	6.4	5.8	54	5 51	204	
96 HOUR OBSERVATIONS - PP	히	TIME	ANALYST	QC LOT	QC EXP VALUE	ß	ş	100%	50%		12 50%	1	V al AEC
US - Hq		1100 hrs	scs	SB114 (8.8-9.2)	8.94	7.88	8.01	7.97	8.11	╈	8 15 %	-1-	
TEMPERATURE °C	10/16/11	1100 hrs	scs	EAS 106		24.9	24.9	24.9	24.9	24.9	249	040	
SPECIFIC CONDUCTANCE umhos	10/16/11	1100 hrs	scs	ERA506-010511(401-457)	437	280	809	15250	8390	4890	2650	1744	
DISSOLVED OXYGEN - ppm	10/16/11	1100 hrs	scs	cal@840		7.0	7.0	6.8	6.7	6.8	7.2	73	
FINAL AMMONIA - ppm													
													ſ
•									-				
•••													
Pa													
ge													
11													
of ŕ										┢			
Approved by:	(+ 0.	~				/							
	lull	2			Date: /0/27/20//	13011							
)													

Analyst 1: DFW	Analyst 2: KJR Analyst 3: SCS			[1	1	7]	[Ţ
Analys	Analys Analys		X% AEC	ALIVE					X% AEC	ALIVE	
_	_	8152 c-k	6.25%	ALIVE	10,10	10,10	10,10	2392 c-k	6.25%	ALIVE	
		HATCH NUMBER: 8152 c-k	12.50%	ALIVE	10,10	10,10	10,10	HATCH NUMBER: 2392 c-k	12.50%	ALIVE	
1100 hrs	1100 hrs	Ŧ	25%	ALIVE	10,10	10,10	10,10	Ħ	25%	ALIVE	
Time Test Began: 1100 hrs	Time Test Finished: 1100 hrs	Bdays	50%	ALIVE	10,10	10,10	7,4	hours	50%	ALIVE	
_	Ţ		100%	ALIVE	10,10	3,4	0,0	<24	100%	ALIVE	
October 12, 2011	10/16/11CD	AGE:	Ŋ	ALIVE	10,10	10,10	10,10	AGE: <24	C	ALIVE	
Octo	10/14/11PP&		RC	ALIVE	10,10	10,10	10/17/2011	(22 22	ALIVE	
Date Test Began:	Date Test Finished: 10/14/11PP&1	P. promelas (PP)		PERIOD	0 HR-PP	24 HR-PP	48 HR-PP	Ceriodaphnia dubia (CD)		PERIOD	

	RC	nc	100%	50%	25%	12.50%	6.25%	X ⁰ / AE
PERIOD	ALIVE							
0 HR-CD	5,5,5,5	5,5,5,5	5,5,5,5	5,5,5,5	5.5.5	5.5.5	5555	
24 HR-CD	5.5.5.5	5.5.5.5	2201	1343	555	222		
48 HR-CD	5.5.5	5.5.5.5	0000	0.1.1.1	0,0,0,0	2,0,0,0		
			2424262		0'0'L'L	0'0'0'0	0'0'0'0	

WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027 Fifth Edition October 2002 EAS LOG# 1402207

City of Emerald, IL (Plant)

Approved by: All, J.

Date: 10/27/2011

	IFW	LR CS											
	Analyst 1: DFW	Analyst 2: KJR Analyst 3: SCS		X% AEC	ALIVE								
	_	_	8152 c-k	6.25%	ALIVE	10,10	10,10	10,9					
			HATCH NUMBER: 8152 c-k	12.50%	ALIVE	10,10	9,10	8,9					
	: 1200 hrs	1200 hrs	H	25%	ALIVE	10,10	8,8	6,4					
	Time Test Began: 1200 hrs	Time Test Finished: 1200 hrs	Bdays	50%	ALIVE	7,4	0'0	0'0	_				
	_	Tim		100%	ALIVE	0'0	0'0	0,0					
EAS LOG# 1402207	October 12, 2011	10/16/11CD	AGE:	nc	ALIVE	10,10	10,10	10,10				-	
		10/14/11PP8		RC	ALIVE	10,10	10,10	10/17/2011					
City of Emerald, IL (Plant)	Date Test Began:[Date Test Finished: 10/14/11PP&10/16/11CD	P. promelas (PP)		PERIOD	48 HR-PP	72 HR-PP	96 HR-PP		L			

Approved by:

Date: 10/27/2011

Page 4 of 5

WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027 Fifth Edition October 2002

Page 5 of 5

Vity OI Efficiency, IL (Plant) EAS#: 1402207	
Notes	Notes & Comments
Prepared by:	Date: 10/07/20
	uale. / U/2///201/

Electronic Filing - Recived, Clerk's Office : 04/12/2013

Page 14 of 16

115054



SUBCONTRACT ORDER

PDC Laboratories, Inc.

1101004

10/11/2011

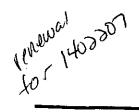
PDC Laboratories, Inc.
2231 W. Altorfer Drive
Peoria, IL 61615
Project Manager: Kurt C. Stepping
kstepping@pdclab.com Phone: 309-683-1719

Environmental Analysis South 4000 East Jackson Blvd Jackson, MO 63755 Phone :(573) 204-8817

Sarr	nple Origin (State) <u>IL</u>
PO#	140741

monald Due Comments Expires Analysis Sampled: 10/10/11 14:00 Un Sample ID: 1101004-01 Waste Water 10/21/11 16:00 10/12/11 14:00 Wet Testing - Single Dilution Sampled: 10/10/11 14:00 Sample ID: 1101004-02 Waste Water 10/12/11 14:00 Wet Testing - Single Dilution 10/21/11 16:00

Quar. d		14:00		Sample Temperature Upon Receipt Sample(s) Received on Ice	C Y or N
Relinquished By	Date/Time	Received By	Date/Time	Proper Bottles Received in Good Condition	Y or N
/		Automas	r $M = 10$	Bottles Filled with Adequate Volume	Y or N
Relinguished By	Date/Time	Received By	Date/Time	Samples Received Within Hold Time	Y or N
Treiniquisited by	Dater finte	1.000,00,		Date/Time Taken From Sample Bottle	Y or N
		······································	· · · · · · · · · · · · · · · · · · ·	Page	15 of 16



SUBCONTRACT ORDER

PDC Laboratories, Inc.

1101004

SENDING LABORATORY:

PDC Laboratories, Inc. 2231 W. Altorfer Drive Peoria, IL 61615 Phone: 309.692.9688 Fax: 309.692.9689 Project Manager: Kurt C. Stepping

RECEIVING LABORATORY:

Environmental Analysis South 4000 East Jackson Blvd Jackson, MO 63755 Phone :(573) 204-8817 Fax: (573) 204-8818

Analysis	Due	Expires	Laboratory ID	Comments
Sample 10: 1101004/01	Water	Sampled:10/10/11 16:00		
01-Wet Single Containers Supplied:	10/21/11 16:00			
Sample ID: 1101004-02	Water 5	Sampled:10/10/11 16:00		
01-Wet Single Containers Supplied;	10/21/11 16:00 Emer		- temp rea	4= 1°
Sample ID: 1101004-03		ampled:10/12/11 16:00		
01-Wet Single Containers Supplied	10/21/11 16:00			H APOITIONAL STAMPLE
Sample ID: 1101004-04	Water Si	ampled:10/12/11 16:00	temo rec	12= 3°CG)
01-Wet Single Containers Supplied:	10/21/11 16:00	10/14/11 16:00		

6-13-11 14:00 ß Released Date Received By Date Released By

Date

Received By

Page 16 of 16 Page 1 of 1



PDC Laboratories, Inc. P.O. Box 9071 • Peoria, IL 61612-9071 (309) 692-9688 • (800) 752-6651 • FAX (309) 692-9689



Emerald Performance Materials 1550 County Rd 1450 N Henry, IL 61537 Attn: Jim Hastings Date Received: 01/24/12 13:18 Report Date: 02/21/12 Customer #: 202011 PO#: HE-40014063-UB

Collect Date: 01/23/12 23:59

Matrix: Waste Water

Laboratory Results

Sample No: 2012627-01 Sample Description: EFFLUENT

Parameters	Result	Qual	Analysis Date	Analyst	Method
Miscellaneous - Environmental Analysis South	<u>1</u>				
WET Testing Single Dilution - subcontracted	<				Subcontracted
Sample No: 2012627-02REAM Sample Description: UPSTREAM			Collect Date: 01/24/12 Matrix: Waste Water	06:00	
Parameters	Result	Qual	Analysis Date	Analyst	Method
Miscellaneous - Environmental Analysis South	<u>1</u>				
WET Testing Single Dilution - subcontracted	<				Subcontracted

2012627



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Emerald Performance Materials 1550 County Rd 1450 N Henry, IL 61537 Attn: Jim Hastings Date Received: 01/24/12 13:18 Report Date: 02/21/12 Customer #: 202011 PO#: HE-40014063-UB

Laboratory Results

Notes

This report shall not be reproduced, except in full, without the written approval of the laboratory.

PDC Laboratories participates in the following accreditation/certification and proficiency programs at the following locations. Endorsement by Federal or State Governments or their agencies is not implied.

PIA PDC Laboratories - Peoria, IL

NELAC Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100230

Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553 Drinking Water Certifications: Kansas (E-10338); Missouri (870); Wisconsin (998284430); Indiana (C-IL-040); Iowa (240) Wastewater Certifications: Arkansas (88-0677); Wisconsin (998284430); Iowa (240); Kansas (E-10335) Hazardous/Solid Waste Certifications; Arkansas (88-0677); Wisconsin (998284430); Iowa (240); Kansas (E-10335) UST Certification; Iowa (240)

SPM PDC Laboratories - Springfield, MO

EPA DMR-QA Program

STL PDC Laboratories - St. Louis, MO

NELAC Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS EPA Lab No. E-10389

WET Analysis subcontracted, report attached.

Certified by: Kurt C. Stepping, Senior Project Manager

2012627

			6 267-5
ENVIRONMEN 4000 East Jackson Blvd Jackson, MO 63755 Phone: (573) 204-8817	TAL ANALYSIS SOUTH, I Fax: (573) 204-8818	NC. //B 3	225
WHO	OLE EFFLUENT TOXIC CHAIN OF CUSTO		1/24/1213.11
CLIENT: Emer	rald Pirformance	Materials	
NPDES PERMIT NUME	BER: IL \$\$\$\$139	2	
EFFLUENT NAME: <u>C</u>	(LEGAL NAME)	_ GRAB 🗆 24 HR COM	IPOSITE 🖵
COLLECTION DATA:	START DATE: 23 Jan 2012	START TIME:	6:41
	FINISH DATE: 23 Jon 201	2 FINISH TIME: 2	3:59
UPSTREAM NAME:	Illinois River (LEGAL NAME)	(GRAB SAMPLE)	
COLLECTION DATA:	DATE: 24 Jon 2012 TIM	IE: 46:49	5
SAMPLER NAME:	Harold Crouch	CARRIER:	
 Commercial car 	ding time errors (Will results in a setup ch rier delivery problems or errors (Will result ealth or delivery of test organisms by ven	ilts in a setup charge of \$10	0 to the client) ent)
	SAMPLER CHECH	(LIST	
SAMPLES TO BE HAN		LAB ON/ ME DAY AS TEST SETU	 P o ERNIGHT o
RELINQUISHED BY: _	Hart Couch	DATE: 29 JON 24	612 _{ТІМЕ:} Ø7: 3¢
LABORATORY USI EFFLUENT	LOG NUMBER: 20120	27-2-14	
RECEIVED TEMPERAT	URE:°C THERMOMETER	ASSIGNED NUMBER	#6
HEADSPACE: YES	NO SAMPLES ICED or	DELIVERED SAME DA	Y AS TEST
UPSTREAM	LOG NUMBER:		
RECEIVED TEMPERAT	URE:°C THERMOMETER	ASSIGNED NUMBER:	P () +
HEADSPACE YES or	NO SAMPLES ICED OF	DELIVERED SAME DA	Y AS TEST
RECEIVED BY:	. Les	DATE: 1/24/12	TIME: 13:18~
10	and the second se		

Environmental Analysis South, Inc.



4000 East Jackson Blvd. • Jackson, MO 63755 • 573-204-8817 • Fax 573-204-8818

REPORT OF ACUTE TOXICITY TESTING Emerald Performance Materials Effluent, AEC = 100%

EAS LOG# 1407821 January 25, 2012 through January 27, 2012

Tests performed by:

John P. Clippard / Chemical Analyst at Environmental Analysis South (EAS) Kelly J. Ray / Biologist at Environmental Analysis South (EAS) Sara C. Shields / Lab Supervisor - Chemist at Environmental Analysis South (EAS) David F. Warren / Lab Director - Chemist at Environmental Analysis South (EAS)

- 1. Report Summation
 - 1.1. Data Summation
 - 1.2. Conclusion
- 2. Method Summation
 - 2.1. Test Conditions and Methods
 - 2.2. Potassium chloride Reference Salt Test
 - 2.2.1. Pimephales promelas data
 - 2.2.2. Ceriodaphnia dubia data
 - 2.3. Literature Cited

3. Raw Data Bench Sheets

- 3.1. Initial observations (page 1)
- 3.2. Zero hour Observations (page 1)
- 3.3. Twenty-four (24) Forty-eight (48) hour Observations (page 1)
- 3.4. Seventy-two (72) Ninety-six (96) hour Observations (page 2)
- 3.5. Survival Data Table (page 3-4)
- 3.6. Test Comments (page 5)
- 4. Chain of Custody

Page 1 of 4



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REPORT OF ACUTE TOXICITY TESTING Emerald Performance Materials Effluent, AEC = 100%

EAS LOG# 1407821 January 25, 2012 through January 27, 2012

1. REPORT SUMMATION:

1.1. Multiple Dilution Data Summation

Test Solution	Pimephales promelas Acute Toxicity Test 96 Hour Survival	Ceriodaphnia dubia Acute Toxicity Test 48 Hour Survival
Reconstituted Control (RC)	100%	100%
Upstream Control (UC)	100%	100%
6.25% Effluent	25%*	95%
12.5% Effluent	0%*	15%*
25% Effluent	0%*	0%*
50% Effluent	0%*	0%*
100% Effluent	0%*	0%*
Estimated LC ₅₀ Value	<6.25% Effluent	9.42% Effluent (8.34% - 10.65%)

* Indicates a significant difference at alpha = 0.5 between effluent and control survival data.

Note: Calculations were performed on the 48 hr Pimepales promelas data rather than 96 hr due to UPS failure to deliver the renewal effluent.

Conclusion:

Pimephales promelas 96 hour WET results:

Ceriodaphnia dubia 48 hour WET results:

LC 50 < 6.25% using Trimmed Spearman-Karber NOAEC < 6.25% by the Steel's Many-One Rank Test LC 50 = 9.42% using Trimmed Spearman-Karber NOAEC = 6.25% by the Steel's Many-One Rank Test

Approved by

Sara C. Shields, Chemist

Page 2 of 4

Environmental Analysis South, Inc.



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REPORT OF ACUTE TOXICITY TESTING Emerald Performance Materials Effluent, AEC = 100%

EAS LOG# 1407821 January 25, 2012 through January 27, 2012

2. TEST METHOD SUMMARY 2.1. TEST CONDITIONS AND METHODS:

	Ceriodaphnia dubia:	Pimephales promelas:
Test duration:	48 hours	48 hours
Temperature:	24 - 26 degree Celsius	24 - 26 degree Celsius
Light quality:	Ambient laboratory illumination	Ambient laboratory illumination
Photoperiod:	16 hour light, 8 hours dark	16 hour light, 8 hours dark
Control Water:	Moderately Hard Reconstituted Water	Moderately Hard Reconstituted Water
Dilution Water:		Upstream Water - If unavailable or toxic, then control water will be used.
Size of test vessel:	30 milliliters	250 milliliters
Volume of test solution:	15 milliliters	200 milliliters
Age of test organisms:	<24 hours	1 -14 days (all same age)
Number of organisms/test vessel:	5	10
Number of replicates/concentration:	4	2
Number of organisms/concentration:		40 for a single dilution test and 20 for a multiple dilution test
Feeding regime:	None (fed prior to test)	None (fed prior to test)
Aeration:	None	None
Test acceptability criterion:	90% or greater survival in controls	90% or greater survival in controls

The methodology used for the chemistry data was taken from the *Standard Methods for the Examination* of *Water and Wastewater*, 18th edition (1992). The exception was hardness, which was determined using a Hach EDTA titration test kit. The toxicity tests follow guidelines laid out in the permittee's NPDES permit and were conducted according to EPA approved methods (USEPA 2002).

All test organisms were cultured according to EPA approved methods (USEPA 2002). The *Ceriodaphnia dubia* and the *Pimephales promelas* were obtained from C-K Associates Inc. located in Baton Rouge, Louisiana and shipped overnight for use in the whole effluent toxicity test.

Page 3 of 4

Environmental Analysis South, Inc.



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REPORT OF ACUTE TOXICITY TESTING Emerald Performance Materials Effluent, AEC = 100%

EAS LOG# 1407821 January 25, 2012 through January 27, 2012

2.2. REFERENCE TOXICITY TEST:

Environmental Analysis South performs monthly reference toxicity tests. The most recent reference test was initiated on January 11, 2012 using KCL Lot #41713. Following are the results: 2.2.1. *P. promelas* - 48 hr. Acute Test – $LC_{50} = 0.978$ g/l 95%Cl (0.733 g/l -1.222 g/l) EAS %CV = 12.5% National Warning Limits (75th percentile) = 19%CV National Control Limits (90th percentile) = 33%CV 2.2.2. *C. dubia* - 48 hr. Acute Test – $LC_{50} = 0.474$ g/l 95%Cl (0.304 g/l - 0.644g/l) EAS %CV = 17.9% National Warning Limits (75th percentile) = 29%CV National Control Limits (90th percentile) = 34%CV

2.3. LITERATURE CITED:

- 1. APHA. 1992. Standard methods for the examination of water and wastewater, 18th Ed. American Public Health Association, Washington, D.C.
- USEPA. 2002. Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms, 5th Ed. EPA-821-R-02-012
- USEPA 2000. Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications under the National Pollutant Discharge Elimination System, (Table B-2). June 2000. EPA 833-R-00-003.

Page 4 of 4

WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027	Fifth Edition October 2002
WHOLE EFFLUE	

The transmission The transmission The transmission The transmission Diff & hunder after transmission The transmission The hunder after transmission The hunder after transmission The hunder after transmission Diff & hunder after transmission Transmission The hunder after transmission	multiple diution. 96 hrs PP & 48 CD. AEC=100%. multiple diution. 96 hrs PP & 48 CD. AEC=100%. multiple diution. 96 hrs PP & 48 CD. AEC=100%. multiple diution. 96 hrs PP & 48 CD. AEC=100%. multiple diution. 96 hrs PP & 48 CD. AEC=100%. multiple diution. 96 hrs PP & 48 CD. AEC=100%. multiple diution. 96 hrs PP & 48 CD. AEC=100%. multiple diution. 96 hrs PP & 48 CD. AEC=100%. multiple diution. 96 hrs PP & 48 CD. AEC=100%. multiple diution. 96 hrs PP & 48 CD. AEC=100%. multiple diution. 96 hrs PP & 48 CD. AEC=100%. multiple diution. 96 hrs PP & 44 CD. AEC=100%. multiple diution. 96 hrs PP & 44 CD. AEC=100%. multiple diution. 96 hrs PP & 44 CD. AEC=100%. multiple diution. 96 hrs PP & 44 CD. AEC=100%. multiple diution. 96 hrs PP & 44 CD. AEC=100%. multiple diution. 96 hrs PP & 44 CD. AEC=100%. multiple diution. 96 hrs PP & 44 CD. AEC=100%. multiple diution. 96 hrs PP & 44 CD. AEC=100%. multiple diution. 96 hrs PP & 44 CD. AEC=100%. multiple diution. 96 hrs PP & 44 CD. AEC=100%. multiple diution. 96 hrs PP & 44 CD. AEC=100%. multiple diution. 96 hrs PP & 44 CD. AEC=100%. multiple diution. 96 hrs PP & 44 CD. AEC=100%. multiple diution. 96 hrs PP & 44 CD. AEC=100%. multiple diution. 96 hrs PP & 44 CD. AEC=100%. multiple diution. 96 hrs PP & 44 CD. AEC=100%. Multiple diution. 96 hrs PP & 44 CD. AEC=100%. Multiple diution. 96 hrs PP & 44 CD. AEC=100%. Multiple diution. 96 hrs PP & 44 CD. AEC=100%. Multiple diution. 96 hrs PP & 44 CD. AEC=100%. Multiple diution. 96 hrs PP & 44 CD. AE	CLIENT NAME: Emerald Permance Materials, Effluent,	e Materials, Efflu	ent,									
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0125/12 1100hrs SCS 8148 825 7 34 800 800 800 798 793 793 01725/12 1100hrs SCS EAS 106 243 246 250 243 <td>01/25/12 1100 hts SCS SB114 (8.8-92) 8.95 8.25 7.84 8.00</td> <td>JR OBSERVATIONS DATE TIME</td> <td>-</td> <td>QC LOT</td> <td>QC EXP VALUE</td> <td>RC</td> <td>NC</td> <td>100%</td> <td>50%</td> <td>25%</td> <td>12.50%</td> <td>6.25%</td> <td></td>	01/25/12 1100 hts SCS SB114 (8.8-92) 8.95 8.25 7.84 8.00	JR OBSERVATIONS DATE TIME	-	QC LOT	QC EXP VALUE	RC	NC	100%	50%	25%	12.50%	6.25%	
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01/26/12 1100 hrs SCS 58114 (8.8-9.2) 8.93 7.70 8.26 8.39 8.37 8.36 8.27 25.1 25.	01/26/12 1100 hrs SCS 5B114 (8.8-9.2) 8.93 7.70 8.26 8.39 8.38 01/26/12 1100 hrs SCS EAS 106 315 914 12640 740 251			QC LOT	QC EXP VALUE	RC	nc	100%	50%	25%	12.50%	6.25%	X %AEC
		pH - SU 01/26/12 1100 h		1 8	8.93	7.70	8.26	8.39	8.38	8.37	8.36	8.27	
01/26/12 1100 hrs SCS ERA566-0814(452-505) 490 315 914 12640 770 4170 2490 1693 01/26/12 1100 hrs SCS cal@840 7.9 7.7 7 7.4 7.5 7.5 01/27/12 1100 hrs SCS cal@840 6.0 8.33 8.06 8.75 12.50% 6.55% 17.50% 6.55% 7.5 01/27/12 1100 hrs SCS ERA506-0814(452-505) 501 390 942 12840 760 420 2530 1708 7.1 01/127/12 1100 hrs SCS ERA506-0814(452-505) 501 390 942 12840 760 420 2530 1708 01/127/12 1100 hrs SCS ERA506-0814(452-505) 501 390 942 7.0 6.9 6.9 7.1 8.7 01/127/12 1100 hrs SCS ERA506-0814(452-505) 7.4 7.2 7.0 6.9 6.8 8.48	01/26/12 1100 hrs SCS ERA566-0814(452-505) 490 315 914 12640 770 7 01/26/12 1100 hrs SCS cal@840 7.9 7.7 7 7 7 7 DATE TIME ANALYST QC LOT QC EXP VALUE RC UC 100% 50%			EAS 106		25.1	25.1	25.1	25.1	25.1	25.1	25.1	
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DATE TIME ANALYST GC LOT QC EXP VALUE RC UC 100% 50% 25% 12.50% 6.25% X 01/27/12 1100 hrs SCS SB114 (8.8-22) 8.93 8.33 8.36 8.33 8.26 8.19 24.9 24.9 24.9 24.9 24.9 24.9 24.9 24.9 24.9 7.4 7.4 7.2 1708 7.600 4200 25.30 1708 7.1 10.0 8.0 6.8 6.9 7.1 7.9	DATE TIME ANALYST GC LOT QC EXP VALUE RC UC 100% 50% 50% 01/27/12 1100 hrs SCS SB114 (8.8-9.2) 8.93 8.33 8.06 8.39 8.37 01/27/12 1100 hrs SCS EAS 106 24.9			cal@840		7.9	7.7	7	7.4	7.4	7.4	7.5	
01/27/12 1100 hrs SCS SB14 (8.8-9.2) 8.93 8.33 8.37 8.33 8.26 8.19 1 01/27/12 1100 hrs SCS EAS 106 9.01 24.9	01/27/12 1100 hrs SCS B8114 (8.8-9.2) 8.93 8.33 8.06 8.39 8.37 8.37 01/27/12 1100 hrs SCS EAS 106 501 24.9 <	D		QC LOT	QC EXP VALUE	RC	nc	100%	50%	25%	12.50%	6.25%	X %AEC
01/27/12 1100 hrs SCS EAS 106 24.9	01/27/12 1100 hrs SCS EAS 106 501 24.9			SB114 (8.8-9.2)	8.93	8.33	8.06	8.39	8.37	8.33	8.26	8.19	
01/27/12 1100 hrs SCS ERA506-0814(452-505) 501 390 942 12840 7600 4200 2530 1708 01/27/12 1100 hrs SCS cal@840 7.4 7.4 7.2 7.0 6.9 6.8 6.9 7.1 1 01/27/12 I100 hrs SCS cal@840 7.4 7.2 7.0 6.9 6.8 6.9 7.1 1 01/27/12 I100 hrs SCS cal@840 7.9 8.48 8.45 8.44 8.44 01/26/12 1100 hrs SCS EAS106 08.03 307 893 12370 7160 39.3 8.3 8.3 01/26/12 1100 hrs SCS EAS106-0814(452-505) 490 307 893 12370 7160 3030 2450 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3	01/27/12 1100 hrs SCS ERA506-0814(452-505) 501 390 942 12840 7600 7 01/27/12 1100 hrs SCS cal@840 7.4 7.2 7.0 6.9 7 DATE TIME ANALYST cal@840 7.4 7.2 7.0 6.9 7.0			EAS 106		24.9	24.9	24.9	24.9	24.9	24.9	24.9	
01/27/12 1100 hrs SCS cal@840 7.4 7.2 7.0 6.9 6.8 6.9 7.1 1 ATE Imme AmaLYST Cal@840 Imme <	01/27/12 1100 hrs SCS cal@840 7.4 7.2 7.0 6.9 DATE TIME ANALYST CC LOT QC EXP VALUE RC UC 100% 50% 50% D1/26/12 1100 hrs SCS SB114 (8.8-9.2) 8.93 7.99 8.28 8.48 8.52 5 01/26/12 1100 hrs SCS EAS 106 8.93 7.99 8.28 8.48 8.52 5 1 25.1 <t< td=""><td></td><td>1.000</td><td>ERA506-0814(452-505)</td><td>501</td><td>390</td><td>942</td><td>12840</td><td>7600</td><td>4200</td><td>2530</td><td>1708</td><td></td></t<>		1.000	ERA506-0814(452-505)	501	390	942	12840	7600	4200	2530	1708	
DATE TIME ANALYST QC LOT QC EXP VALUE RC UC 100% 50% 25% 12.50% 6.25% X D1/26/12 1100 hrs SCS SB114 (8.8-9.2) 8.93 7.99 8.26 8.48 8.45 8.45 8.45 8.44 8.45 01/26/12 1100 hrs SCS EAS 106 307 8.93 12.51 25.1	DATE TIME ANALYST QC LOT QC EXP VALUE RC UC 100% 50% 01/26/12 1100 hrs SCS SB114 (8.8-9.2) 8.93 7.99 8.28 8.48 8.52 01/26/12 1100 hrs SCS EAS106 307 893 12370 7160 01/26/12 1100 hrs SCS ERA506-0814(452-505) 490 307 893 12370 7160 01/26/12 1100 hrs SCS ERA506-0814(452-505) 490 307 893 12370 7160 01/25/12 1100 hrs SCS ERA506-0814(452-505) 490 8.4 8.2 8.2 8.2 01/27/12 1100 hrs SCS SB114 (8.8-9.2) 8.93 1.00 8.25 8.71 8.50 01/27/12 1100 hrs SCS SB114 (8.8-9.2) 8.93 1.00 8.25 8.71 8.50 01/27/12 1100 hrs SCS ERA506-0814(452-505) 501 25.1 25.1 25.			cal@840		7.4	7.2	7.0	6.9	6.8	6.9	7.1	
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01/26/12 1100 hrs SCS BB114 (8.8-9.2) 8.93 7.99 8.28 8.48 8.45 8.45 8.44 4 01/26/12 1100 hrs SCS EAS106 25.1	01/26/12 1100 hrs SCS SB114 (8.8-9.2) 8.93 7.99 8.28 8.48 8.52 7 01/26/12 1100 hrs SCS EAS 106 25.1 <td< td=""><td></td><td></td><td>QC LOT</td><td>QC EXP VALUE</td><td>RC</td><td>nc</td><td>100%</td><td>50%</td><td>25%</td><td>12.50%</td><td>6.25%</td><td>X %AEC</td></td<>			QC LOT	QC EXP VALUE	RC	nc	100%	50%	25%	12.50%	6.25%	X %AEC
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01/26/12 1100 hrs SCS ERA506-0814(452-505) 490 307 893 12370 7160 3960 2450 1627 1627 01/26/12 1100 hrs SCS cal@840 8.4 8.2 8.2 8.3	01/26/12 1100 hrs SCS ERA506-0814(452-505) 490 307 893 12370 7160 01/26/12 1100 hrs SCS cal@840 8.4 8.2 8.2 8.2 8.2 DATE TIME ANALYST QC LOT QC EXP VALUE RC UC 100% 50% 01/27/12 1100 hrs SCS SB114 (8.8-9.2) 8.93 1.00 8.25 8.71 8.50 01/27/12 1100 hrs SCS EAS 106 25.1	01/26/12		EAS 106		25.1	25.1	25.1	25.1	25.1	25.1	25.1	
01/26/12 1100 hrs SCS cal@840 8.4 8.2 8.2 8.3	01/26/12 1100 hrs SCS cal@840 8.4 8.2 100			ERA506-0814(452-505)	490	307	893	12370	7160	3960	2450	1627	
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01/27/12 1100 hrs SCS SB114 (8.8-9.2) 8.93 1.00 8.25 8.71 8.50 8.51 8.46 01/27/12 1100 hrs SCS EAS 106 25.1	01/27/12 1100 hrs SCS SB114 (8.8-9.2) 8.93 1.00 8.25 8.71 8.50 01/27/12 1100 hrs SCS EAS 106 25.1 25.1 25.1 25.1 01/27/12 1100 hrs SCS ERA506-0814(452-505) 501 304 897 12230 7160 01/27/12 1100 hrs SCS cal@840 801 827 12230 7160			QC LOT	QC EXP VALUE	RC	nc	100%	50%	25%	12.50%	6.25%	X %AEC
01/27/12 1100 hrs SCS EAS 106 25.1	01/27/12 1100 hrs SCS EAS 106 25.1 27.10 27.0 27.0	-		SB114 (8.8-9.2)	8.93	1.00	8.25	8.71	8.50	8.51	8.46	8.38	
01/27/12 1100 hrs SCS ERA506-0814(452-505) 501 304 897 12230 7160 4010 2390 01/27/12 1100 hrs SCS cal@840 8.0 8.0 8.1 8.0 8.0 8.1 8.0 8.1 8.0 8.0 8.1 8.0 8.0 8.1 8.0 8.0 8.1 8.0 8.0 8.1 8.0 8.0 8.1 8.0 8.0 8.1 8.0 8.0 8.1 8.0 8.0 8.1 8.0 8.0 8.1 8.0 8.0 8.0 8.1 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0	01/27/12 1100 hrs SCS ERA506-0814(452-505) 501 304 897 12230 7160 01/27/12 1100 hrs SCS cal@840 8.0 8.1 8.0 8.1			EAS 106		25.1	25.1	25.1	25.1	25.1	25.1	25.1	
01/27/12 1100 hrs SCS cal@840 8.1 8.0 8.1 8.0 8.1 8.0 8.1 8.1 8.0 8.1	01/27/12 1100 hrs SCS cal@840 8.1 8.0 8.1 8.0 8.1 8.1	-		ERA506-0814(452-505)	501	304	897	12230	7160	4010	2390	1619	
FINAL AMMONIA - PPm	FINAL AMMONIA - PPm			cal@840		8.0	8.1	8.0	8.1	8.0	8.1	8.0	
		VAL AMMONIA - ppm											

Approved by: (

Date: 02/02/2012

Page 1 of 5

Multiple dilution. 96 hrs PP & 41 CD. AEC=100%. Retreval was not received due to UPS error-calculations to be made at 46 hours. Upstream. River DATE Time ANALYST CC LOT OCC EXP VALUE INT EFF MT UC INT FF DATE Time ANALYST OC LOT OCC EXP VALUE INT FFF MT UC INT FF DATE Table ERA 060 dil (452.500) CC EXP VALUE INT FFF MT UC INT FF DATE ERA 060 dil (452.500) S5114 (8.842) 120 242 243 DATE Time ANALYST OC CUT OC EXP VALUE RC UC 100% 50% 25% DATE TIME ANALYST OC CUT OC EXP VALUE RC UC 100% 50% 25% O1/27/12 1100 hrs SCS EAS 1981 (8-12) CC CUT OC EXP VALUE RC UC 100% 50% 25% O1/27/12 1100 hrs SCS EAS 1981 (8-12) CC CUT OC EXP VALUE RC UC 100% 50% 25% O1		CLICINI NAME. LINEIAIU L'EIMAINE MALENAIS, LINUEIN,	Emuent,								
multiple alution, 96 hrs Pr & 43 CD, AEC=100%. Destremaniant Upstream: River Renewal was not received due to UPS error-calculations to be made at 48 hours. Upstream: River Upstream: River DATE Time ANALYST GC LOT OC EXP VALUE INT FFT [INT UC INT FFT DATE Time ANALYST GC LOT OC EXP VALUE T/39 EAS 114 (8.642) EAS 1195 (107:134) 120 80 242 EAS 1100 EAS 1193 (107:134) 120 80 242 Impound EAS 1193 (107:134) 120 80% 25% Impound EAS 1193 (18-12) 120 80% 26% Impound EAS 1193 (18-12) Impound 7/4 124 Impound EAS 1191 (100 his SCS EAS 4198 (18-12) 124 Impound EAS 41	NPDES NUMBER:										
Retered vol correctioned due to UPS error-calculations to be made at 46 hours Upstream: River DATE TIME AINLYST OC LOT OC EXP VALUE INT FFL INT FC DATE TME AINLYST OC LOT OC EXP VALUE INT FC RC4029 B114 (8.8-9.2) ERX 906-0814(452-005) 120 242 242 ERX 906-0814(452-005) ERX 9175-56(42.8-49.6) 120 242 Interval Interval 7.49 242 ERX 9173-56(42.8-49.6) Interval 7.4 Interval Interval CO 242 Interval Interval CO CO 242 Interval Interval CO CO CO Interval Interval CO CO CO Interval Int		96 hrs PP & 4	48 CD, AEC=100%								
ONTE TME MALYST CCLOT CCEEP VALUE INT EFF INT UC INT RC 58114 58114 68-23 7.99 7.99 58114 ERA506-0814(452-505) 58114 2.2 2.2 6 ERA506-0814(452-505) 120 80 2.4 6 ERA506-0814(452-505) 120 80 7.4 7 ANALYST CCUT 2.0 80 1 ERA506-0814(452-505) 120 80 7.4 1 ERA506-0814(452-505) 120 80 7.4 1 ERA505-0814(452-505) 120 90 7.4 1 ERA505-0814(452-505) CCUT 0CEXP VALUE RC UC 100% 50% 25% 01727/12<1100 Ins SCS 5811(8-12) 0CEXP VALUE RC UC 100% 50% 25% 01727/12<1100 Ins SCS 5811(8-2.2) 0CEXP VALUE RC UC 100% 50% 25% 01727/12<1100 Ins <	DATE & TIME OF COLLECTION: Renewal was not	ot received due	e to UPS errorcalculations to	be made at 48 hours		Upstream:	River				
DATE TIME MALYST GC LOT GC EXY VALUE INT RC 1 1 24 SB114 (8.8-2) 24 1 1 EAA 105 243 242 1 1 EAA 105 120 242 1 1 EAA 105 120 242 1 1 EAA 170-507(107-134) 120 242 1 1 EAA 173-506(2.8-46.6) 1 0.04 1 1 EAA 173-506(2.8-46.6) 1 0 1 1 1 EAA 173-506(2.8-46.6) ACEXP VALUE RC UC 100% 1 10 SCS EAA 168-9.2) 0 1 1 1 1 10 SCS EAA 168-9.2) 0 1 1	DATE & TIME OF SUBMISSION:										
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Image: black	LOG NUMBER / ID NUMBER	ないない 「「「「「」」	の正義のないませんに無いったの	「「「「「「「「」」」」		RC4029					
EAS 106 EAS 106 EAS 106 EAS 06 0814(452-505) 242 ERA506-0814(452-505) EAS 4792(10713) 120 242 EAP 177-507(10713) 120 242 EAP 177-506(42 8-49 b) C0 04 7.4 Constrained EAS 4793(18.12) C0 04 7.4 DATE TIME AMALYST CU CT 100% 50% 25% O1/27/12 100 hts SCS ES1 4(8-22) CC EXP VALUE RC UC 100% 50% 25% O1/27/12 1100 hts SCS ERA506-0814(452-505) CC EXP VALUE RC UC 100% 50% 25% O1/27/12 1100 hts SCS ERA506-0814(452-505) CC EXP VALUE RC UC 100% 50% 25% O1/27/12 1100 hts SCS ERA506-0814(452-505) CC EXP VALUE RC UC 100% 50% 25% O1/27/12 1100 hts SCS ERA506-0814(452-505) CC EXP VALUE RC UC 100% 50% 25% O1/29/12 1000	DH - SU		SB114 (8.8-9.2)			7.99					
Image: matrix intermed and interme	TEMPERATURE °C RECEIVED		EAS 106			24					
Image: black	PECIFIC CONDUCTANCE umhos		ERA506-0814(452-505			242					
(100 (120 (120 (120 (120 (120 (100 (120 (100 (120 (100 (120 (100 (120 (100 (120 (100 (120 (100 (120 (100 (120 (100 (120 (100 (120 (100 (120 (100 (120 (100 (120 (100 (120 (100 (120 (100 (120 (100 (120 (100 (120 (100 (120 <th< td=""><td>HARDNESS - ppm</td><td></td><td>ERA P170-507(107-13</td><td></td><td></td><td>80</td><td></td><td></td><td></td><td></td><td></td></th<>	HARDNESS - ppm		ERA P170-507(107-13			80					
(1) (a)(0,40) (a)(1,27) (a)(CHLORINE - ppm		tap water			<0.04					
Image: black in the state of the s	DISSOLVED OXYGEN - ppm		cal@840			7.4					
ATE EAS #1981 (8-12) CE UC 100% 50% 25% ATE TME ANALYST GC LOT OC EXP VALUE RC UC 100% 50% 25% 01/2/1/2 1100 hus SCS S8114 (8.9.2) OC EXP VALUE RC UC 100% 50% 25% 01/2/1/2 1100 hus SCS ERA506-0814 (452-505) N N N N 01/2/1/2 1100 hus SCS ERA506-0814 (452-505) N N N N 01/2/1/2 1100 hus SCS EAS 106 N N N N 01/2/1/2 1100 hus SCS EAS 106 N N N N 01/2/1/2 1100 hus SCS EAS 106 N N N N N 01/2/1/2 1100 hus SCS EAS 106 N N N N 01/2/2/12 1100 hus SCS EAS 106 N N N<	TOTAL ALKALINITY - ppm			(9)							
Date Imme Nalvyst Oc LOT Oc ExP VALUE RC UC 100% 50% 25% 01/17/12 1100 hts SCS E83146 8.9.2 FA3166 601 50% 55% 01/17/12 1100 hts SCS E83146 8.9.2 FA3506-0814(452-505) FRA506-0814(452-505)	INITIAL AMMONIA - ppm		EAS #1981 (8-12)								
DATE TME ANALYST QC LOT QC EXP VALUE NC 100% 50% 25% 0112/12 1100 hts SCS SB114 (8.8-32) 0 0 10 10 50% 50% 25% 0112/12 1100 hts SCS ERA506-0814(452.505) 0 0 10 0 10 0 50% 25% 01/27/12 1100 hts SCS ERA506-0814(452.505) QC EXP VALUE NC UC 100% 50% 25% 01/28/12 1100 hts SCS SB114 (8.8-2) QC EXP VALUE NC UC 100% 50% 25% 01/28/12 1100 hts SCS SB114 (8.8-2) QC EXP VALUE NC UC 100% 50% 25% 01/28/12 1100 hts SCS ERA506-0814(452-505) QC EXP VALUE NC UC 100% 50% 25% 01/28/12 1100 hts SCS ERA506-0814(452-505) QC EXP VALUE NC UC 100% 50											
01/27/12 1100 hts SCS B814 (8.8-9.2) 0 <th< td=""><td></td><td></td><td>1</td><td>QC EXP VALUE</td><td></td><td>100%</td><td>50%</td><td>25%</td><td>12.50%</td><td>6.25%</td><td>X %AEC</td></th<>			1	QC EXP VALUE		100%	50%	25%	12.50%	6.25%	X %AEC
01/27/12 1100 hrs SCS EAS06-0814(452-505)		-	SB114 (8.8-9.2)								
01/27/12 1100 hrs SCS ERAS06-0814(452-505) I	01/27/12	<	EAS 106								
01/27/12 1100 hrs SCS cal@840 AmALYST CC LOT QC EXP VALUE RC UC 100% 50% 25% DATE Time AmALYST QC LOT QC EXP VALUE RC UC 100% 50% 25% 01/28/12 1100 hrs SCS EAS 106 QC EXP VALUE RC UC 100% 50% 25% 01/28/12 1100 hrs SCS ERA506-0814(452-505) QC EXP VALUE RC UC 100% 50% 25% 01/28/12 1100 hrs SCS cal@840 QC EXP VALUE RC UC 100% 50% 25% 01/29/12 1100 hrs SCS cal@840 QC EXP VALUE RC UC 100% 50% 25% 01/29/12 1100 hrs SCS EAS10 QC EXP VALUE RC UC 100% 50% 25% 01/29/12 1100 hrs SCS EAS10 QC EXP VALUE RC UC 100% 50% 25	1	-	ERA506-0814(452-505								
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Mill Mindles M					+	100%	50%	75%	12 50%	6 25%	X %AFC
01/26/12 1100 ms 5C3 5EAS 106 5014 (452-505) 501 50 25 50 100 ms 50 50 25 50 10			CD111/0		+	2000					
01/28/12 1100 ftrs 5C3 ErA506-0814(452-505)											
01/28/12 1100 hrs SCS ERA506-0814(452-505)											
01/28/12 1100 hrs SCS cal@840 0 25% DATE TIME ANALYST QC LOT QC EXP VALUE RC UC 100% 50% 25% 01/29/12 1100 hrs SCS SB114 (8.8-9.2) 01/29/12 1100 hrs SCS ERA506-0814(452-505)			ERA506-0814(452-505								
DATE TIME ANALYST QC LOT QC EXP VALUE RC UC 100% 50% 25% 01/29/12 1100 hrs SCS SB114 (8.8-9.2) 25% 01/29/12 1100 hrs SCS EAS 106 25% 25% 25% 25% 25% 25% 25%	8/12				+					+	
01/29/12 1100 hrs SCS SB114 (8. 01/29/12 1100 hrs SCS EAS 106 01/29/12 1100 hrs SCS cal@840 01/29/12 1100 hrs SCS cal@840			QC LOT		-	100%	50%	25%	12.50%	6.25%	X %AEC
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01/29/12 1100 hrs SCS ER4506-C 01/29/12 1100 hrs SCS cal@840			EAS 106								
01/29/12 1100 hrs SCS			ERA506-0814(452-505	(
			cal@840								
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Page 2 of 5

WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027

Approved by: Alle

Date Test Began:		January 25, 2012	F	Time Test Began: 1100 hrs	1100 hrs			Analyst 1: DFW
Date Test Finished: 11/27/12CD&11/29/12PP	11/27/12CD	\$11/29/12PP	Tim	Time Test Finished: 1100 hrs	1100 hrs		_	Analyst 2: KJR Analyst 3: SCS
P. promelas (PP)		AGE:		7]days	HA	HATCH NUMBER: 8257 c-k	8257 c-k	
	RC	nc	100%	50%	25%	12.50%	6.25%	X% AEC
PERIOD	ALIVE	ALIVE	ALIVE	ALIVE	ALIVE	ALIVE	ALIVE	ALIVE
0 HR-PP	10,10	10,10	10,10	10,10	10,10	10,10	10,10	
24 HR-PP	10,10	10,10	0'0	0'0	2,1	8,7	8,9	
48 HR-PP	10,10	10,10	0'0	0'0	0'0	0'0	4,1	
Ceriodaphnia dubia (CD)	(Q;	AGE: <24	24	hours	Н	HATCH NUMBER: 2429 c-k	2429 c-k	
	RC	nc	100%	50%	25%	12.50%	6.25%	X% AEC
PERIOD	ALIVE	ALIVE	ALIVE	ALIVE	ALIVE	ALIVE	ALIVE	ALIVE
0 HR-CD	5,5,5,5	5,5,5,5	5,5,5,5	5,5,5,5	5,5,5,5	5,5,5,5	5,5,5,5	
24 HR-CD	5,5,5,5	5,5,5,5	0'0'0'0	0,0,0,0	2,4,3,5	5,5,5,5	5,5,5,5	

WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027 Fifth Edition October 2002

Page 3 of 5

Page 10 of 13

Approved by:

Date: 02/02/2012

Electronic Filing - Recived, Clerk's Office : 04/12/2013

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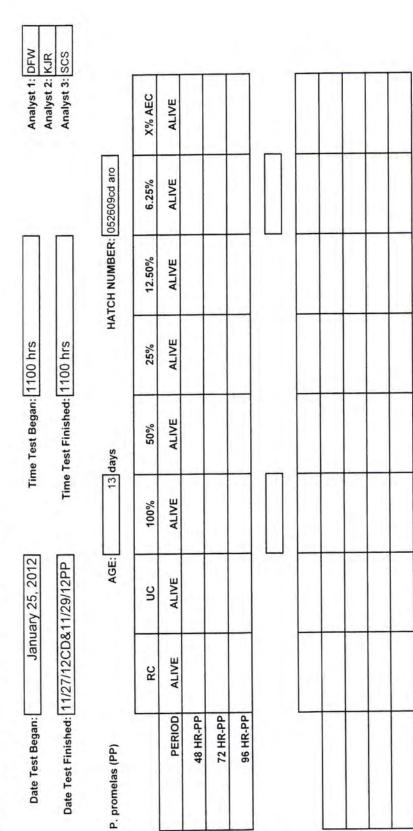
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48 HR-CD



WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027 Fifth Edition October 2002 EAS LOG# 1407821

Emerald Permance Materials, Effluent,

Approved by: Aller ide

Liceled & Date: Date:

WHOLE EFFLUENT TEST conducted in accordance with US EPA 600/4-90/027 Fifth Edition October 2002

Page 5 of 5

Emerald Permance Materials, Effluent, EAS#: 1407821	
	Notes & Comments
Note #1:Effluent aerated prior to test initiation due low DO upon arrival.) upon arrival.
Note #2:Effluent bright orange in color.	
- 1al	a na las las
Prepared by: Concerned	Date: U2/02/ 50/20

Electronic Filing - Recived, Clerk's Office : 04/12/2013

Page 12 of 13

alon	Electronic F	116119			
5 S	SUBCONTRACT ORDER PDC Laboratories, Inc.			1/24/2012	
		2012627			
PDC Laboratories, Inc 2231 W. Altorfer Drive Peoria, IL 61615 Project Manager: Kur kstepping@pdclab.cor	t C. Stepping	583-1719	Environmental Analysis So 4000 East Jackson Blvd Jackson, MO 63755 Phone :(573) 204-8817 Sample Origin PO#	(State) <u>IL</u> 40833	
Analysis	Due	Expires	Comments	temp	
Sample ID: 2012627-01 _Effund Waste Water			Sampled: 01/23/12 [*] 23:59	140782130	
Wet Testing - Single Dilution		6:00 01/25/12 23:59			
Sample ID: 2012627-02 - RIVEC Waste Water			Sampled: 01/24/12 06:00	407821-A	
Wet Testing - Single Dilution	02/03/12 1	6:00 01/26/12 06:00		3'0	
	_			ES.	

10.3.0	4	12 13:30		Sample Temperature Upon Receipt Sample(s) Received on Ice	C Y or N
elinguished By	Date/Time	, Received By	Date/Time	Proper Bottles Received in Good Condition	Y or N
		A for a	1/25/12	Bottles Filled with Adequate Volume	Y or N
Relinguished By	Date/Time	Received By	1030 Date/Time UF	Samples Received Within Hold Time	Y or N
Centralished by	Buter fille	0		Date/Time Taken From Sample Bottle	Y or N