

3352 128th Street Holland, Michigan 49424
 Telephone:
 +1 616 738 7308

 Fax:
 +1 616 399 3777

www.erm.com

September 16, 2019

Mr. Les Arnold ALS Environmental 3352 128th Avenue Holland, MI 49424



Reference: 0501867.0152

Subject: Whole Effluent Toxicity Test Results

Dear Les,

Enclosed please find the final results of the following Chronic Toxicity Tests performed on samples of the ArcelorMittal Burns Harbor Outfall 001 effluent.

- 26 August 2019, Chronic Ceriodaphnia dubia Toxicity Test
- 26 August 2019, Chronic Pimephales promelas Toxicity Test

If you have any questions concerning this report or if I can be of any further assistance to you, please feel free to contact me at (616) 738-7308 or via e-mail at bruce.rabe@erm.com.

Yours sincerely,

Bon G. Rale

Bruce A. Rabe Director, Aquatic Toxicology Laboratory

BAR:km

Enclosure: Whole Effluent Toxicity Test Report

cc: Amanda Grzybowski Brandon Frye File

ArcelorMittal I 250 West U.S	Permittee/Location: ArcelorMittal Burns Harbor LLC 250 West U.S. Hwy 12 Burns Harbor, IN 46304						Outfall number: 001
Laboratory N Environmenta 3352 128 th Av Holland, MI 49	nent	Report <u>Du</u> N/A	<u>e</u> Date:	:	Report Date: September 16, 2019		
WETT Reporting Frequency or Type:	Monthly	Quarterly	Semi- annual	Annual	TRE	Post TRE	<u>First</u> (per Reporting Frequency)? <u>Re-take</u> (per Reporting Frequency)?

Test Organism	Test Type	Endpoint	Units	Result	Pass/ Fail	Limit	Reporting
Ceriodaphnia	7-day	NOEC	%	100		N/A	Laboratory
dubia	Survival and	Survival	TUc	1.0		1.0	Report
	Reproduction	NOEC	%	100		N/A	
		Reproduction	TUc	1.0		1.0	
	Definitive	IC ₂₅	%	>100		N/A	
	Static-	Reproduction	TUc	1.0		1.0	
	Renewal	48 hr. LC ₅₀	%	>100		N/A	
			TUa	1.0		1.0	
		Toxicity (chronic)	TUc	1.0	Pass	1.0	Laboratory Report <u>and</u> NetDMR (Parameter Code 61426)
		Toxicity (acute)	TUa	1.0	Pass	1.0	Laboratory Report <u>and</u> NetDMR (Parameter Code 61425)
Pimephales	7-day Larval	NOEC	%	100		N/A	
, promelas	Survival and	Survival	TUc	1.0		1.0	
	Growth	NOEC	%	100		N/A	
		Growth	TUc	1.0		1.0	Laboratory
	Definitive	IC ₂₅	%	>100		N/A	Report
	Static-	Growth	TU₀	1.0		1.0	
	Renewal	96 hr. LC ₅₀	%	>100		N/A	
		90 III. LC ₅₀	TUa	1.0		1.0	
		Toxicity (chronic)	τυ _c	1.0	Pass	1.0	Laboratory Report <u>and</u> NetDMR (Parameter Code 61428)
		Toxicity (acute)	TUa	1.0	Pass	1.0	Laboratory Report <u>and</u> NetDMR (Parameter Code 61427)

FINAL REPORT

Chronic Toxicity Test Freshwater Invertebrate, *Ceriodaphnia dubia* EPA Test Method 1002.0

> Submitted To: ALS Environmental 3352 128th Avenue Holland, MI 49424

Sample: ArcelorMittal Burns Harbor, LLC - Outfall 001

Testing Period: 26 August – 2 September 2019

Laboratory I.D. Number: 082619-1



Conducted By: Environmental Resources Management, Inc. 3352 128th Avenue Holland, Michigan 49424



082619-1 Cd Page 1 of 21

Test Overview



Permittee: Location: Contact: Telephone #:	ArcelorMittal Burns Harbor, LLC 250 West U.S. Hwy 12 Burns Harbor, IN 46304 Robert Maciel 219.787.2120
	IN0000175 Acute Toxicity Limit = 1.0 TUa Chronic Toxicity Limit = 1.0 TUc Outfall 001
Test Sample: Receiving Water:	East Branch, Little Calumet River
Testing Date:	26 August – 2 September 2019
Sample Date(s):	26 August 2019 28 August 2019 30 August 2019
Test/Method:	Daphnid, <i>Ceriodaphnia dubia</i> , Survival and Reproduction Test EPA 821-R-02-013 Method 1002.0.
QC Objectives:	Test data met all test acceptability criteria, except where noted below.
Data Qualifiers:	None

DATA SUMMARY

Effluent Concentrations (%)	Survival (%)	Reproduction (Average Young/Female)
Control	100	28.3
6	100	25.5
13	100	25.8
25	100	26.0
50	100	30.2
100	100	36.6

>100%
100%
10070
>100%
210078
>100%
29.3%
1.0
1.0

TEST CONCLUSION

In accordance with the NPDES permit requirements for ArcelorMittal Burns Harbor, LLC, this toxicity test did not exceed either the acute or the chronic toxicity limit.

Brun G. Rabe

Bruce A. Rabe Director, Aquatic Toxicology Laboratory ERM Project No. 0501867.0152 Environmental Resources Management 3352 128th Avenue Holland, Michigan 49424-9263 Phone: 616.399.3500 Fax: 616.399.3777



ERM Testing Method

Ceriodaphnia dubia – Survival and Reproduction Toxicity Test

Upon sample receipt, each effluent sample was analyzed for a suite of water quality parameters (Appendix A - Table 1). Where indigenous organisms were present, the sample was filtered through a 60 micron (μ m) NITEX® screen. All samples were maintained at 0 – 6 degrees Celsius (°C) until needed for testing.

A series of five effluent concentrations and a control solution were established for testing. All test solutions were prepared by mixing appropriate volumes of dilution water and effluent in the test containers. Dilution water consisted of reconstituted moderately hard water. The control solution consisted of 100 percent dilution water.

Ceriodaphnia dubia used to initiate this test were obtained from individual, in-house cultures and were less than 24-hours old, and had an age range of 0 to 8 hours at test initiation. Test organisms used to initiate this test were released from adults which met acceptable performance criteria (i.e., \geq 15 young/surviving female within 3 broods and obtained from a brood of at least 8 young) and were maintained in reconstituted moderately hard water prior to test initiation.

The Ceriodaphnia dubia test was conducted using 30-milliliter (mL) disposable polystyrene containers containing 15 mL of control water or test solution. One Ceriodaphnia dubia was added to each test chamber with ten replicate chambers per treatment. Each Ceriodaphnia dubia test chamber was fed a 0.2-mL suspension consisting of yeast-Cerophyll-trout chow (YCT) and green algae (*Raphidocelis subcapitata*) mixture daily.

The test solutions were renewed daily during the exposure by transferring the adult daphnid, by way of a wide bore pipette, into fresh control water or test solution.



Percent survival of exposed *Ceriodaphnia dubia* was determined by inspecting for adult mortality daily. Mortality was defined as no body or appendage movement after gentle prodding. Production of young was also determined by daily inspections and enumeration. When 60 percent of the surviving females in the control treatment produced three broods, mean reproduction was determined by calculating the average number of live young produced per female for each treatment.

The test was conducted at a temperature of $25 \pm 1^{\circ}$ C under fluorescent lighting with a photoperiod of 16 hours light and 8 hours dark. Water quality measurements were performed on all control and test solutions prior to test initiation and on selected treatments daily thereafter, as indicated in the raw data (Appendix A - Table 2).

Following termination of the chronic toxicity test, No Observed Effect Concentrations (NOEC) and Lowest Observed Effect Concentrations (LOEC) were determined for Ceriodaphnia dubia survival and reproduction, and a 25 percent Inhibition Concentration (IC₂₅) was determined for Ceriodaphnia dubia reproduction. An NOEC is defined as the highest effluent concentration that does not produce any observed adverse effect to the exposed test organism. An LOEC is defined as the lowest effluent concentration that does produce an observed adverse effect to the exposed test organism. An adverse effect is determined as a statistically significant difference between the control and a given effluent concentration. Significant differences in Ceriodaphnia dubia survival were determined using the Fisher's Exact Test.

Prior to the determination of any significant differences in *Ceriodaphnia dubia* reproduction, the data were evaluated for normal distribution and homogeneity characteristics. Depending on the result and the number of test replicates per concentration, an analysis of variance test was performed followed by one of the following mean comparison tests: Dunnett's Procedure, Bonferroni t-Test, Steel's Many-One Rank Test, Wilcoxon Rank Sum Test, or the T-Test. For reporting purposes, a chronic toxic unit (TUc) is calculated and is defined as the most conservative of either 100/NOEC based on the more sensitive test endpoint or 100/IC₂₅.

To evaluate acute toxicity, a 48-hour LC₅₀ and corresponding 95 percent confidence interval was also calculated, where possible. The LC₅₀ value estimate was determined by using one of the following statistical methods: graphical, Spearman-Karber, Trimmed Spearman-Karber, or Probit. The method selected for reporting test results was determined by the characteristics of the data; that is, the presence or absence of 0 and 100 percent mortality and the number of concentrations in which mortalities between 0 and 100 percent occurred. For reporting purposes, the 48-hour LC₅₀ value was converted to an acute toxic unit (TUa) by 100/LC₅₀. All statistical analyses were performed using the CETISTM Version 1.9.4.3 software program.

The reference toxicant, sodium chloride, was used to monitor the sensitivity of the test organisms and the precision of the testing procedure. Chronic reference toxicant tests are performed at least monthly and the resulting IC_{25} are plotted to determine if the results are within prescribed limits (Appendix A - Standard Reference Toxicant Data). If the IC_{25} of a particular reference toxicant test does not fall within the expected range of \pm two standard deviations from the mean for a given test organism, the sensitivity of that organism and the overall credibility of the test system is suspect.

Reference:

USEPA. 2002. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, 4th Ed. U.S. Environmental Protection Agency, Office of Water, Washington, D.C., EPA-821-R-02-013.

Case Narrative



1.0 TEST PERFORMANCE CRITERIA

The quality control results achieved laboratory specifications.

2.0 MODIFICATIONS TO ERM'S STANDARD TEST METHOD

Test was performed in accordance with ERM's standard test method (see page 3).

Appendix A Supporting Documents

- Raw Test Data
- Statistical Analysis (if necessary)
- Chain-of-Custody Forms
- Standard Reference Toxicant Data

Ceriodaphnia dubia - Chronic Toxicity Test Initial Water Quality and Test Solution Preparation

ţ.

2

ArcelorMittal Burns Harbor, LL	.c	Control/Dilution Water:	RMHW
Outfall 001		Organism Batch #:	150-15
082619-1		Organism Age: 910-0110911	to 18 KG
v812649 Time:	1600	QC Review:	SAR
Time	1200	QC Review Date:	09/03/19
	Outfall 001 Ø82619-1 v81261(9 Time: Time:	082619-1 0812619 Time: 1600 Time: 1600	Outfall 001 Organism Batch #: 082619-1 Organism Age: 0812616 Time: 600 0812616 Time: 600

Initial Water Quality:

Parameter	Units		Effluent		Synthetic Water			
Sample #		1	2	3				
Lab I.D.#/ Batch #		082619-1	082819-1	083017-1	99-19	5.700pm	-	
Temperature	°C	5	5	2				
Dissolved Oxygen	mg / L	10.5	7.3	9.2				
pН	S.U.	7.1	7.2	7.3	7.8	-	*	
Conductivity	umhos/cm	417	391	454	315	~	1	
Alkalinity	mg / L CaCO ₃	110	103	102	60	-	-	
Hardness	mg / L CaCO ₃	140	160	140	80	8	-	
Total Ammonia	mg / L NH ₃	0:29	0.04	0,42				
Total Residual Chlorine	mg / L Cl ₂	20,01	10,01	20.01	20.01	~		
Total mis of 7.0 g/L	1	1.1.1.1.1.1						
Sodium Thiosulfate	mL/L							
added per liter								
Initials	-	RIA .	PM	MS	KM		~	

Test Solution Preparation:

Test Solution Prepared For Both Species.

Treatment	Effluent	Dilution	Tes	t	Effluent	Synthetic
(% Effluent)	(mL)	(mL)	Day	y Initials	Sample #	Batch #
Control	0	1200	0	RH	1	99-19
6%	72	1128	1	RH	1	99-19
13%	156	1044	2	PM	a	99-19
25%	300	900	3	RWM	2	99-19
50%	600	600	4	pars	3	94-16
100%	1200	0	5	RH	3	99-19
			6	RH	3	99-19
			7			-

Ceriodaphnia dubia - Chronic Toxicity Test Water Quality Data

Environmental Resources Management

1

Permittee/Client: Effluent/Location: Lab I.D.#:

ArcelorMittal Burns Harbor, LLC Outfall 001

Water Quality Data:

valer quanty						Disso	lved Ox Di		ng/L)					
Meter #	5	5	3	14	5	5	3	-	5	3	3	5	3	3
Treatment	0		1		2				4	!	5		6	7
(% Effluent)	- I	F	L. L.	F	1	F	1	F		F	1	F	I	F
Control	7.8	7.7	8.3	77	7,9	7.4	8,4	7,8	29	8.1	8.7	7.9	8,3	8.0
6%	78	27	8.3	78	19	24	84	7.9	29	8.0	8.2	7.9	8.3	8.2
13%	28	7.7	8.3	ネフ	7.9	24	8.4	2.8	2.4	8.0	8.2	7.8	8.3	8.1
25%	28	7,7	8.3	27	29	7.4	6,4	1.8	14	8.0	8.2	7,8	8.3	8-1
50%	7,8	77	8.3	78	8.0	7.4	6.3	7.7	5.3	8.0	8.2	7.8	8.3	8.1
100%	7.8	7.6	8.3	76	0.8	73	5,3	1.7	8.0	8.0	8.2	7.8	8.3	8.1
											20034			
							pH (
Meter #	9	9	0	9	8	\$	10	ay S	9	10	10	9	ID	10
Treatment	0		1		2		3		4		5		6	7
(% Effluent)		F		F		F		F	, 	F		F	Ĭī	F
Control	18	7.2	7.9		7,8	7.6	7Fb	24	7.8	7.3	7.8	77	7.8	7.4
Control	48	7.2	1.7	78	40	7.7	170	7.6	1.0	7.6		7.7		8.0
13%		7.7		80		77		27		7.7		7.7		8.0
25%		74		80		7.58		2.7		7.8		7.8		8-0
50%		2.6		gri		7.9		1.9		7.9		7.9		8.1
100%	7.5	7.7	7.5	82	7.5	8,1	7.7	8.0	7.6	8.0	7.6	8.0	7.6	8.1
10078		1.1	1.7	8.0	113	011	1.1	0.0	1.0	0.0	1.0	0.0		
Meter #	4		4		Ч		2	ay 	Y		3		3	
Treatment	0		1		2		3		4		5		6	7
(% Effluent)	1.1	F		<u> </u>		F		F		F		F	m 26 f	F
Control	318		320		323		324		BND		319		314	
6%	324		326		324		349		316		322		326	
13%	329		330		326		349		326		331		332	
25%	341		342		3283		336		341		340		347	
50%	363		363		3641	2	356		374		369		380	
100%	412		412		411		392		441		421		440	
						<u> </u>	_						12.1	
						1	empera D	ture (*) ay	()					
Meter #	5	5	3	3	5	5	3	-	5	3	3	5	3	8
Treatment	0		1		2		3	3	4		5		6	7
(% Effluent)		F	1	F,	1	F	1	F	1	F	1	F	. 1 .	F
Control	24	24	24	24	24	24	24	24	24	24	24	24	24	20
6%	24	24	24	21	24	24	24	24	24	24	24	24	24	45
13%	24	24	24	21	34	24	24	24	24	24	24	24	24	r
25%	24	24	24	M	24	24	24	14	24	24	24	24	24	ir
50%	24	24	24	24	24	24	24	27	24	24	24	24	24	25
	24	24	24	24	24	24	24	14	24	24	24	24	24	15
100%	0													
100%	9	1			f	Ľ.	1		= Final (

Note: D.O. meter also used for temperature measurement unless otherwise noted.

Environmental Resources Management

× 3

18

Ceriodaphnia dubia - Chronic Toxicity Test Survival and Reproduction Data

Table 3 Page 1 of 2

Permittee/Client: Effluent/Location: Lab I.D.#:

ArcelorMittal Burns Harbor, LLC Outfall 001 082619-1

The started	Devi					Donli	o o t o					Average Young/	Number of Live Adults	Average Young/ Female
Treatment (% Effluent)	Day No.	1	2	3	4	Repli 5	6	7	8	9	10	Female	(% Sur.)	% CV
(70 Endent)	1							-					10	
	2			-									10	
Control	4	5	6	8	6		1.	5	8	6	6		10	
	5	12	13	9	10	5	12	8	13	9	-		10	Salar
9/2	6		-	-	-	9	T	9	dain-	-	12		10	
fotals:	12	27	40	17	39	35	29	22	16	28	15	28.3	(100)	30.6
Broods (% 3rd	Brood)	3	3	2	3	3	3	3	3	3	3	(90)		
	1				-			~					10	1
	2									ī			10	
	3		6		-	-	-	8			-		10	
6%	4	6	3 10	8	8	7	13	5	7 12	6	7 10		18	
9/2-	6	16	-	-		-	12	-	12	-	-	10.54	10	
me	710		179			15	-	-	-	10	-	100	10	50 9
Fotals:	1012-0	37	22	20	22	33	31	14	31	28	17	2515	(100)	29.
	1												10	100
	2					: (6		10	
13%	3	2	7	4	-		5	6	8	2	-		10	1.12
	6	12	10	-	-	6	10		10	9	14		10	
min	6	-	15	8	8		20	10	-		17		10	
Totals:	7 2	55	32	12	7	25	35	Re	18	5	37	25.8	(100)	34.9
rotais,			-					-		100		1	10	1
	1												10	6
	3			-	-	-		~~~	-	-	~		10	
25%	4	6	7	7	8	5	7	7	8	5	5		10	
	5	11	11	12	10	10	14	9	12_	10	14		10	
	7	13	II	(100-			14	16		-			10	
Totals:	1	30	20	19	18	15	42	28	20	29	30	26.0	(100)	30-
	1			-		-				[]			10]
	2												0	-
C00/	3		-	2			~	6		-	2		10	
50%	4	12	-	11	13	12	12	13		12	14	13.70	10	1.50
	6	22	14	19	-		22	19	12	17	13		10	
	7	-	-	-			-	1	1000	-	-		10	150
Totals:		41	FI	37	21	19	41	40	13	35	34	30.2	(100)	35.
	1									1			10	
	2				-							NI 10-1	10	- W.
100%	4	5	5	10	8	5	7	5	5	3	6	1.1	10	
	5	12	12	43	10	IT	13	10	12	12	13	tel a	10	
	6		19	20	18	18	20	19	18		20		10	
64 C 10 C 1							and the second	-		10	State State		10	
pmala Totals:	723	24	36	39	36	34	40	310	0.5	34		36.6	(100)	16.4

> 082619-1 Cd Page 9 of 21

Ceriodaphnia dubia - Chronic Toxicity Test Support Data

F.

Permittee/Client: Arca Effluent/Location: Out Lab I.D.#: \land 8

ArcelorMittal Burns Harbor, LLC Outfall 001 O & CI9-

Brood Board Information:

Replicate	1	2	3	4	5	6	7	8	9	10	Brood Board Date:	08/12	19
Chamber Number	48	57	56	55	48	WA	46	45	41	U	Young Age Range:	10-18	hours
· · · · · · · · · · · · · · · · · · ·		<u> </u>				_						5-16	SPR 04/03

Test Information:

	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
YCT Batch #:	17-19	17-19	17/19	17-19	17-19	17-19	17-19	
Algae Batch #:	18-19	18-19	18-19	18-19	18.A	18-19	18-19	
Observation Time:	1600	1600	1430	1430	1500	1230	1230	1200
Initials:	pn	SPR	pr-	SPR	ms	KM	KM	ms
Date:	08196/19	08/21/19	08/28/19	05/29/19	08/30/19	08/31/19	09/01/19	Oglosic

Comment Section:

Day	Date	Initials	Comments	
	_			
	-			
				_
	_			

CETIS Analytical Report

Report Date: Test Code/ID: 04 Sep-19 10:15 (p 1 of 2) 570DE466 / 14-6052-8230

Ceriodaprinia	a 7-d Survival an	d Reprodu	iction Test								ERM
Analysis ID: Analyzed:	13-2016-6890 04 Sep-19 10:14			production rametric-Con	trol vs Treat	ments		S Versio Is Level:	n: CETISv1. 1	9.4	
Batch ID:	17-5546-6047	Tes	st Type: Re	production-S	urvival (7d)		Analy	yst: La	ab Tech		
Start Date:	26 Aug-19 16:00) Pro	otocol: EF	A/821/R-02-0	013 (2002)		Dilue	ent: R	econstituted W	ater	
Ending Date:	02 Sep-19 12:00) Spe	ecies: Ce	riodaphnia du	ubia		Brine				
lest Length:	6d 20h	Тах	kon: Br	anchiopoda			Sour	ce: In	-House Culture)	Age: <24
Sample ID:	20-9122-8489			A59D49			Proje		/ET Testing		
	: 26 Aug-19 06:18		Contraction of the second	lustrial Efflue	nt		Sour		rcelorMittal Bui	'ns Harbor,	
	: 26 Aug-19 12:00		S (PC):				Stati	on: U	utfall 001		
Sample Age:	10h (5 °C)	Clie	ent: An	celorMittal Bu	irns Harbor,						
Data Transfo		Alt Hyp					NOEL 100	>100	TOEL n/a	<u>ти</u> 1	PMSD 29.34%
Untransforme		C > T					100	>100)#a		23.0470
	tiple Comparison	n Test					DValue	Desials	m(m, E0/)		
Control	vs Conc-%			Critical	MSD DF 8.303 18	P-Type CDF	P-Value 0.5219		on(α:5%) gnificant Effect		
ab Water	6		0.772 0.6892	2.289 2.289		CDF	0.5219		gnificant Effect		
	13 25		0.6892	2.289		CDF	0.5857		gnificant Effect		
	25 50		-0.5238	2.289		CDF	0.9441		gnificant Effect		
	100		-2.288	2.289		CDF	0.9998		gnificant Effect		
Test Accenta	bility Criteria	TAO									
Attribute	Test Stat		Limits Upper	Overlap	Decision						
Control Resp	28.3	15	>>	Yes	Passes Cr	iteria					
ANOVA Table	e										
Source	Sum Squ	ares	Mean So	luare	DF	F Stat	P-Value	Decisio	on(a:5%)		
	wann wood	0100	Internet of a								
	907.533		181.507		5	2.759	0.0272	Signific	ant Effect		
Between						2.759	0.0272	Signific	ant Effect		
Between Error	907.533		181.507		5	2.759	0.0272	Signific	ant Effect		
Between Error Total	907.533 3552.2 4459.73		181.507		5 54	2.759	0.0272	Signific	ant Effect	14	
Between Error Total Distributiona	907.533 3552.2 4459.73		181.507		5 54		0.0272 P-Value		ant Effect on(α:1%)		
Between Error Total Distributiona Attribute	907.533 3552.2 4459.73 al Tests Test		181.507		5 54 59			Decision Equal V	on(α:1%) /ariances		
Between Error Total Distributiona Attribute Variances	907.533 3552.2 4459.73 al Tests Test Bartlett Ed		181.507 65.7815 /ariance Tes		5 54 59 Test Stat	Critical	P-Value	Decision Equal V	on(a:1%)		
Between Error Total Distributiona Attribute Variances Distribution	907.533 3552.2 4459.73 al Tests Test Bartlett Ec Shapiro-V	quality of V	181.507 65.7815 /ariance Tes		5 54 59 Test Stat 14.85	Critical 15.09 0.9459	P-Value 0.0110 0.2140	Decisio Equal V Norma	on(α:1%) /ariances I Distribution		
Between Error Total Distributiona Attribute Variances Distribution Reproduction	907.533 3552.2 4459.73 al Tests Test Bartlett Ec Shapiro-V	quality of V	181.507 65.7815 /ariance Tes	t 95% LCL	5 54 59 Test Stat 14.85 0.9734 95% UCL	Critical 15.09 0.9459 Median	P-Value 0.0110 0.2140 Min	Decisio Equal V Norma Max	on(α:1%) /ariances I Distribution Std Err	CV%	%Effect
Between Error Total Distributiona Attribute Variances Distribution Reproduction Conc-%	907.533 3552.2 4459.73 al Tests Test Bartlett Ec Shapiro-V n Summary	quality of V Vilk W Norr Count 10	181.507 65.7815 /ariance Tes mality Test Mean 28.3	t 95% LCL 22.11	5 54 59 Test Stat 14.85 0.9734 95% UCL 34.49	Critical 15.09 0.9459 Median 28.5	P-Value 0.0110 0.2140 Min 17	Decisio Equal V Norma Max 40	on(a:1%) /ariances I Distribution Std Err 2.737	30.58%	0.00%
Between Error Total Distributiona Attribute Variances Distribution Reproduction Conc-% 0 6	907.533 3552.2 4459.73 al Tests Test Bartlett Ec Shapiro-V n Summary Code	quality of V Vilk W Norr Count 10 10	181.507 65.7815 /ariance Tes mality Test Mean 28.3 25.5	t 95% LCL 22.11 20.09	5 54 59 Test Stat 14.85 0.9734 95% UCL 34.49 30.91	Critical 15.09 0.9459 Median 28.5 25	P-Value 0.0110 0.2140 Min 17 14	Decision Equal Norma Max 40 37	on(α:1%) /ariances I Distribution Std Err 2.737 2.391	30.58% 29.65%	0.00% 9.89%
Between Error Total Distributiona Attribute Variances Distribution Reproduction Conc-% 0 6 13	907.533 3552.2 4459.73 al Tests Test Bartlett Ec Shapiro-V n Summary Code	quality of V Vilk W Norr Count 10 10 10	181.507 65.7815 /ariance Tes mality Test Mean 28.3 25.5 25.8	95% LCL 22.11 20.09 19.37	5 54 59 Test Stat 14.85 0.9734 95% UCL 34.49 30.91 32.23	Critical 15.09 0.9459 Median 28.5 25 26.5	P-Value 0.0110 0.2140 Min 17 14 12	Decision Equal Norma Max 40 37 37	on(α:1%) /ariances I Distribution Std Err 2.737 2.391 2.843	30.58% 29.65% 34.85%	0.00% 9.89% 8.83%
Between Error Total Distributiona Attribute Variances Distribution Reproduction Conc-% 0 6 13 25	907.533 3552.2 4459.73 al Tests Test Bartlett Ec Shapiro-V n Summary Code	quality of V Vilk W Norr Count 10 10 10 10	181.507 65.7815 /ariance Tes mality Test 28.3 25.5 25.8 26	t 95% LCL 22.11 20.09 19.37 20.26	5 54 59 Test Stat 14.85 0.9734 95% UCL 34.49 30.91 32.23 31.74	Critical 15.09 0.9459 Median 28.5 25 26.5 28.5	P-Value 0.0110 0.2140 Min 17 14 12 15	Decision Equal Norma Max 40 37 37 42	on(α:1%) /ariances I Distribution Std Err 2.737 2.391 2.843 2.539	30.58% 29.65% 34.85% 30.88%	0.00% 9.89% 8.83% 8.13%
Between Error Total Distributiona Attribute Variances Distribution Reproduction Conc-% 0 6 13 25 50	907.533 3552.2 4459.73 al Tests Test Bartlett Ec Shapiro-V n Summary Code	quality of V Vilk W Norr Count 10 10 10 10 10	181.507 65.7815 /ariance Tes mality Test 28.3 25.5 25.8 26 30.2	t 95% LCL 22.11 20.09 19.37 20.26 22.65	5 54 59 Test Stat 14.85 0.9734 95% UCL 34.49 30.91 32.23 31.74 37.75	Critical 15.09 0.9459 Median 28.5 25 26.5 28.5 34.5	P-Value 0.0110 0.2140 Min 17 14 12 15 13	Decision Equal V Norma Max 40 37 37 42 41	on(α:1%) /ariances Distribution	30.58% 29.65% 34.85% 30.88% 34.97%	0.00% 9.89% 8.83% 8.13% -6.71%
Between Error Total Distributiona Attribute Variances Distribution Reproduction Conc-% 0 6 13 25 50 100	907.533 3552.2 4459.73 al Tests Test Bartlett Ec Shapiro-V n Summary Code L	quality of V Vilk W Norr Count 10 10 10 10	181.507 65.7815 /ariance Tes mality Test 28.3 25.5 25.8 26	t 95% LCL 22.11 20.09 19.37 20.26	5 54 59 Test Stat 14.85 0.9734 95% UCL 34.49 30.91 32.23 31.74	Critical 15.09 0.9459 Median 28.5 25 26.5 28.5	P-Value 0.0110 0.2140 Min 17 14 12 15	Decision Equal Norma Max 40 37 37 42	on(α:1%) /ariances I Distribution Std Err 2.737 2.391 2.843 2.539	30.58% 29.65% 34.85% 30.88%	0.00% 9.89% 8.83% 8.13% -6.71%
Between Error Total Distributiona Attribute Variances Distribution Reproduction Conc-% 0 6 13 25 50 100 Reproductio	907.533 3552.2 4459.73 al Tests Test Bartlett Eo Shapiro-V n Summary Code L	quality of V Vilk W Norr 10 10 10 10 10 10	181.507 65.7815 /ariance Tes mality Test Mean 28.3 25.5 25.8 26 30.2 36.6	t 95% LCL 22.11 20.09 19.37 20.26 22.65 34.87	5 54 59 Test Stat 14.85 0.9734 95% UCL 34.49 30.91 32.23 31.74 37.75 38.33	Critical 15.09 0.9459 Median 28.5 25 26.5 28.5 34.5 36	P-Value 0.0110 0.2140 Min 17 14 12 15 13 34	Decisio Equal V Norma Max 40 37 37 42 41 40	on(a:1%) /ariances I Distribution Std Err 2.737 2.391 2.843 2.539 3.339 0.763	30.58% 29.65% 34.85% 30.88% 34.97% 6.59%	0.00% 9.89% 8.83% 8.13% -6.71% -29.33%
Between Error Total Distributiona Attribute Variances Distribution Reproduction Conc-% 0 6 13 25 50 100 Reproductio Conc-%	907.533 3552.2 4459.73 al Tests Test Bartlett Ec Shapiro-V n Summary Code L	quality of V Vilk W Norr 10 10 10 10 10 10 10	181.507 65.7815 /ariance Tes mality Test Mean 28.3 25.5 25.8 26 30.2 36.6 Rep 2	t 95% LCL 22.11 20.09 19.37 20.26 22.65 34.87 Rep 3	5 54 59 Test Stat 14.85 0.9734 95% UCL 34.49 30.91 32.23 31.74 37.75 38.33 Rep 4	Critical 15.09 0.9459 Median 28.5 25 26.5 28.5 34.5 36 Rep 5	P-Value 0.0110 0.2140 Min 17 14 12 15 13 34 Rep 6	Decision Equal V Norma Max 40 37 37 42 41 40 Rep 7	on(a:1%) /ariances I Distribution Std Err 2.737 2.391 2.843 2.539 3.339 0.763 Rep 8	30.58% 29.65% 34.85% 30.88% 34.97% 6.59% Rep 9	0.00% 9.89% 8.83% 8.13% -6.71% -29.33% Rep 10
Between Error Total Distributiona Attribute Variances Distribution Reproduction Conc-% 0 6 13 25 50 100 Reproductio Conc-% 0	907.533 3552.2 4459.73 al Tests Test Bartlett Eo Shapiro-V n Summary Code L	quality of V Vilk W Norr 10 10 10 10 10 10 10 37	181.507 65.7815 /ariance Tes mality Test ////////////////////////////////////	t 95% LCL 22.11 20.09 19.37 20.26 22.65 34.87 Rep 3 17	5 54 59 Test Stat 14.85 0.9734 95% UCL 34.49 30.91 32.23 31.74 37.75 38.33 Rep 4 19	Critical 15.09 0.9459 Median 28.5 25 26.5 28.5 34.5 36 Rep 5 35	P-Value 0.0110 0.2140 Min 17 14 12 15 13 34 Rep 6 29	Decision Equal V Norma Max 40 37 37 42 41 40 Rep 7 22	on(α:1%) /ariances I Distribution Std Err 2.737 2.391 2.843 2.539 3.339 0.763 Rep 8 37	30.58% 29.65% 34.85% 30.88% 34.97% 6.59% Rep 9 28	0.00% 9.89% 8.83% 8.13% -6.71% -29.33% Rep 10 19
Between Error Total Distributiona Attribute Variances Distribution Reproduction Conc-% 0 6 13 25 50 100 Reproductio Conc-% 0 6	907.533 3552.2 4459.73 al Tests Test Bartlett Ec Shapiro-V n Summary Code L	quality of V Vilk W Norr 10 10 10 10 10 10 10 37 37 37	181.507 65.7815 /ariance Tes mality Test ////////////////////////////////////	t 95% LCL 22.11 20.09 19.37 20.26 22.65 34.87 Rep 3 17 20	5 54 59 Test Stat 14.85 0.9734 95% UCL 34.49 30.91 32.23 31.74 37.75 38.33 Rep 4 19 22	Critical 15.09 0.9459 Median 28.5 25 26.5 28.5 34.5 36 Rep 5 35 33	P-Value 0.0110 0.2140 Min 17 14 12 15 13 34 Rep 6 29 31	Decision Equal V Norma 40 37 37 42 41 40 Rep 7 22 14	on(a:1%) /ariances I Distribution 2.737 2.391 2.843 2.539 3.339 0.763 Rep 8 37 31	30.58% 29.65% 34.85% 30.88% 34.97% 6.59% Rep 9 28 28	0.00% 9.89% 8.83% 8.13% -6.71% -29.33% Rep 10 19 17
Between Error Total Distributiona Attribute Variances Distribution Reproduction Conc-% 0 6 13 25 50 100 Reproductio Conc-% 0 6 13	907.533 3552.2 4459.73 al Tests Test Bartlett Ec Shapiro-V n Summary Code L	quality of V Vilk W Norr 10 10 10 10 10 10 10 37 37 37 34	181.507 65.7815 /ariance Tes mality Test 28.3 25.5 25.8 26 30.2 36.6 Rep 2 40 22 32	t 95% LCL 22.11 20.09 19.37 20.26 22.65 34.87 Rep 3 17 20 12	5 54 59 Test Stat 14.85 0.9734 95% UCL 34.49 30.91 32.23 31.74 37.75 38.33 Rep 4 19 22 22	Critical 15.09 0.9459 Median 28.5 25 26.5 28.5 34.5 36 35 33 33 31	P-Value 0.0110 0.2140 Min 17 14 12 15 13 34 Rep 6 29 31 35	Decision Equal V Norma Max 40 37 37 42 41 40 Rep 7 22 14 16	on(α:1%) /ariances Distribution Std Err 2.737 2.391 2.843 2.539 3.339 0.763 Rep 8 37 31 18	30.58% 29.65% 34.85% 30.88% 34.97% 6.59% Rep 9 28 28 28 28 21	0.00% 9.89% 8.83% 8.13% -6.71% -29.33% Rep 10 19 17 37
Between Error Total Distributiona Attribute Variances Distribution Reproduction Conc-% 0 6 13 25 50 100 Reproductio Conc-% 0 6 13 25	907.533 3552.2 4459.73 al Tests Test Bartlett Ec Shapiro-V n Summary Code L	quality of V Vilk W Norr 10 10 10 10 10 10 10 10 37 37 37 34 30	181.507 65.7815 /ariance Tes mality Test 28.3 25.5 25.8 26 30.2 36.6 Rep 2 40 22 32 29	t 95% LCL 22.11 20.09 19.37 20.26 22.65 34.87 Rep 3 17 20 12 19	5 54 59 Test Stat 14.85 0.9734 95% UCL 34.49 30.91 32.23 31.74 37.75 38.33 Rep 4 19 22 22 18	Critical 15.09 0.9459 Median 28.5 25 26.5 28.5 34.5 36 Rep 5 35 33 31 15	P-Value 0.0110 0.2140 Min 17 14 12 15 13 34 Rep 6 29 31 35 42	Decision Equal V Norma 40 37 37 42 41 40 Rep 7 22 14 16 28	on(α:1%) /ariances I Distribution Std Err 2.737 2.391 2.843 2.539 3.339 0.763 Rep 8 37 31 18 20	30.58% 29.65% 34.85% 30.88% 34.97% 6.59% Rep 9 28 28 28 21 29	0.00% 9.89% 8.83% 8.13% -6.71% -29.33% Rep 10 19 17 37 30
Between Error Total Distributiona Attribute Variances	907.533 3552.2 4459.73 al Tests Test Bartlett Ec Shapiro-V n Summary Code L	quality of V Vilk W Norr 10 10 10 10 10 10 10 37 37 37 34	181.507 65.7815 /ariance Tes mality Test 28.3 25.5 25.8 26 30.2 36.6 Rep 2 40 22 32	t 95% LCL 22.11 20.09 19.37 20.26 22.65 34.87 Rep 3 17 20 12	5 54 59 Test Stat 14.85 0.9734 95% UCL 34.49 30.91 32.23 31.74 37.75 38.33 Rep 4 19 22 22	Critical 15.09 0.9459 Median 28.5 25 26.5 28.5 34.5 36 35 33 33 31	P-Value 0.0110 0.2140 Min 17 14 12 15 13 34 Rep 6 29 31 35	Decision Equal V Norma Max 40 37 37 42 41 40 Rep 7 22 14 16	on(α:1%) /ariances Distribution Std Err 2.737 2.391 2.843 2.539 3.339 0.763 Rep 8 37 31 18	30.58% 29.65% 34.85% 30.88% 34.97% 6.59% Rep 9 28 28 28 28 21	0.00% 9.89% 8.83% 8.13% -6.71% -29.33% Rep 10 19 17 37

082619-1 Cd GETISTM v1 94.3

Analyst: 4 QA:

CETIS Analytical Report	Report Date:	04 Sep-19 10:15 (p 2 of 2)
	Test Code/ID:	570DE466 / 14-6052-8230

ornouaprini	a 7-d Survival and Rep	production I	est		ERM
Analysis ID: Analyzed:	13-2016-6890 04 Sep-19 10:14	Endpoint: Analysis:	Reproduction Parametric-Control vs Treatments	CETIS Version: CETISv1.9.4 Status Level: 1	
Graphics 45 40 35 30 25 20 15 10 5			Reject Null Reject Null Reject Null	· · · · · · · · · · · · · · · · · · ·	•

Conc-%

Analyst: MA QA.M

Rankits

CETIS Analytical Report

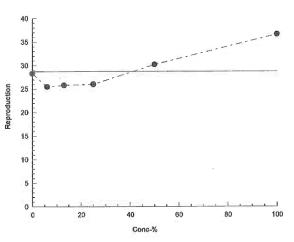
04 Sep-19 10:15 (p 1 of 2) 570DE466 / 14-6052-8230

Cerioa	aprinia	7-d Survival and	1 Keproduc	uon re	7.6								ERN
Analysi Analyza		01-1546-9422 04 Sep-19 10:14		ooint: ysis:	Reproduction Linear Interpola	tion (ICPIN)				3 Version: s Level:	CETISv 1	1.9.4	
Batch I	D:	17-5546-6047	Test	Type:	Reproduction-S	urvival (7d)			Analy	st: Lab	Tech		
Start D	ate:	26 Aug-19 16:00	Prot	ocol:	EPA/821/R-02-	013 (2002)			Diluer	nt: Reco	onstituted 1	Water	
Ending	Date:	02 Sep-19 12:00	Spec	cies:	Ceriodaphnia d	ubia			Brine				
l'est Le	ength:	6d 20h	Тахо	on:	Branchiopoda				Sourc	e: In-H	ouse Cultu	ire	Age: <24
Sample	D:	20-9122-8489	Code	e:	7CA59D49				Proje	ct: WET	Testing		
Sample	Date:	26 Aug-19 06:18	Mate	rial:	Industrial Efflue	ent			Sourc	e: Arce	IorMittal B	urns Harbor	, LLC
Receip	t Date:	26 Aug-19 12:00	CAS	(PC):					Statio	n: Outf	all 001		
Sample	e Age:	10h (5 °C)	Clier	nt:	ArcelorMittal Bu	urns Harbor,	LLC			-			
inear	Interpo	plation Options											
K Tran	sform	Y Transform	Seed	1	Resamples	Exp 95%		lethod					
Log(X+	1)	Linear	1515	610	200	Yes	T	wo-Point	t Interpo	lation			-
Test Ac	ceptal	oility Criteria	TAC LI	mits									
Attribu	te	Test Stat	Lower	Uppe	r Overlap	Decision							
Control	Resp	28.3	15	>>	Yes	Passes Cr	riteria						
Point E	stimat	es									•		
_evel	%	95% LCL	95% UCL	τu	95% LCL	95% UCL							
C5	>100	n/a	n/a	<1	n/a	n/a							
C10	>100	n/a	n/a	<1	n/a	n/a							
C15	>100	n/a	n/a	<1	n/a	n/a							
C20	>100	n/a	n/a	<1	n/a	n/a							
C25	>100	n/a	n/a	<1	n/a	n/a							
C40	>100	n/a	n/a	<1	n/a	n/a							
IC50	>100	n/a	n/a	<1	n/a	n/a							
Reproc	duction	Summary			. mayor app	Cal	culated	Variate				Isotor	nic Variate
Conc-9	6	Code	Count	Mean	AND DESCRIPTION OF THE OWNER OF T	Max	Std De			%Effect		Mean	%Effect
)		L	10	28.3	17	40	8.654		.58%	0.0%		28.73	0.0%
6			10	25.5	14	37	7.561		.65%	9.89%		28.73	0.0%
13			10	25.8	12	37	8.991	34.	.85%	8.83%		28.73	0.0%
25			10	26	15	42	8.028		.88%	8.13%		28.73	0.0%
50			10	30.2	13	41	10.56		.97%	-6.71%		28.73	0.0%
100			10	36.6	34	40	2.413	6.5	59%	-29.33%		28.73	0.0%
Reproc	duction	Detail									-		
Conc-%	6	Code	Rep 1	Rep		Rep 4	Rep 5	-	ep 6	Rep 7	Rep 8	Rep 9	Rep 10
0		L	37	40	17	19	35	29		22	37	28	19
c			37	22	20	22	33	31		14	31	28	17
			34	32	12	22	31	35		16	18	21	37
13			30	29	19	18	15	42		28	20	29	30
13 25								4.4		40	13	35	24
6 13 25 50			41	21 36	37	21 36	19 34	41 40		34	35	34	34 39

Analyst: M QA: M

CETIS Ana	alytical Report			Report Date: Test Code/ID:	04 Sep-19 10:15 (p 2 of 2) 570DE466 / 14-6052-8230
Ceriodaphnia	a 7-d Survival and R	eproduction T	est		ERM
Analysis ID:	01-1546-9422	Endpoint:	Reproduction	CETIS Version:	CETISv1.9.4
Analyzed:	04 Sep-19 10:14	Analysis:	Linear Interpolation (ICPIN)	Status Level:	1





Analyst: KM QA: M

F		H	F	N	F	5
F		鄭	Ŧ			1
E	H			Z	1	-
H	H	Ħ	ť			\mathbf{P}
		ť,	Þ	h		ÊT

ENVIRONMENTAL RESOURCES MANAGEMENT

3352 128th Avenue Holland, Michigan 49424-9263 Phone: 616- 399-3500 FAX: 616-399-3777

AOUATIC TOXICITY LAB CHAIN OF CUSTODY FORM *

		ć	LUNI.	AQUALLU LUNULL	TTUD)	TTAIN OF CON	TUULI	TATA			
CLIENT NAME:	AMBIA	24	Arc	Srceloc)	SAMPLER	IL	-					
ADDRESS:			,		PHONE NUMBER:	R:						
SAMPLE DESCRIPTION (i.e. Outfall 001)	DATE (Begin End)	TIME (Begin End)	GRAB OR COMP	NUMBER AND SIZE OF CONTAINERS	FIELD PARAMETERS		SAMPLE ID NUMBER (Filled in by ERM).	INITIAL WATER UPON RECEIPT (filled in by ERM)	INITIAL WATER QUALITY PARAN UPON RECEIPT BY LABORATORY (filled in by ERM)	INITIAL WATER QUALITY PARAMETERS UPON RECEIPT BY LABORATORY (filled in by ERM)	ERS	
00 (akurah godizzha	05/25/19	0613 0613		1-2.5 gel	pH= NH3=	s.u. mg/L	OB26.69-1	•Temp. S (• C) FXOn Ice	D:0.	pH L	Cond Lef [7] umhos/cm	nhos/an
1 1 Calification	SAR OFIDIN OGIDENIA	0603		1-2554	pH= NH₃=	s.u. mg/L	E-119080	Temp. S (e.C) SOn Ice	p.o.	PH Su	Cond LI-I-I m	umhos/cm
					pH= NH₃=	s.u. mg/L		1 1 1 2 1	D.O. mg/L	PH s.u.	1. 1. 1. 1.	umhos/cm
					PH= NH₃=	s.u. mg/L		Temp. (• C)	D.O. mg/L	n.s	Cond	umhós/cm
					pH= NH3=	s.u. mg/L		Temp. (• C) [] On Ice	D.O. mg/L		Cond u	umhos/cm
					pH= NH3=	s.u. mg/L		Temp. (° C) [] On Ice	D.O. mg/L	pH s.u.	Cond	umhos/cm
ANALYSES REQUESTED [check item(s)]	Test Material: Water, Sedim Produ	aterial: Water/Wastewater Sediment Product	tewater	Test Type: Acute Chronic Other	Test Species: Ceriodapiru Daphrnia m Daphrnia pr Fathead m	t Species: Ceriodaphnia dubia Daphnia magna Daphnia pulex Fathead minnow	(Pimephu	Trout (Oncor [†] ad minnow ((is minnow (Me as)	Rainbow Trout (Oncorhynchus mykiss) Sheepshead minnow (Cyprinodon variegatus) Silverside minnow (Menidia beryllina) ales promelas)	egatus) Other (write	Americamysis bahia Hyalella azteca Chironomus dilutus in comments sectio	ahia tus sction)
COMMENT SECTION: 500 ALS COC 41579	ECTION:	oce AL	200 5	41579								
SAMPLE TRANSFERS	RANSFERS	0										
RELINQUISHED BY: Signature,	HED BY:	Signatu		Organization	DATE '	TIMÈ	ACCEPTED BY: Signature /Organization	Y: Signat	ure/Organ	uization -	DATE	TIME

082619-1 Cd Page 15 of 21 See Instructions for Sample Collection on Back of Sheet

February 2018

Control Team			Cincinnati, OH +1 513 733 5336		Fort Collins, CO +1 970 490 1511	O	Chain of Custody Form	f Cust	tody F	orm	Houst +1 281	Houston, TX +1 281 530 5656	Spring City, PA +1 610 948 4903	South Charleston, WV +1 304 356 3168
COCID: 41573 COCID: 4167 Provide Request Name COCID: 41573 COCID: 41573 COCID: 41573 CONSTRUCTO			Everett, WA +1 425 356 26		nd, MI 6 399 6070		Page				Middle +1 717	town, PA 1944 5541	Salt Lake City, UT +1 801 266 7700	York, PA +1 717 505 5280
Project Internation All Project Internation Fertions (note) All		N					S	CID: 4	1579					
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$							ALS	S Project	Manager			ALS	Work Order #:	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	0	ustomer Informati	ion			Project [Informatic	c.			Par	ameter/Me	thod Request for	Analysis
$\begin{tabular}{ c $	Purchase Order			Projec	-	AM BH		\mathbf{x}	R 3	_		- Sub	ERM	
Company Name MMBH In to company Name D D Send Report To Invoice Atin Invoice Atin D D Send Report To Address Address E E Address Address Address E E Chylstat/Clo Chylstat/Clo Chylstat/Clo B F Fax Chylstat/Clo Chylstat/Clo B F F Fax F Chylstat/Clo Chylstat/Clo B F F Fax Sample Description Desc D te F A F A Mark Mark Pres. #Bottles A B C D F A Mark Chylstat/Clo Chylstat/Clo A B C D F A A B C D F A A B C D F A A B C D F A A <t< td=""><td>Work Order</td><td></td><td></td><td>Project</td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	Work Order			Project	-									
Independent to the product	Company Name		EPT	Bill To C	ompany	Å	HOW			O				
Address Address F_{IRA}	Send Report To		0	Invo	nice Attn					0				
ChyChate/Cip ColyState/Cip ColyState/Cip ColyState/Cip ColyState/Cip Phone Phone <th< td=""><td>Address</td><td></td><td></td><td></td><td>Address</td><td></td><td></td><td></td><td></td><td>шш</td><td></td><td></td><td></td><td></td></th<>	Address				Address					шш				
Flore Phone Phone <th< td=""><td>City/State/Zip</td><td></td><td></td><td>City/S</td><td>tate/Zip</td><td></td><td></td><td></td><td></td><td>IJ</td><td></td><td></td><td></td><td></td></th<>	City/State/Zip			City/S	tate/Zip					IJ				
Fax Fax Fax Fax Fax 1 Mail Address Mail Address Mail Address 0 - - <	Phone				Phone					Ŧ		-		
Mail Address Mail Address Mail Address Mail Address Mail Address No. Sample Description Date Time Matrix Press. # C D E F O H I 25 0.U-BAL 0/1 Comp # R*35-19 0/6/8 A B R X 0/72/19-2 F O H I X 0/72/19-2 F O H H X 0/72/19-2 F A H <td>Fax</td> <td></td> <td></td> <td></td> <td>Fax</td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td>	Fax				Fax					-				
No. Sample Description Date Time Matrix Pres. # Bottle A B C D E A H 20 0/1/4/M 001 Comp ¥ 2-35-15 0/6/8 A 8 7 X 0 <td< td=""><td>e-Mail Address</td><td></td><td></td><td>e-Mail</td><td>Address</td><td></td><td></td><td></td><td></td><td>P</td><td></td><td></td><td></td><td></td></td<>	e-Mail Address			e-Mail	Address					P				
Bit Du H&M COI Conp X S-35-19 Do 18 A S <td>and the second</td> <td>Sample Description</td> <td></td> <td>Date</td> <td>ų L</td> <td>au</td> <td>Matrix</td> <td>Pres.</td> <td># Bottles</td> <td>-</td> <td></td> <td></td> <td>U</td> <td>7</td>	and the second	Sample Description		Date	ų L	au	Matrix	Pres.	# Bottles	-			U	7
1 2 0045all 011 0.672619-2 1 X 0472619-2 X 0472619-2 X	0826			8-25-14	-	18	40	8		×	062	619-1		
Q3 Control Con	19-1			8-25-14		80	Aa	00	-	X	042	2-51		
Time Shipment Method Turnaround Time in Business Days (BD) One Results Due D upler(s) Plant	Cd 21										-	i		
Bit Bit Beautis Due D Beautis Due D Shipment Method Turnaround Time in Business Days (BD) Coher Beautis Due D Shipment Method Turnaround Time in Business Days (BD) Coher Beautis Due D Shipment Method Turnaround Time in Business Days (BD) Coher Beautis Due D Shipment Method Turnaround Time in Business Days (BD) Coher Beautis Due D Shipment Method Turnaround Time in Business Days (BD) Coher Beautis Due D Shipment Method Turnaround Time in Business Days (BD) Coher Beautis Due D Date: Date: Time Received by (Laboratory)i S.C.M 1 (Lo.S. Cooler 1D Cooler 1D Cooler 1D Cooler 1D Deaving Circles Area Date: Time Checked by (Laboratory)i S.C.M 1 (Lo.S. Cooler 1D Cooler 1D Cooler 1D Cooler 1D Deaving Circles Area Area Hacon Ha	4		-			1								1
Shipment Method Turnaround Time in Business Days (BD) Other Results Due Shipment Method Turnaround Time in Business Days (BD) Other In Bo Shipment Method Turnaround Time in Business Days (BD) Other Besults Due Shipment Method Turnaround Time in Business Days (BD) Other In Bo Shipment Method Turnaround Time in Business Days (BD) Other In Bo Shipment Method Turnaround Time in Business Days (BD) Other In Bo Shipment Method Turnaround Time in Business Days (BD) Other In Bo Shipment Method Turnaround Time in Business Days (BD) In Bo In Bo Shipment Method Turnaround Time in Business Days (BD) In Bo In Bo Shipment Method Turnaround Time in Business Days (BD) In Bo In Bo Shipment Method Turnaround Time in Business Days (BD) In Bo In Bo Pate Time Received by (Laboratory) Stock In Bo In Bo Date: Time Cheetweed by (Laboratory) Stock In Bo In Bo <	ú													
Billipment Method Turnaround Time in Business Days (BD) Other Results Due D Shipment Method Turnaround Time in Business Days (BD) Other 0 </td <td>ę</td> <td></td>	ę													
Balance Balance <t< td=""><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	7													
Bit Difference Bit Bit Besuits Due Bit Shipment Method Turnaround Time in Business Days (BD) Other In Business Days (BD) In Business Days (BD) Bit Bit Time In Business Days (BD) In Business Days (BD) In Business Days (BD) In Business Days (BD) Particle Bit In Business Days (BD) Particle Date: In Business Days (BD) In Business (BD) In Bus	80						<u>.</u>							
Bit Days Besults Due Partie Shipment Method Turnaround Time in Business Days (BD) Other Partie Shipment Method Turnaround Time in Business Days (BD) Other Results Due Partie Partie Time Received by (Laboratory) S.G.M. / C.D.M. Notes: A.Comparity is A.G.M. A. State Arive Partie: Time Received by (Laboratory) S.G.M. / [C.O.M. Notes: Descripter (Check One Box Bet Partie: Time: Date: Time: Other tends Cooler Temp Oc.Pactager (Check One Box Bet 2-HNO2 3-H.SO4 4-Na,OH 5-Na,S2,Oa 5-NaHSO4 7-Other 8-4°C 9-5035 Doter	ŋ													
Besults Due D Besults Due D Besults Due D Page: A 1 Time: <	10			11										
The Page 36 11 Time. Received by: Laboratory) Received by: Laboratory Laboratory) Received by: Laborat	Sampler(s) Please P	int & Sign		Ship	oment Metho	g	Turna 101	Found Time	in Busines	s Days (BD 3 8t	Ô	12 80		Due Date:
Date: Time! Time! Time! Time! Cooler 10 Co	Relinquish dby:	- you	P7-36-19	Time	Receive	Y T T		L .		Notes: *C(ONIDE:	He samply	ends and	chizelly at same .	
Date: Time: Checked by (Laboratory): Level II std CC/Raw Date 2-HNO ₂ 3-H_SO ₄ 4-Na ₂ S ₂ O ₃ 6-Na ₂ S ₂ O ₄ 7-Other 8-4°C 9-5035 1 1 0 1 0	Relinquished by:	A 4	Date:	Time: V	Receive	d by (Labor	5	32641-	2021	Cooler	D Cool	ar Temp	Package: (Check One I	
2-HNO ₃ 3-H ₃ SO ₄ 4-NaOH 5-Na ₃ S ₃ O ₃ 6-NaHSO ₄ 7-Other 8-4°C 9-5035	Logged by (Laboratory);		Date:	Time:	Checke	d by (Labor							Level III Sta QC/Raw Da	
	Preservative Key:			aOH 5-Nag		VaHSO.	7-Other		9-5035		+		Other	
	3 The Chain of	f Custody is a local day			and have been		Para addies							

÷

ENVIRONMENTAL RESOURCES MANAGEMENT	5700 VCV0V 40
L RESOURCE	257 170th Among Malland Michigan 10,
ENVIRONMENTAL RESOURCES MANAGEME	2257 170th A view

3352 128th Avenue Holland, Michigan 49424-9265 Phone: 616- 399-3500 FAX: 616-399-3777

AOUATIC TOXICITY LAB CHAIN OF CUSTODY FORM *

.

				umhos/cm	umhos/cm	umhos/ cm	umhós/cm	umhos/cm	umhos/cm	bahia Iutus section)			TIME	
			ERS	SQ 1	Cond Cond La muhos/can	Cond	Cond	Cond	Cond	Americamysis bahia Hyalella azteca Chironomus dilutus in comments sectio			DATE	
			INITIAL WATER QUALITY PARAMETERS UPON RECEIPT BY LABORATORY (filled in by ERM)	$\mathcal{L}_{\mathcal{L},\mathcal{S}}^{\mathrm{HH}}$	n.s S.J	pH s.u.	.n.s Hd	pH	pH s.u.	(write			nization	
FUKM *			INITIAL WATER QUALITY PARAN UPON RECEIPT BY LABORATORY (filled in by ERM)	D.O. 7, 3 mgL	D.O.	D.O. mg/L	D.O. mg/L	D.O. mgl.	D.O.	Rainbow Trout (Oncorhynchus mykiss) Sheepshead minnow (Cyprinodon variegatus) Silverside minnow (Menidia beryllina) des promelas)			thure/Organ	
TUULY				Temp. (• C)	Temp. S (• C)	×Temp. (• C)∻ □ On Ice	Temp. (• C) = □ On Ice.	Temp. (• C)	Temp: (° C) □ On Ice	r Trout (Onco ead minnow le minnow (A			BY: Signa	
IN OF CU			SAMPLE ID NUMBER (Filled in by ERM)	1-612000	E-413620					Pimephu			ACCEPTED BY: Signature /Organization	
B CHA	LER	E sER:	FIELD PARAMETERS	s.u. mg/L	s.u. mg/L	s.u. mg/L	s.u. mg/L	s.u. mg/L	s.u. mg/L	t Species: Ceriodaphnia dubia Daphnia magna Daphnia pulex Fathead minnow (TIME	
IY LA	SAMPLER	PHONE NUMBER:	FIELD PARAN	PH= NH3=	PH= NH3=	PH= NH3=	PH= NH3=	pH= NH3=	pH= NH3=	Test Species: Ceriodaphni Daphnia m Daphnia pu Fathead m			DATE	
AQUATIC TUXICITY LAB CHAIN UF CUSTODY FURM			NUMBER AND SIZE OF CONTAINERS	259	256					Test Type: Acute Chronic Other	12011		anization	
JUAI		e.	GRAB OR COMP							ewater	COCE		re/Org	
A C	BN		TIME (Begin End)	0610	0555 0555					aterial: Water/Wastewater Sediment Product	ire ALS	-	Signatu	
	AM		DATE (Begin End)	09/12/20 09/21/19	6412130 1450000 1					Test Material: Water Sedim Produ	CTION: 5	ANSFERS	HED BY:	
	CLIENT NAME:	ADDRESS:	SAMPLE DESCRIPTION (i.e. Outfall 001)	OO1 ostaviti	Philos 1 10					ANALYSES REQUESTED [check item(s)]	COMMENT SECTION: See ALS COC 4201	SAMPLE TRANSFERS	RELINQUISHED BY: Signature / Organization	
	l <u></u>			L	L	082619 Page 1	9-1 Cd 7 of 21	<u> </u>				L		 _

See Instructions for Sample Collection on Back of Sheet *

February 2018

Interview Inter	Cooler ID Cooler Temp OC Package: (Check Cooler ID Cooler ID Cooler Temp I Level II Std DC R
The second of th	8-1210 1300
The second of th	1 10
EPT Reject Name Project Name Project Number Address Ctty/State/Zp Phone Fax e-Mail Address Dete Ti Dete Ti Shipment Meth	aboratory):
EPT BIII Production of the set o	Received by (Laboratory): Checked by (Laboratory):
Ed to the second	Time: Time:
	8-38-14 Date: Date:
AMBH + HMBH + AMBH + OIL 60 011 60 011 60 011 60	X
Address Rampler(s) Please Print & Sampler(s) Please Print & Sign	Relinquished by:

ERM

ENVIRONMENTAL RESOURCES MANAGEMENT

3352 128th Avenue Holland, Michigan 49424-9263 Phone: 616- 399-3500 FAX: 616-399-3777

AQUATIC TOXICITY LAB CHAIN OF CUSTODY FORM *

CLIENT	P		<.		SAMPLER				
NAME:	Arlow		ai the						
ADDRESS:					PHONE NUMBER:				
SAMPLE DESCRUPTION (i.e. Outfall 001)	DATE (Begin End)	TIME (Begin End)	GRAB OR COMP	NUMBER AND SIZE OF CONTAINERS	FIELD PARAMETERS	SAMPLE ID INITIAL WATER NUMBER UPON RECEIPT (Filled in by ERM) (filled in by ERM)	INITIAL WATER QUALITY PARAMETERS UPON RECEIPT BY LABORATORY (filled in by ERM)	UALITY PARAN LABORATORY	IETERS
00	8/20/14	22.20		15 2 & 2.5 Sp) PH= s.u. NH3= mg/L	1-5105.30	Temp: D.O. 2 (°C) G 2 mg/L ⊡ On Ice.	ngT 7 S.u.	\mathcal{C} Cond \mathcal{C} with \mathcal{C}
110	8/26	0605 0605		1 42. 5ml	pH= s.u. NH3= mg/L	06 3419.1	Temp. D.O. D.O.	net C Jau	\mathcal{C} ond \mathcal{M} unitios/ \mathfrak{m}
					pH= s.u. NH3= mg/L		Temp. D.O. mg/L (• C) mg/L	ng/L p.H s.u.	L Cond unhos/cm
					pH= s.u. NH3= mg/L		Temp. (• C) D.O. mg/L	ns. Hq	c Cond unhos/cm
					pH= s.u. NH3= mg/L		Temp. D.O	PH.	s.u. Cond
					pH= s.u. NH3= mg/L		D:O.	PH	s.u.
ANALYSES REQUESTED [check item(s)]	Test Material: Water, Sedim Produ	aterial: Water/Wastewater Sediment Product	ewater	Test Type: Acute Chronic Other	Test Species: Ceriodaphnia dubia Daphnia magna Daphnia pulex Fathead minnow	[Pimephu	Rainbow Trout (Oncorhynchus mykiss) Sheepshead minnow (Cyprinodon variegatus) Silverside minnow (Menidia beryllina) des promelas)Other	nykiss) on variegatus) yllina)Other (writ	sgatus) Americamysis bahia sgatus) Hyalella azteca Chironomus dilutus Other (write in comments section)
COMMENT SECTION: See ALS COL 42012	ECTION: 2	ice ALS	H 200	2012					
SAMPLET	SAMPLE TRANSFERS							Ų	
RELINQUISHED BY: Signature,	HED BY:	Signatu		Organization	DATE TIME		ACCEPTED BY: Signature /Organization	rganization	DATE TIME

See Instructions for Sample Collection on Back of Sheet

February 2018

430

8/34/19

Fer

082619-1 Cd Page 19 of 21

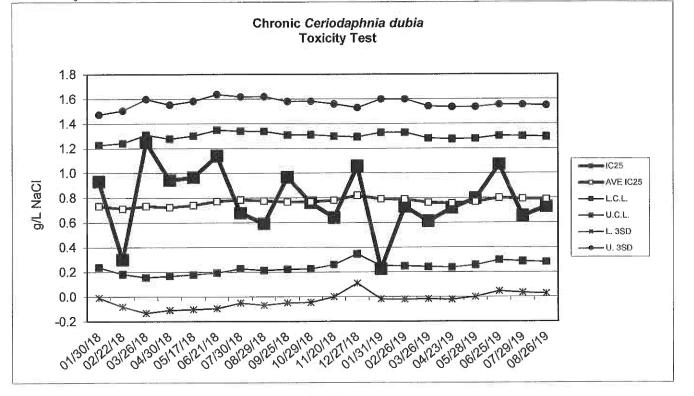
	Cincinnati, OH +1 513 733 5336	H Fort Collins, CO	ins, CO 90 1511	Cha	Chain of Custody Form	Custo	dy Fo	m	Hous +1 28	Houston, TX +1 281 530 5656	ds +	Spring City, PA +1 610 948 4903		South Charleston, WV +1 304 356 3168	eston, WV 3168
	Everett, WA +1 425 356 2600	Holland, Ml 00 +1 616 399 6070	0209 6070		Page	^{age_of}			Dhim 7 T+	Middletown, PA +1 717 944 5541	sa +1	Salt Lake City, UT +1 801 266 7700		York, PA +1 717 505 5280	5280
					ALS PI	ALS Project Manager:	inager:			×	LS Work	ALS Work Order #:			
Customer Information	ation		Pro	Project Information	rmation				P	Parameter/Method Request for Analysis	Method	Request	for Anal	ysis	
Purchase Order		Project Name	Territoria de la	AMBH	WETT	week	3	×	NET		dvs	R	L	ERM	
Work Order		Project Number	12					œ							
Company Name AM BH	- EPT	Bill To Company	pany	AM	BH			U							
Send Report To		Invoice Attn	Attn					0							
Address		Add	Address				11210	ш							
								LL C							
Crty/State/Zip		City/State/Zip	diz/s					2							
Phone		đ	Phone					I					ľ,		
Fax			Fax					Ŧ							
e-Mail Address		e-Mail Address	iress				00044	5							
No. Sample Description	tion	Date	Time	Matrix	-	Pres. #	# Bottles	A	C B	٩	u. W	U	H H	~	Hold
100 MTHO 826 age	Conp *	5-2-19	062	A A	0		2-3gel	X	20	043019-1					
110 118 011 91 00 01	Certo 4	× 8-28-19	0608	8	8		3-3gal	×	8	2-210200					
21	•)												
*															
2															
6															
2								-							
									-		 				
Ø	-														
10															
Sampler(s) Please P(hit & \$1gn		Shipme	Shipment Method		Turnaroun	Turnaround Time in Business Days (BD)	Business [Days (BD	D D	er		222	Results Due Date:	late:	
21.1.0				J	10 80	0580	Ì	CI 3 BD		0280	0180	0			
Helinquy are a by	8-30-9	Time:	Becelecter	a le K	m	15	ERM	Notes: ACE marshile		Dample and on OGIN 19 of Same time	04 091	W/A of se	me the	-41	09/03/14
Relinquished by:	Date:	Time:	Received by	by (Laboratory) x			_	Cooler ID		Cooler Temp	OC Packas	OC Package: [Check One Box Below]	ne Box Be	[Mo	
Logged by (Laboratory):	Date:	Time:	Checked by	by (Laboratory):							L Level II Std QC	Level III Std QC/Raw Date		L TRRP Checklist	Checklist evel IV
Preservative Key: 1-HCI 2-HNO ₃	3-H ₅ SO ₄	4-NaOH 5-NE ₂ S ₂ O ₃), 6-NaHSO.		7-Other 8	8-4°C 9	9-5035		+		Other In Other	C Level IV SW846/CLP			
Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.	writing once samples a	nd COC Form have	been submi	tted to ALS	Environm	ental.	1			COMPLEX		Copyright	: 2012 by	ALS Envi	Copyright 2012 by ALS Environmental.

3. The Chain of Custody is a legal document. All information must be completed accurately.



Environmental Resources Management

Standard Reference Toxicant Data



Chronic Ceriodaphnia dubia Toxicity Test Data

Date	IC25	AVE IC25	CONTRO		Survival	CONTROL Reproduction	CV
	(g/L NaCI)	(g/L NaCl)	Lower	Upper	(%)	(ave. young)	(%)
01/30/18	0.93	0.7	0.24	1.23	100	25.5	36.3
02/22/18	0.30	0.7	0.18	1.24	100	17.8	35.0
03/26/18	1.25	0.7	0.16	1.31	90	32.5	38.5
04/30/18	0.94	0.7	0.17	1.28	100	32.0	25.5
05/17/18	0.97	0.7	0.18	1.30	100	30.0	38.6
06/21/18	1.14	0.8	0.19	1.35	80	35.2	8.2
07/30/18	0.68	0.8	0.23	1.34	100	25.5	16.3
08/29/18	0.59	0.8	0.21	1.34	100	30.1	26.2
09/25/18	0.97	0.8	0.22	1.31	100	27.6	26.7
10/29/18	0.76	0.8	0.22	1.31	100	32.7	24.8
11/20/18	0.64	0.8	0.26	1.30	100	34.8	15.2
12/27/18	1.06	0.8	0.35	1.29	100	26.8	43.7
01/31/19	0.23	0.8	0.25	1.33	100	34.7	14.9
02/26/19	0.73	0.8	0.25	1.33	100	27.9	9.3
03/26/19	0.61	0.8	0.24	1.28	100	40.2	9.9
04/23/19	0.72	0.8	0.24	1.28	100	36.1	25.4
05/28/19	0.79	0.8	0.26	1.28	100	37.6	3.1
06/25/19	1.07	0.8	0.30	1.30	100	29.4	26.7
07/29/19	0.65	0.8	0.29	1.30	100	33.7	14.6
08/26/19	0.73	0.8	0.28	1.29	100	30.4	23.5

FINAL REPORT

Chronic Toxicity Test Freshwater Vertebrate, *Pimephales promelas* EPA Test Method 1000.0

> Submitted To: ALS Environmental 3352 128th Avenue Holland, MI 49424

Sample: ArcelorMittal Burns Harbor, LLC - Outfall 001

Testing Period: 26 August - 2 September 2019

Laboratory I.D. Number: 082619-1



Conducted By: Environmental Resources Management, Inc. 3352 128th Avenue Holland, Michigan 49424



082619-1 Pp Page 1 of 23

Test Overview



Permittee:	ArcelorMittal Burns Harbor, LLC	DATA SUMMARY		
Location:	250 West U.S. Hwy 12	Effluent	Survival	Growth
	Burns Harbor, IN 46304	Concentrations	(%)	Average Wt./
Contact:	Robert Maciel	(%)		Organism (mg)
Telephone #:	219.787.2120	Control	97.5	0.501
	100000175	6	95	0.532
NPDES Permit #:	IN0000175 ts: Acute Toxicity Limit = 1.0 TUa	13	95	0.468
r ennit ivequiremen	Chronic Toxicity Limit = 1.0 TUc	25	87.5	0.465
Test Sample:	Outfall 001	50	90	0.434
Receiving Water:	East Branch, Little Calumet River	100	100	0.526
Testing Date:	26 August – 2 September 2019			
Sample Date(s):	26 August 2019 28 August 2019	<u>TEST RESUL TS</u> 96-Hour LC₅₀		>100%
	30 August 2019			100%
		NOEC (Survival)		
Test/Method:	Fathead Minnow, <i>Pimephales</i>	LOEC (Survival)		>100%
	<i>promelas</i> , Survival and Growth Test EPA 821-R-02-013	IC ₂₅		>100%
	Method 1000.0.	MSDp (Survival)		26.9%
		TUa (100/LC₅₀)		1.0
QC Objectives:	Test data met all test	TUc (100/ NOEC	or IC ₂₅)	1.0
	acceptability criteria, except where noted below.			
Data Qualifiers:	None	TEST CONCLUS	ON	
		In accordance with		

requirements for ArcelorMittal Burns Harbor, LLC, this toxicity test did not exceed either the acute or the chronic toxicity limit.

Bon G. Role

Bruce A. Rabe Director, Aquatic Toxicology Laboratory ERM Project No. 0501867.0152 **Environmental Resources Management** 3352 128th Ävenue Holland, Michigan 49424-9263 Phone: 616.399.3500 Fax: 616.399.3777



ERM Testing Method

Pimephales promelas – Survival and Growth Toxicity Test

Upon sample receipt, each effluent sample was analyzed for a suite of water quality parameters (Appendix A - Table 1). Where indigenous organisms were present, the sample was filtered through a 60 micron (μ m) NITEX® screen. All samples were maintained at 0 – 6 degrees Celsius (°C) until needed for testing.

A series of five effluent concentrations and a control solution were established for testing. All test solutions were prepared by mixing appropriate volumes of dilution water and effluent in the test containers. Dilution water consisted of reconstituted moderately hard water. The control solution consisted of 100 percent dilution water.

Pimephales promelas used to initiate this test were obtained from in-house cultures and were less than 24-hours old at test initiation. Test organisms were maintained in reconstituted moderately hard water prior to test initiation.

The Pimephales promelas test was conducted using 300 to 500-milliliter (mL) disposable polypropylene containers containing 250 mL of control water or test solution. Ten fish were randomly added to each test chamber with four replicate chambers per treatment. Each Pimephales promelas test chamber was fed 0.2 mL of a concentrated suspension of less than 24-hour old live brine shrimp nauplii (Artemia sp.) two times per day. Test solutions were renewed daily during the exposure by replacing approximately 90 percent of the 24-hour old solution with fresh control water or appropriate test solution. Prior to test solution renewal, uneaten and dead brine shrimp, along with other debris, were removed from the bottom of the test chambers.

Percent survival of exposed *Pimephales promelas* was determined daily by enumeration of live organisms. Mortality was defined as no body movement after gentle prodding. At the termination of the chronic test, larvae in each test chamber were counted, dried, and weighed to the nearest 0.01 milligram (mg) on an analytical balance.



The test was conducted at a temperature of $25\pm 1^{\circ}$ C under fluorescent lighting with a photoperiod of 16 hours light and 8 hours dark. Water quality measurements were performed on all control and test solutions prior to test initiation and on selected treatments daily thereafter, as indicated in the raw data (Appendix A - Table 2).

Following termination of the chronic toxicity test, No Observed Effect Concentration (NOEC) and Lowest Observed Effect Concentration (LOEC) were determined for both Pimephales promelas survival and growth and a 25 percent Inhibition Concentration (IC25) was determined for Pimephales promelas growth. The NOEC is defined as the highest effluent concentration which does not produce any observed adverse effect to the exposed test organism whereas the LOEC is defined as the lowest effluent concentration which does produce an observed adverse effect to the exposed test organism. An adverse effect is determined as a statistically significant difference between the control and a given effluent concentration.

Prior to the determination of any significant differences in *Pimephales promelas* survival and growth, the data were evaluated for normal distribution and homogeneity characteristics. Depending on the result and the number of test replicates per concentration, an analysis of variance test was performed, followed by one of the following mean comparison tests: Dunnett's Procedure, Bonferroni t-Test, Steel's Many-One Rank Test, Wilcoxon Rank Sum Test, or the T-Test.

For reporting purposes, a chronic toxic unit (TUc) is calculated and is defined as the most conservative of either 100/NOEC based on the most sensitive test endpoint or $100/IC_{25}$.

To evaluate acute toxicity, a 96-hour LC₅₀ and corresponding 95 percent confidence interval were also calculated, where possible. The LC₅₀ value estimate was determined by using one of the following statistical methods: graphical, Spearman-Karber, Trimmed Spearman-Karber, or Probit. The method selected for reporting test results was determined by the characteristics of the data; that is, the presence or absence of 0 and 100 percent mortality and the number of concentrations in which mortalities between 0 and 100 percent occurred. For reporting purposes, the 96-hour LC₅₀ value was converted to an acute toxic unit (TUa) by 100/LC₅₀. All statistical analyses were performed using the CETISTM Version 1.9.4.3 software program.

The reference toxicant, sodium chloride, was used to monitor the sensitivity of the test organisms. Chronic reference toxicant tests are performed at least monthly and the resulting Inhibition Concentrations (IC₂₅) are plotted to determine if the results are within prescribed limits (Appendix A - Standard Reference Toxicant Data). If the IC₂₅ of a particular reference toxicant test does not fall within the expected range of \pm two standard deviations from the mean for a given test organism, the sensitivity of that organism and the overall credibility of the test system is suspect.

Reference:

USEPA. 2002. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, 4th Ed. U.S. Environmental Protection Agency, Office of Water, Washington, D.C., EPA-821-R-02-013.

Case Narrative



1.0 TEST PERFORMANCE CRITERIA

The quality control results achieved laboratory specifications.

2.0 MODIFICATIONS TO ERM'S STANDARD TEST METHOD

Test was performed in accordance with ERM's standard test method (see page 3).

Appendix A Supporting Documents

- Raw Test Data
- Statistical Analysis (if necessary)
- Chain-of-Custody Forms
- Standard Reference Toxicant Data

Environmental Resources Management

Pimephales promelas - Chronic Toxicity Test Initial Water Quality and Test Solution Preparation

Table 1 Page 1 of 1

Permittee/Client: Effluent/Location: Lab I.D.#: Beginning Date: Ending Date:

ArcelorMittal Burns Harbor, LLC Outfall 001 98/26/19

Time: 630 Time: (500 Control/Dilution Water: Organism Batch #: Organism Age: QC Review: QC Review Date:

RMHW 149-19 LZYVS LM ogla

Initial Water Quality:

Parameter	Units		Effluent		Syr	thetic Wate	er
Sample #		1	2	3			
Lab I.D.#/ Batch #		082619-1	08/879-1	083019-1	99-19	-	~
Temperature	°C	5	5	2		-	
Dissolved Oxygen	mg / L	10.5	7.3	9.2		-	
рН	S.U.	7.1	7.2	73	787.8		-
Conductivity	umhos/cm	417	391	454	31315		
Alkalinity	mg / L CaCO ₃	110	108	102	6060		~
Hardness	mg / L CaCO ₃	140	160	140	80	~	
Total Ammonia	mg / L NH ₃	0.29	0.04	0,42			
Total Residual Chlorine	mg / L Cl ₂	10.01	20.01	50.07	20.01	~	-
Total mls of 7.0 g/L							
Sodium Thiosulfate	mL/L						
added per liter			DIA		111		
Initials		RA	M	MB	8-24-9		~

Test Solution Preparation:

Test Solution Prepared For Both Species.

Treatment	Effluent	Dilution	Test		Effluent	Synthetic
(% Effluent)	(mL)	(mL)	Day	Initials	Sample #	Batch #
Control	0	1200	0	I RIJ_	1	99-19
6%	72	1128	1	RH	1	99-19
13%	156	1044	2	PA	d	97-19
25%	300	900	3	RWM	2	99-19
50%	600	600	4	NY	3	99-19
100%	1200	· 0	5	RA	3	99-10
5. A			6	RH	3	99-10
·····			7	RA		

Pimephales promelas - Chronic Toxicity Test Water Quality Data

 Permittee/Client:
 ArcelorMittal Burns Harbor, LLC

 Effluent/Location:
 Outfall 001

 Lab I.D.#:
 O & C (19-1)

Water Quality Data:

						Disso	lved Ox D		ng/L)					
Meter #	5	5	3	1	5	3	3	ay 5	5	3	3	5	3	8
Treatment	0		1	<u></u>	2		3		4		5		6	7
(% Effluent)		F	Ĩ	F		. F	-	F	1	F	1	F		F
Control	7.8	6.2	8.3	5.8	7.9	5.9	8,4	6.3	7.9	6.2	8.2	6.8	8.3	7.6
6%	1.8	52	6.3	3.9	7.9	5.3	16,4	5.5	7.9	6.6	8.2	6.9	8.3	73
13%	28	6.4	8.3	5.6	7.9	60	8.4	5.7	29	6.2	82	6.6	8.3	73
25%	28	5.5	8.3	5.6	29	C.I	84	5.5	29	6.0	8.2	6.5	8.3	7.1
50%	28	5.1	83	5.8	8.0	528	8.3	5.4	7.9	5.7	8.7	6.2	6.3	7.2
100%	28	5.0	8:3	610	8.0	67	433	6.0	8.0	5.5	8.7	6.2	8.3	67
10070	1.0	3.0	0.2	VIU	DIV	91 1	233	4.0	0.0	91.3	0.2	9.6	0.2	
			1	1				S.U.)						
		1		0	10	10		ay	12	4	10	9	19.2	10
Meter #	9	9	10	8	8	IV	10	9	9	10	10		10	10
Treatment	0		1		2		3		4		5		6	7
(% Effluent)		F		F		F		F		F		F		F
Control	7.8	7.2	7.9	7.0	7.8	7.3	7.6	7.4	7.8	7.3	7.8	7.3	7.8	7,6
6%		7.Z		7,0		7.3		7.3		7.3		7.4		7.6
13%		7.3		7.0		7.3		7,4	=	7.3		7.4		76
25%		73		7.		7,3		7,4		7.4		7.4		46
50%		7.3		7.1		7,4		7.4		7.4		7.5		7.6
100%	7.5	73	7.5	7,2	7.5	7.5	7.7	7.5	7.6	75	7.6	7.5	26	41
									307					
						Cond	uctivity (D	(umhos ay	/ cm)					
Meter #	4		4		4		4		4		3		3	
Treatment	0		1		2		3 '		4 ′		5	-	6	7
(% Effluent)		F	1	F		F		F	1	F	1	F		F
0.11					040				0		319			
Control	318		320		328		324		310		511		314	
6%	318		320		329						322		314	
6%	324		326		324		349		316					
6% 13%	324		326		324		34G 34G	<u> </u>	3/6		322		326	
6% 13% 25%	324 329 341		326 330 342		324 32634 32834		349 349 336		316 344 341	 52 (5	322 331 340		326 332 347	
6% 13% 25% 50%	324 329 341 363		326 330 342 363		324 326 32834 364		349 349 336 356		3/6	 کالا 	322 331 340 369		326	
6% 13% 25%	324 329 341		326 330 342		324 32634 32834		349 349 336		316 344 341 374	 حوا 22	322 331 340		326 332 347 380	
6% 13% 25% 50%	324 329 341 363		326 330 342 363		324 326 32834 364		349 349 336 356 356 342 emperat	 ture (° (316 341 341 374 1011	 حوا 22	322 331 340 369		326 332 347 380	
6% 13% 25% 50% 100%	324 329 341 263 412		326 330 342 363		324 326 32834 364 411	 T	349 349 336 356 356 392 emperat		316 341 341 374 1011	 حوا 22	322 331 340 369		326 332 347 380	
6% 13% 25% 50% 100% Meter #	324 329 341 263 412		326 330 342 363 412 3		324 32639 32839 3164 4111	 T	349 349 336 356 356 357 emperat D	 ure (° (ay	3/6 344 341 374 941		322 331 340 369 421		326 332 347 380 440	
6% 13% 25% 50% 100% Meter # Treatment	324 329 341 263 412	 5	326 330 342 363 412		324 326 32834 364 411	 T	349 349 336 356 356 392 emperat	 ture (° (° ay	316 341 341 374 1011	 حالا 	322 331 340 369		326 332 347 380	 37
6% 13% 25% 50% 100% Meter # Treatment (% Effluent)	324 329 341 263 412 5 0	 5 F	326 330 342 363 412 412 3 1	 5	324 32834 32834 364 411 5 2	 T	349 349 336 356 342 emperat D 3 3	 ture (° (ay	3/6 344 341 374 941	 	322 331 340 369 421 5	 	326 332 347 380 440 56	
6% 13% 25% 50% 100% Meter # Treatment (% Effluent) Control	324 329 341 263 412 412 5 0 1 24	 5 F Z5	326 330 342 363 412 1 24	 5 F 395	324 32834 364 4111 5 2 1 24	 T	349 349 3356 3556 342 emperat 0 3 1 24	 ture (° (ay F 2)	3/6 344 374 374 374 001 5 5 4 2 1 4	حوا <u>لا</u> 3 F 25	322 331 340 369 421 5 5	 5 F 75	326 332 347 380 440 380 440	
6% 13% 25% 50% 100% Meter # Treatment (% Effluent) Control 6%	324 329 341 363 412 50 1 2 0 1 24 24	 5 F Z5 26	326 330 342 363 412 3 1 1 24 24 24	 5 F JF	324 32834 364 4111 5 2 1 24 24	 T T	349 349 336 355 342 emperat 0 3 3 1 24 24	 ture (° (ay	3/6 3/4	 	322 331 340 369 421 5 5 1 24 24	 	326 332 347 380 440 5 6 1 24 24 24	
6% 13% 25% 50% 100% Meter # Treatment (% Effluent) Control 6% 13%	324 329 341 341 263 412 412 5 0 1 24 24 24 24	 5 F 75 26 26	326 330 342 363 412 3 412 1 1 24 24 24 24 24	 	324 32534 3654 3654 23654 2411 25 2 2 2 2 2 2 2 2 4 2 4 2 4 2 4 2 4 2		349 349 356 356 382 emperat D 3 3 1 24 24 24 24		3/6 3/4	 	322 331 340 369 421 421 5 5 5 1 24 24 24 24		326 332 347 380 440 5 6 1 24 24 24 24 24	
6% 13% 25% 50% 100% Meter # Treatment (% Effluent) Control 6% 13% 25%	324 329 341 341 263 412 263 412 5 0 1 263 4 24 24 24 24 24	 	326 330 342 363 412 3 1 2 1 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2	 	324 32534 32534 3254 23554 24 24 24 24 24 24 24 24 24 2	 T T T T T T T T T T T T T T T T T 	349 349 356 356 356 347 0 3 3 1 24 24 24 24 24 24 24		3/6 3/4	 	322 331 340 369 421 421 5 5 5 1 24 24 24 24 24 24		326 337 380 440 5 6 1 24 24 24 24 24	
6% 13% 25% 50% 100% Meter # Treatment (% Effluent) Control 6% 13% 25% 50%	324 329 34 34 34 34 34 34 34 24 24 24 24 24 24 24 24	 5 F 75 26 26	326 330 342 363 412 31 2 1 24 24 24 24 24 24 24	 	324 22 3654 3654 21 2 2 2 2 2 2 2 2 2 2 2 2 2		349 349 356 356 356 342 0 3 3 2 4 24 24 24 24 24 24		3/6 3/4 3/7	 	322 331 340 369 421 421 5 5 1 24 24 24 24 24 24 24 24 24		326 332 347 380 440 	
6% 13% 25% 50% 100% Meter # Treatment (% Effluent) Control 6% 13% 25%	324 329 341 341 263 412 763 412 763 412 74 24 24 24 24 24	 	326 330 342 363 412 3 1 2 1 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2 4 2	 	324 32534 32534 3254 23554 24 24 24 24 24 24 24 24 24 2		349 349 356 356 356 347 0 3 3 1 24 24 24 24 24 24 24		3/6 3/4	 	322 331 340 369 421 421 5 5 5 1 24 24 24 24 24 24		326 337 380 440 5 6 1 24 24 24 24 24	
6% 13% 25% 50% 100% Meter # Treatment (% Effluent) Control 6% 13% 25% 50%	324 329 34 34 34 34 34 34 34 24 24 24 24 24 24 24 24	 	326 330 342 363 412 31 2 1 24 24 24 24 24 24 24	 	324 22 3654 3654 21 2 2 2 2 2 2 2 2 2 2 2 2 2	 T T T T T T T T T T T T T T T T T 	349 349 3355 355 342 0 3 3 1 24 24 24 24 24 24 24 24 24 24		3/6 3/4 3/7	 	322 331 340 369 421 421 5 5 1 24 24 24 24 24 24 24 24		326 332 347 380 440 	

Note: D.O. meter also used for temperature measurement unless otherwise noted.

3

Pimephales promelas - Chronic Toxicity Test Survival Data

Environmental Resources Management

 Permittee/Client:
 ArcelorMittal Burns Harbor, LLC

 Effluent/Location:
 Outfall 001

 Lab I.D.#:
 O%2(19-1)

Survival Data:

				#Li	ve O	rgani	sms						#Li	ve O	rgani	sms			96 Hou	r Surviv	al Summary
Treatment					D	ay							-	D	ay				Tota	Live	%
(% Effluent)	Rep.	0	1	2	3	4	5	6	7	Rep.	0	1	2	3	4	5	6	7	Initial	Final	Survival
Control	Α	10	10	10	10	10	10	ID	a	В	10	10	10	10	10	10	10	10	40	40	100
6%	Α	10	10	10	10	6	10	10	W	В	10	10	16	0	10	10	9	9	40	39	97.5
13%	Α	10	10	10	16	13	10	9	9	В	10	10	10	10	12	10	10	10	40	39	97.5
25%	Α	10	10	10	16	2	7	6	6	В	10	9	9	9	9	9		9	40	38	95
50%	Α	10	10	10	10	12	10	9	9	В	10	10	10	10	9	9	8	8	40	39	97.5
100%	Α	10	10	10	10	12	D	10	10	В	10	10	10	10	10	IN	10	10	40	40	100
								s===													
	1-7/6			# Li	ve O	rgani	sms						# Li	ive O	rgani	sms			7 Day	Surviva	al Summary
Treatment						ay									ay				Tota	Live	%
(% Effluent)	Rep.	0	1	2	3	4	5	6	7	Rep.	0	1	2	3	4	5	6	7	Initial	Final	Survival
Control	С	10	10	10	10	10	9	9	9	D	10	10	10	10	10	10	10	10	40	39	97.5
6%	С	10	10	10	10	9	9	9	9	D	10	10	10	10	10	10	10	IN	40	38	95
13%	С	10	10	10	9	9	9	9	9	D	10	10	01	10	10	10	10	ID	40	38	45
25%	С	10	10	16	10	10	10	10	10	D	10	16	10	10	15	P	10	10	40	35	875
50%	С	10	10	01	10	1.2	10	10	10	D	10	10	10	10	10	9	9	9	40	36	90
100%	С	10	10	10	10	R.	10	iD	10	D	10	10	10	10	19	IN	10	10	40	40	100_
						17			12000							N-	- 22	101			20000

Test Information:

	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Time:	1530	1600	1400	1400	1500	1300	1130	1500
Initials:	pm	SPR	RUN	MU	my	KM	km	RH
Date:	08/26/19		08-28-19	08-29-19	08/30/10	08/31/19	09/01/19	09-02-19

Feeding:

	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Batch #:	237-19	238-19	239-19	240-19	041-19	242-19	243-19	
nitials AM:		RN	RA	SPR	BM	KM	KM	
Initials PM:	PA	SPR	Pn	er	TAA .	KM	KM	

Oven:

Date In	Time In	Initials	Date Out Time Out	Initials
02-02-19	1500	RAT	69-03-19 500	RHA

Comment Section:

Day	Date	Initials	Comments

Pimephales promelas - Chronic Toxicity Test Growth Data

Table 3 Page 2 of 2

Permittee/Client:ArcelorMittal Burns Harbor, LLCEffluent/Location:Outfall 001Lab l.D.#:082619-1

							Avg. Wt./	Avg. Wt./	Avg. Wt./
			Final	Initial	Larvae	# of	Organism/	Organism/	Organism
Pan	Conc.	Replicate	Weight	Weight	Weight	Initial	Replicate	Treatment	Treatmen
#	(% Effluent)		(mg)	(mg)	(mg)	Organisms	(mg)	(mg)	% CV
Date			9/4/2019	9/1/2019					
Analyst			rh	km					
1	Control	А	24.78	20.34	4.44	10	0.444		
2	Control	В	25.58	20.74	4.84	10	0.484		
3	Control	С	25.59	21.11	4.48	10	0.448		
4	Control	D	30.52	24.24	6.28	10	0.628	0.501	17.3
5	6%	A	32.57	26.45	6.12	10	0.612		
6	6%	В	26.31	21.22	5.09	10	0.509		
7	6%	С	30.70	26.57	4.13	10	0.413		
8	6%	D	33.22	27.28	5.94	10	0.594	0.532	17.1
9	13%	A	24.52	19.69	4.83	10	0.483		
10	13%	В	25.35	20.44	4.91	10	0.491		
11	13%	С	26.29	21.94	4.35	10	0.435		
12	13%	D	27.35	22.73	4.62	10	0.462	0.468	5.4
13	25%	A	29.10	25.97	3.13	10	0.313		
14	25%	В	22.88	18.44	4.44	10	0.444		
15	25%	С	22.29	16.66	5.63	10	0.563		
16	25%	D	25.72	20.34	5.38	10	0.538	0.465	24.4
17	50%	A	21.95	17.89	4.06	10	0.406		
18	50%	В	28.11	23.55	4.56	10	0.456		
19	50%	С	30.91	25.63	5.28	10	0.528		
20	50%	D	24.63	21.16	3.47	10	0.347	0.434	17.7
21	100%	A	24.30	19.70	4.60	10	0.460		
22	100%	В	25.30	19.55	5.75	10	0.575		
23	100%	C	26.11	20.69	5.42	10	0.542		
24	100%	D	25.26	20.01	5.25	10	0.525	0.526	9.2

uality A	ssurance				Final Wt. (n
25	Blank	A	15.33	15.32	0.01
26	Blank	В	17.58	17.6	-0.02

* Biomass data were transferred directly to the spreadsheet using the data transfer function of the analytical balance.

.

CETIS Analytical Report

	low 7-d Larv	al Survival	and Growth	Test							ERM
Analysis ID: Analyzed:	08-4531-17 04 Sep-19 1			d Survival Rat arametric-Cor		ments		S Version Is Level:	n: CETISv1 1	.9.4	
Batch ID:	01-9158-74	74 -	Test Type: G	rowth-Surviva	l (7d)		Anal	yst: La	b Tech		
Start Date:	26 Aug-19 1	15:30 I	Protocol: E	PA/821/R-02-	013 (2002)		Dilue	ent: Re	econstituted V	Vater	
Ending Date:	02 Sep-19 1	5:00	Species: P	imephales pro	melas		Brine	e:			
Test Length:	6d 23h		Taxon: A	ctinopterygii			Sour	ce: In-	House Cultur	e	Age: <24
Sample ID:	20-6551-57	61	Code: 7	B1D44F1			Proje	ect: W	ET Testing		
Sample Date:	26 Aug-19 ()6:18 I	Material: In	dustrial Efflue	nt		Sour	ce: Ar	celorMittal Bu	rns Harbor,	LLC
Receipt Date:	26 Aug-19 1	2:00	CAS (PC):				Stati	on: O	utfall 001		
Sample Age:	9h (5 °C)		Client: A	rcelorMittal Bu	irns Harbor,	LLC					
Data Transfor	m	Alt Hy	/p				NOEL	LOEL	TOEL	TU	PMSD
Angular (Corre	ected)	C > T					100	>100	n/a	1	14.55%
Dunnett Multi	ple Compar	ison Test									
Control	vs Con	c-%	Test Sta			Р-Туре	P-Value	Decisio			
Lab Water	6		0.4433	2.407	0.221 6	CDF	0.6719	-	nificant Effect		
	13		0.4433	2.407	0.221 6	CDF	0.6719	4-	nificant Effect		
	25		1.43	2.407	0.221 6	CDF	0.2510	-	nificant Effect		
	50		1.272	2.407	0.221 6	CDF	0.3085		nificant Effect		
	100		-0.4433	2.407	0.221 6	CDF	0.9314	Non-Sig	nificant Effect		
Test Acceptat	bility Criteria	а та	C Limits								
Attribute	Test	Stat Lower	Upper	Overlap	Decision						
Control Resp	0.975	0.8	>>	Yes	Passes Cr	iteria					
ANOVA Table	•										
Source		Squares	Mean S		DF	F Stat	P-Value		n(a:5%)		
Between	0.088	0378	0.01760	76	5	1.042	0.4235	Non-Sig	nificant Effect	t	
Error	0.304	143	0.01689	69	18	_					
	and the second s				23						
Total	0.392	181			20						
		181									
Distributional		181			Test Stat	Critical	P-Value	Decisio	n(α:1%)		
Distributional Attribute	l Tests Test		f Variance Te	st		Critical 4.248	P-Value 0.0545	Equal V	ariances		
Distributional Attribute Variances	l Tests Test Lever Mod L	ne Equality o .evene Equa	lity of Varianc		Test Stat 2.7 1.654	4.248 4.248	0.0545 0.1966	Equal V Equal V	ariances ariances		
Distributional Attribute Variances Variances	l Tests Test Lever Mod L	ne Equality o .evene Equa			Test Stat 2.7	4.248	0.0545	Equal V Equal V	ariances		
Distributional Attribute Variances Variances Distribution	l Tests Test Lever Mod L Shapi	ne Equality o _evene Equa iro-Wilk W N	lity of Varianc		Test Stat 2.7 1.654	4.248 4.248	0.0545 0.1966	Equal V Equal V	ariances ariances Distribution		
Distributional Attribute Variances Variances Distribution 7d Survival R Conc-%	l Tests Test Lever Mod L Shapi	ne Equality o Levene Equa iro-Wilk W N ry Count	lity of Variand ormality Test Mean	e Test 95% LCL	Test Stat 2.7 1.654 0.9118 95% UCL	4.248 4.248 0.884 Median	0.0545 0.1966 0.0385 Min	Equal V Equal V Normal Max	ariances ariances Distribution Std Err	CV%	
Distributional Attribute Variances Variances Distribution 7d Survival R Conc-% 0	l Tests Test Lever Mod L Shapi tate Summa	ne Equality o Levene Equa iro-Wilk W N ry Count 4	lity of Variand ormality Test Mean 0.9750	e Test 95% LCL 0.8954	Test Stat 2.7 1.654 0.9118 95% UCL 1.0000	4.248 4.248 0.884 Median 1.0000	0.0545 0.1966 0.0385 Min 0.9000	Equal V Equal V Normal Max 1.0000	ariances ariances Distribution Std Err 0.0250	5.13%	0.00%
Distributional Attribute Variances Variances Distribution 7d Survival R Conc-% 0 6	l Tests Test Lever Mod L Shapi tate Summat Code	ne Equality o Levene Equa iro-Wilk W N ry Count 4 4	lity of Variand ormality Test Mean 0.9750 0.9500	95% LCL 0.8954 0.8581	Test Stat 2.7 1.654 0.9118 95% UCL 1.0000 1.0000	4.248 4.248 0.884 Median 1.0000 0.9500	0.0545 0.1966 0.0385 Min 0.9000 0.9000	Equal V Equal V Normal Max 1.0000 1.0000	ariances ariances Distribution Std Err 0.0250 0.0289	5.13% 6.08%	0.00% 2.56%
Distributional Attribute Variances Distribution 7d Survival R Conc-% 0 6 13	l Tests Test Lever Mod L Shapi tate Summat Code	ne Equality o Levene Equa iro-Wilk W N ry Count 4 4 4 4	lity of Variand ormality Test 	95% LCL 0.8954 0.8581 0.8581	Test Stat 2.7 1.654 0.9118 95% UCL 1.0000 1.0000 1.0000	4.248 4.248 0.884 Median 1.0000 0.9500 0.9500	0.0545 0.1966 0.0385 Min 0.9000 0.9000 0.9000 0.9000	Equal V Equal V Normal Max 1.0000 1.0000 1.0000	ariances ariances Distribution Std Err 0.0250 0.0289 0.0289	5.13% 6.08% 6.08%	0.00% 2.56% 2.56%
Distributional Attribute Variances Variances Distribution 7d Survival R Conc-% 0 6 13 25	l Tests Test Lever Mod L Shapi tate Summat Code	ie Equality o evene Equa iro-Wilk W N ry Count 4 4 4 4 4	lity of Variand ormality Test 0.9750 0.9500 0.9500 0.8750	95% LCL 0.8954 0.8581 0.8581 0.5738	Test Stat 2.7 1.654 0.9118 95% UCL 1.0000 1.0000 1.0000 1.0000	4.248 4.248 0.884 Median 1.0000 0.9500 0.9500 0.9500	0.0545 0.1966 0.0385 Min 0.9000 0.9000 0.9000 0.9000 0.6000	Equal V Equal V Normal Max 1.0000 1.0000 1.0000 1.0000	ariances ariances Distribution Std Err 0.0250 0.0289 0.0289 0.0947	5.13% 6.08% 6.08% 21.63%	0.00% 2.56% 2.56% 10.26%
Distributional Attribute Variances Distribution 7d Survival R Conc-% 0 6 13 25 50	l Tests Test Lever Mod L Shapi tate Summat Code	ne Equality o Levene Equa iro-Wilk W N ry Count 4 4 4 4 4 4 4	lity of Variand ormality Test 0.9750 0.9500 0.9500 0.8750 0.9000	95% LCL 0.8954 0.8581 0.8581 0.5738 0.7701	Test Stat 2.7 1.654 0.9118 95% UCL 1.0000 1.0000 1.0000 1.0000 1.0000	4.248 4.248 0.884 Median 1.0000 0.9500 0.9500 0.9500 0.9500 0.9500	0.0545 0.1966 0.0385 Min 0.9000 0.9000 0.9000 0.6000 0.8000	Equal V Equal V Normal Max 1.0000 1.0000 1.0000 1.0000 1.0000	ariances ariances Distribution Std Err 0.0250 0.0289 0.0289 0.0947 0.0408	5.13% 6.08% 6.08% 21.63% 9.07%	0.00% 2.56% 2.56% 10.26% 7.69%
Distributional Attribute Variances Distribution 7d Survival R Conc-% 0 6 13 25 50 100	l Tests Test Lever Mod L Shapi ate Summar Code L	ie Equality o Levene Equa iro-Wilk W N ry <u>Count</u> 4 4 4 4 4 4 4 4 4	lity of Variand ormality Test 0.9750 0.9500 0.9500 0.8750 0.9000 1.0000	95% LCL 0.8954 0.8581 0.8581 0.5738	Test Stat 2.7 1.654 0.9118 95% UCL 1.0000 1.0000 1.0000 1.0000	4.248 4.248 0.884 Median 1.0000 0.9500 0.9500 0.9500	0.0545 0.1966 0.0385 Min 0.9000 0.9000 0.9000 0.9000 0.6000	Equal V Equal V Normal Max 1.0000 1.0000 1.0000 1.0000	ariances ariances Distribution Std Err 0.0250 0.0289 0.0289 0.0947	5.13% 6.08% 6.08% 21.63%	0.00% 2.56% 2.56% 10.26%
Distributional Attribute Variances Distribution 7d Survival R Conc-% 0 6 13 25 50 100 Angular (Corr	I Tests Test Lever Mod L Shapi tate Summat Code L	ne Equality o Levene Equa iro-Wilk W N ry Count 4 4 4 4 4 4 4 4 4 4 5 formed Su	lity of Variand ormality Test 0.9750 0.9500 0.9500 0.8750 0.9000 1.0000 mmary	95% LCL 0.8954 0.8581 0.8581 0.5738 0.7701 1.0000	Test Stat 2.7 1.654 0.9118 95% UCL 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	4.248 4.248 0.884 Median 1.0000 0.9500 0.9500 0.9500 0.9500 1.0000	0.0545 0.1966 0.0385 Min 0.9000 0.9000 0.9000 0.6000 0.8000 1.0000	Equal V Equal V Normal 1.0000 1.0000 1.0000 1.0000 1.0000	ariances ariances Distribution Std Err 0.0250 0.0289 0.0289 0.0289 0.0947 0.0408 0.0000	5.13% 6.08% 6.08% 21.63% 9.07% 0.00%	0.00% 2.56% 2.56% 10.26% 7.69% -2.56%
Distributional Attribute Variances Distribution 7d Survival R Conc-% 0 6 13 25 50 100 Angular (Corr Conc-%	I Tests Test Lever Mod L Shapi ate Summar Code L	re Equality o Levene Equa iro-Wilk W N ry Count 4 4 4 4 4 4 4 5 formed Su Count	lity of Variand ormality Test 0.9750 0.9500 0.9500 0.8750 0.9000 1.0000 mmary t. Mean	95% LCL 0.8954 0.8581 0.8581 0.5738 0.7701 1.0000 95% LCL	Test Stat 2.7 1.654 0.9118 95% UCL 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 95% UCL	4.248 4.248 0.884 Median 1.0000 0.9500 0.9500 0.9500 0.9500 0.9000 1.0000 Median	0.0545 0.1966 0.0385 Min 0.9000 0.9000 0.9000 0.9000 0.6000 0.8000 1.0000 Min	Equal V Equal V Normal 1.0000 1.0000 1.0000 1.0000 1.0000 Max	ariances ariances Distribution Std Err 0.0250 0.0289 0.0289 0.0947 0.0408 0.0000 Std Err	5.13% 6.08% 21.63% 9.07% 0.00%	0.00% 2.56% 2.56% 10.26% 7.69% -2.56%
Distributional Attribute Variances Variances Distribution 7d Survival R Conc-% 0 6 13 25 50 100 Angular (Corr Conc-% 0	I Tests Test Lever Mod L Shapi tate Summat Code L	re Equality o Levene Equa iro-Wilk W N ry Count 4 4 4 4 4 4 4 5 formed Su Count 4	lity of Variand ormality Test 0.9750 0.9500 0.9500 0.8750 0.9000 1.0000 mmary t. Mean 1.371	e Test 95% LCL 0.8954 0.8581 0.8581 0.5738 0.7701 1.0000 95% LCL 1.242	Test Stat 2.7 1.654 0.9118 95% UCL 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	4.248 4.248 0.884 Median 1.0000 0.9500 0.9500 0.9500 0.9500 0.9000 1.0000 Median 1.412	0.0545 0.1966 0.0385 Min 0.9000 0.9000 0.9000 0.9000 0.6000 0.8000 1.0000 Min 1.249	Equal V Equal V Normal 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	ariances ariances Distribution Std Err 0.0250 0.0289 0.0289 0.0947 0.0408 0.0000 Std Err 0.04074	5.13% 6.08% 21.63% 9.07% 0.00% CV% 5.94%	0.00% 2.56% 2.56% 10.26% 7.69% -2.56% %Effect 0.00%
Distributional Attribute Variances Variances Distribution 7d Survival R Conc-% 0 6 13 25 50 100 Angular (Corr Conc-% 0 6	I Tests Test Lever Mod L Shapi ate Summar Code L	re Equality o Levene Equa iro-Wilk W N ry Count 4 4 4 4 4 4 5formed Su Count 4 4	lity of Variand ormality Test 0.9750 0.9500 0.9500 0.8750 0.9000 1.0000 mmary t Mean 1.371 1.331	95% LCL 0.8954 0.8581 0.8581 0.5738 0.7701 1.0000 95% LCL 1.242 1.181	Test Stat 2.7 1.654 0.9118 95% UCL 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	4.248 4.248 0.884 Median 1.0000 0.9500 0.9500 0.9500 0.9500 0.9000 1.0000 Median 1.412 1.331	0.0545 0.1966 0.0385 Min 0.9000 0.9000 0.9000 0.9000 0.6000 0.8000 1.0000 Min 1.249 1.249	Equal V Equal V Normal 1.0000 1.0000 1.0000 1.0000 1.0000 Max 1.412 1.412	ariances ariances Distribution Std Err 0.0250 0.0289 0.0289 0.0947 0.0408 0.0000 Std Err 0.04074 0.04705	5.13% 6.08% 21.63% 9.07% 0.00% CV% 5.94% 7.07%	0.00% 2.56% 2.56% 10.26% 7.69% -2.56% %Effect 0.00% 2.97%
Distributional Attribute Variances Distribution 7d Survival R Conc-% 0 6 13 25 50 100 Angular (Corr Conc-% 0 6 13	I Tests Test Lever Mod L Shapi ate Summar Code L	ne Equality o evene Equa ro-Wilk W N ry Count 4 4 4 4 4 4 4 5formed Su Count 4 4 4	lity of Variand ormality Test 0.9750 0.9500 0.9500 0.8750 0.9000 1.0000 mmary t Mean 1.371 1.331 1.331	95% LCL 0.8954 0.8581 0.8581 0.5738 0.7701 1.0000 95% LCL 1.242 1.181 1.181	Test Stat 2.7 1.654 0.9118 95% UCL 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	4.248 4.248 0.884 <u>Median</u> 1.0000 0.9500 0.9500 0.9500 0.9500 1.0000 <u>Median</u> 1.412 1.331 1.331	0.0545 0.1966 0.0385 Min 0.9000 0.9000 0.9000 0.9000 0.6000 0.8000 1.0000 Min 1.249 1.249 1.249 1.249	Equal V Equal V Normal 1.0000 1.0000 1.0000 1.0000 1.0000 Max 1.412 1.412 1.412	ariances ariances Distribution Std Err 0.0250 0.0289 0.0289 0.0947 0.0408 0.0000 Std Err 0.04074 0.04705 0.04705 0.04705	5.13% 6.08% 21.63% 9.07% 0.00% CV% 5.94% 7.07% 7.07%	0.00% 2.56% 2.56% 10.26% 7.69% -2.56% %Effect 0.00% 2.97% 2.97%
Total Distributional Attribute Variances Distribution 7d Survival R Conc-% 0 6 13 25 50 100 Angular (Corr Conc-% 0 6 13 25 50 100 25 50 13 25 50 13 25 50 13 25 50 13 25 50 13 25 50 100 13 25 50 100 13 25 50 100 13 25 50 100 13 25 50 100 100 100 100 100 100 100	I Tests Test Lever Mod L Shapi ate Summar Code L	re Equality o Levene Equa iro-Wilk W N ry Count 4 4 4 4 4 4 5formed Su Count 4 4	lity of Variand ormality Test 0.9750 0.9500 0.9500 0.8750 0.9000 1.0000 mmary t Mean 1.371 1.331	95% LCL 0.8954 0.8581 0.8581 0.5738 0.7701 1.0000 95% LCL 1.242 1.181	Test Stat 2.7 1.654 0.9118 95% UCL 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	4.248 4.248 0.884 Median 1.0000 0.9500 0.9500 0.9500 0.9500 0.9000 1.0000 Median 1.412 1.331	0.0545 0.1966 0.0385 Min 0.9000 0.9000 0.9000 0.9000 0.6000 0.8000 1.0000 Min 1.249 1.249	Equal V Equal V Normal 1.0000 1.0000 1.0000 1.0000 1.0000 Max 1.412 1.412	ariances ariances Distribution Std Err 0.0250 0.0289 0.0289 0.0947 0.0408 0.0000 Std Err 0.04074 0.04705	5.13% 6.08% 21.63% 9.07% 0.00% CV% 5.94% 7.07%	2.56% 2.56% 10.26% 7.69% -2.56% %Effect 0.00% 2.97%

Analyst:______QA:___

m

CETIS Analytical Report

Report Date: Test Code/ID:

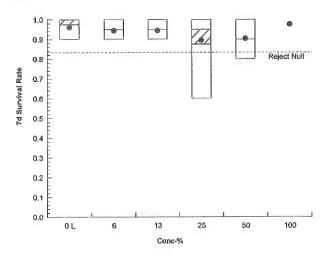
04 Sep-19 15:07 (p 2 of 2) 5B48F66F / 15-3150-8335

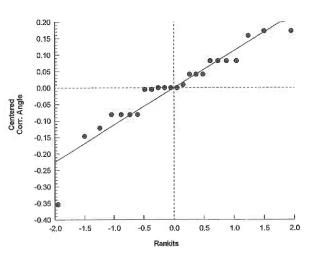
ERM

Fathead Minnow 7-d Larval Survival and Growth Test

Analysis ID: Analyzed:	08-4531-1791 04 Sep-19 15:07		-	7d Survival Ra Parametric-Co	te ntrol vs Treatments	CETIS Version: Status Level:	CETISv1.9.4 1
7d Survival F	Rate Detail						
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4		
0	L	1.0000	1.0000	0.9000	1.0000		
6		1.0000	0.9000	0.9000	1.0000		
13		0.9000	1.0000	0.9000	1.0000		
25		0.6000	0.9000	1.0000	1.0000		
50		0.9000	0.8000	1.0000	0.9000		
100		1.0000	1.0000	1.0000	1.0000		
Angular (Cor	rected) Transform	ned Detail					
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4		
0	L	1.412	1.412	1.249	1.412		
6		1.412	1.249	1.249	1.412		
13		1.249	1.412	1.249	1.412		
25		0.8861	1.249	1.412	1.412		
50		1.249	1.107	1.412	1.249		
100		1.412	1.412	1.412	1.412		
7d Survival F	Rate Binomials						
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4		
0	L	10/10	10/10	9/10	10/10		
6		10/10	9/10	9/10	10/10		
13		9/10	10/10	9/10	10/10		
25		6/10	9/10	10/10	10/10		
50		9/10	8/10	10/10	9/10		
100		10/10	10/10	10/10	10/10		

Graphics





Analyst:______ QA:_____

CETIS Ana	alytical Repo	ort						ort Date: Code/ID:			07 (p 1 of 2) 5-3150-8335
Fathead Minn	now 7-d Larval S	urvival a	nd Growth Te	est							ERM
Analysis ID:	04-1375-2485			an Dry Biom	-			IS Version	: CETISv1	.9.4	
Analyzed:	04 Sep-19 15:0	7 Ar	nalysis: Par	ametric-Cor	trol vs Treat	tments	State	us Level:	1		
Batch ID:	01-9158-7474	Те	est Type: Gro	wth-Surviva	l (7d)		Anal	yst: La	b Tech		
Start Date:	26 Aug-19 15:30	0 Pr	otocol: EP.	A/821/R-02-	013 (2002)		Dilu	ent: Re	constituted V	Vater	
Ending Date:	02 Sep-19 15:00	0 S j	pecies: Pin	nephales pro	melas		Brin				
Test Length:	6d 23h	Та	axon: Act	inopterygii			Sou	rce: In-	House Cultur	e	Age: <24
Sample ID:	20-6551-5761	Ce	ode: 7B	1D44F1			Proj		ET Testing		
Sample Date:	: 26 Aug-19 06:18	8 M	aterial: Ind	ustrial Efflue	nt		Sou		celorMittal Bu	irns Harbor	, LLC
	: 26 Aug-19 12:00		AS (PC):			The second	Stati	ion: Ol	tfall 001		
Sample Age:	9h (5 °C)	CI	ient: Arc	elorMittal Bu	ırns Harbor,	LLC					
Data Transfo		Alt Hyp)				NOEL	LOEL	TOEL	TU	PMSD
Untransforme	d	C > T					100	>100	n/a	1	26.85%
Dunnett Mult	iple Comparisor	n Test									
Control	vs Conc-%		Test Stat	Critical	MSD DF	P-Type	P-Value	Decisio			
Lab Water	6		-0.5547	2.407	0.135 6	CDF	0.9468	-	nificant Effect		
	13		0.5949	2.407	0.135 6	CDF	0.6056	•	nificant Effect		
	25		0.6531	2.407	0.135 6	CDF	0.5794	+	nificant Effect		
	50		1.194	2.407	0.135 6	CDF	0.3394		nificant Effect		
	100		-0.4384	2.407	0.135 6	CDF	0.9306	Non-Sig	nificant Effect	t	
Test Accepta	bility Criteria	TAC	Limits								
Attribute	Test Stat		Upper	Overlap	Decision		_				
Control Resp	0.501	0.25	>>	Yes	Passes Cr	riteria					
ANOVA Table	•										
Source	Sum Squ	ares	Mean Squ	lare	DF	F Stat	P-Value	Decision	n(α:5%)		
Between	0.029444	5	0.0058888	9	5	0.9426	0.4775	Non-Sig	nificant Effect	t	
Error	0.112451		0.0062473	3	18						
Total	0.141896				23						
Distributiona	l Tests										
Attribute	Test				Test Stat	Critical	P-Value	Decisio	n(α:1%)		
Variances	Bartlett Ed	quality of \	/ariance Test		5.724	15.09	0.3340	Equal Va	ariances		,
Distribution			rmality Test		0.9854	0.884	0.9714	Normal I	Distribution		
Mean Dry Bio	omass-mg Sumn	nary									
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	L	4	0.501	0.3633	0.6387	0.466	0.444	0.628	0.04328	17.28%	0.00%
6		4	0.532	0.3869	0.6771	0.5515	0.413	0.612	0.04558	17.14%	-6.19%
13		4	0.4678	0.4279	0.5076	0.4725	0.435	0.491	0.01251	5.35%	6.64%
25		4	0.4645	0.2843	0.6447	0.491	0.313	0.563	0.05663	24.38%	7.29%
50		4	0.4343	0.3121	0.5564	0.431	0.347	0.528	0.03838	17.67%	13.32%
100		4	0.5255	0.4486	0.6024	0.5335	0.46	0.575	0.02417	9.20%	-4.89%
Mean Dry Bio	omass-mg Detai										
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4						
0	L	0.444	0.484	0.448	0.628						
6		0.612	0.509	0.413	0.594						
13		0.483	0.491	0.435	0.462						
25		0.313	0.444	0.563	0.538						
50		0 406	0.456	0 629	0 347						

50

100

0.347

0.525

0.528

0.542

0.456

0.575

0.406

0.46

mB

QA:

Fathead Minnow 7-d Larval Survival and Growth Test		ERM
OE NO Analytical Report	Test Code/ID:	5B48F66F / 15-3150-8335
CETIS Analytical Report	Report Date:	04 Sep-19 15:07 (p 2 of 2)

0.06

0.04

0.02

0.00 -0.02

-0.04 -0.06

-0.08 -0.10

-0.12 -0,14 -0.16

-2.0

-1.5

-1.0

-0.5

0,0

Rankits

0.5

1.0

1.5

2.0

Centered Untransformed

Fathead Minnow 7-d Larval Survival and Growth Test **CETIS Version:** CETISv1.9.4 Analysis ID: 04-1375-2485 Endpoint: Mean Dry Biomass-mg Parametric-Control vs Treatments Status Level: 1 04 Sep-19 15:07 Analysis: Analyzed: Graphics 0.16 _F 0.7 0.14 a 0.12 0.6 0.10 Mean Dry Biomass-mg 0.08

Reject Null

100

0.5

0.4

0.3

0.2

0.1

0.0

0 L

6

-0---

13

Conc-%

25

50

CETIS™ v1.9,4.3 Page 14 of 23

Analyst: 12A QA:___

pu

CETI	S Ana	lytical Repo	ort						eport Date: est Code/ID:		04 Sep-19 15: 5B48F66F / 1	
Fathea	ad Minn	low 7-d Larval S	urvival an	d Grow	th Test	-						ERM
Analys Analyz		13-8214-7378 04 Sep-19 15:07		dpoint: alysis:	Mean Dry Bior Linear Interpol)		ETIS Version: atus Level:	CET 1	ISv1.9.4	
Batch		01-9158-7474	Те	st Tyne:	Growth-Surviv	al (7d)		A	nalyst: Lab	Tech		
Start D		26 Aug-19 15:30		otocol:	EPA/821/R-02					onstitut	ed Water	
		02 Sep-19 15:00		ecies:	Pimephales pi	. ,		B	ine:			
		6d 23h		xon:	Actinopterygii			Se	ource: In-H	ouse C	ulture	Age: <24
Sampl	e ID:	20-6551-5761	Co	de:	7B1D44F1			Pi	oject: WE	T Testir	ng	
		26 Aug-19 06:18		terial:	Industrial Efflu	ent			-	elorMitta	al Burns Harbo	r, LLC
-		26 Aug-19 12:00		S (PC):				St	ation: Out	fall 001		
		9h (5 °C)		ent:	ArcelorMittal E	Burns Harbor.	, LLC					
Linear	Interpo	plation Options									dealing you	
X Tran	sform	Y Transform	se Se	ed	Resamples	Exp 95%	CL Met	hod				
Log(X+	-1)	Linear	48	4944	200	Yes	Two	-Point Inte	erpolation			
Test A	ccepta	bility Criteria	ТАС	Limits								
Attribu	ite	Test Stat		Uppe	er Overlap	Decision						
Contro	Resp	0.501	0.25	>>	Yes	Passes C	riteria					
Point	Estimat	tes										
Level	%	95% LCL	95% UC	L_TU	95% LCL	95% UCL						
IC5	9.564	4 n/a	n/a	10.46	6 n/a	n/a						
IC10	>100	n/a	n/a	<1	n/a	n/a						
IC15	>100	n/a	n/a	<1	n/a	n/a						
IC20	>100	n/a	n/a	<1	n/a	n/a						
IC25	>100	n/a	n/a	<1	n/a	n/a						
IC40	>100	n/a	n/a	<1	п/а	n/a						
IC50	>100	n/a	n/a	<1	n/a	n/a			0.0			-
Mean	Dry Bio	mass-mg Summ	nary			Ca	Iculated Va	ariate			Isoto	nic Variate
Conc-	%	Code	Count	Mean	n Min	Max	Std Dev	CV%	%Effect		Mean	%Effect
0		L	4	0.501	0.444	0.628	0.08656	17.28%	0.0%	1 (CC)	0.5165	0.0%
6			4	0.532	0.413	0.612	0.09117	17.14%	6.19%		0.5165	0.0%
13			4	0.467	78 0.435	0.491	0.02503	5.35%	6.64%		0.473	8.42%
25			4	0.464	5 0.313	0.563	0.1133	24.38%	7.29%		0.473	8.42%
50			4	0.434		0.528	0.07675	17.67%			0.473	8.42%
100			4	0.525		0.575	0.04835	9.20%	-4.89%		0.473	8.42%
Mean	Dry Bio	mass-mg Detail										
Conc-	%	Code	Rep 1	Rep	2 Rep 3	Rep 4						
0		L	0.444	0.484		0.628						
6			0.612	0.509		0.594						
13			0.483	0.49		0.462						
			0.313	0.44		0.538						
25			0.010	O'adaday		0.000						

50 100 0.528

0.542

0.456

0.575

0.406

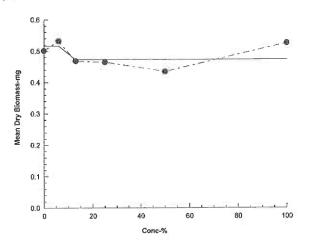
0.46

0.347

0.525

CETIS Ana	alytical Report			Report Date: Test Code/ID:	04 Sep-19 15:07 (p 2 of 2) 5B48F66F / 15-3150-8335
Fathead Min	now 7-d Larval Survi	ival and Grow	th Test		ERM
Analysis ID:	13-8214-7378	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.9.4
Analyzed:	04 Sep-19 15:07	Analysis:	Linear Interpolation (ICPIN)	Status Level:	1

Graphics



Analyst: VM

QA: M7

LT.	1.47	100	п	8
	N.	-N°		2
H	200			ALC: NO
H			4	Frank
		X		-
	+++		a fi	PL.
T.	F-P	12	н.	
H-			H	FT]
				and so its second

ENVIRONMENTAL RESOURCES MANAGEMENT 3352 128th Avenue Holland, Michigan 49424-9263

Phone: 616-399-3500 FAX: 616-399-3777

AOUATIC TOXICITY LAB CHAIN OF CUSTODY FORM *

		A	JUAL.	AQUATIC TUNICITY LAB CHAIN UF CUSTUDI FUNM	I LAD	CILA	TIN OF COS	TADT	. TANTOL			
CLIENT NAME:	AMBIA	SH	CArc	Arceloc)	SAMPLER	ж						
ADDRESS:		- 1	>		PHONE NUMBER:	نہ						
SAMPLE DESCRUPTION (i.e. Outfall 001)	DATE (Begin End)	TIME (Begin End)	GRAB OR COMP	NUMBER AND SIZE OF CONTAINERS	FIELD PARAMETERS		SAMPLE ID NUMBER (Filled in by ERM)	INITIAL WATER C UPON RECEIPT BY (filled in by ERM)	INITIAL WATER QUALITY PARAMETERS UPON RECEIPT BY LABORATORY (filled in by ERM)	TY PARAME) DRATORY	reks-	
00 (akurah gost 7511	03125/9	0618	•	1-2.5 gel	pH= NH3=	s.u. mg/L	$ODU_{I}(q-1) = \frac{12 \text{ mp}}{5} (\circ \text{ O}) = \frac{D.0}{10.5} = \frac{D.1}{10.5} = \frac{D.1}$	*Temp. 5 (• C) SOn Ice	D:0.	PH 1, s.u.	5	umhos/am
plicalso 2982	Sar ostratin OG/25/19	0605		1-2554	PH= NH₃=	s.u. mg/L	6-114C80	Temp. S (; C) S(On Ice	Temp S (e C) 0.0 mg/L SOn Ice	PH 75 s.u.	J	umhos/cm
					pH= NH ₃ =	s.u. mg/L		≂Temp. (• C) □ On Ice	⊼Temp. (• C) mg/L □ On Ice	pH	Cond	umhos/cm
					pH= NH3=	s.u. mg/L		Temp. (∘ C) □ On Ice	$\begin{array}{c c} Temp. \\ \hline (\circ C) \\ \hline (\circ C) \\ \Box On Ice \end{array} D.O.$.pH s.u	Cond	umhos/cm
					pH= NH3=	s.u. mg/L		Temp. (• C) □ On Ice ~	D.O.	pH. s.u.	Cond	umhos/cm
					PH= NH₃=	s.u. mg/L		Temp. (° Ć)/	D.O. mg/L	pH s.u.	Cond	umhos/cm
ANALYSES REQUESTED [check item(s)]	Test Material: Water Sedim Produ	aterial: Water/Wastewater Sediment Product	ewater	Test Type: Acute Chronic Other	Test Species: Ceriodapha Daphrnia m Daphrnia p	t Species: Ceriodaphnia dubia Daphnia magna Daphnia pulex Fathead minnow	Pimephu	Trout (Oncor ad minnow (e minnow (M las)	Rainbow Trout (Oncorhynchus mykiss) Sheepshead minnow (Cyprinodon variegatus) Silverside minnow (Menidia beryllina) ides promelas)	egatus) Other (write	Americamysis bahia Hyalella azteca Chironomus dilutus in comments sectio	bahia Iutus section)
COMMENT SECTION: See ALS COC 41579	CTION: 5	ree Ar	5 600	41579								
SAMPLE TRANSFERS	RANSFERS											
RELINQUISHED BY:	HED BY:	Signature,		Organization	DATE 1	TIME	ACCEPTED BY: Signature /Organization	3Y: Signat	ure/Organ	uization	DATE	TIME

February 2018

See Instructions for Sample Collection on Back of Sheet

*

082619-1 Pp Page 17 of 23

		Everett, WA		IM		Dane	5	Γ		Mid	dletown. PA		Salt Lake City. III		vrk. PA	York. PA
	V	+1 425 356 2600	500 +1 616 399 6070 	02 09 60		COOO		coc ID: 41579		Ŧ	+1 717 944 5541				+1 717 505 5280	80
						ALS	Project	ALS Project Manager:			A	LS Worl	ALS Work Order #:			
	Customer Information	on		P	roject In	Project Information				E.	arameter/	Method	Parameter/Method Request for Analysis	or Analy	sis	
Purchase Order			Project Name		AM BH	METI	T WEEK	3	A IL	WETT	- Sub	4	ERM			
Work Order			Project Number						- 00	4						
Company Name	AMBH +	EPT	Bill To Company	pany	AM	AMBH			U							
Send Report To			Invoice Attn	Attn					۵							
Address			Add	Address					шш							
City/State/Zip			City/State/Zip	e/Zip					Ű							
Phone			۵.	Phone				216	x							
Fax				Fax					-							
e-Mail Address			e-Mail Address	Iress					7							
No.	Sample Description	-	Date	Time	-	Matrix	Pres.	# Bottles	×	C B	9	u.	H D		r	Hold
Not Part 19	001 600	ene 3	* 8-25-19	061	8	40	80	-	×	8	052619-1	-		-	-	
125400 Z1			* 8-35-19		~	40	0	_	\geq	0%	047619-7					
en Pn						;						-				
4			: 		- -										-	
5									 							
8																
7														 		
60																
0				:												
10						100										
Sampler(s) Please P	Full		Shipme	Shipment Method		Turnaro	and Time	Turnaround Time in Business Days (BD)	s Days (BD	0 Dother	ther	1	-	Results Due Date:	ite:	
Relinquist of by:	11-1	ALICIPED	Time:	Received	Y X	19	X	7000	Notes:							
Relinquished by:	-Ch-	Date:	Time.	Received	Received by (Laboratory)	-			*Contor	たの意	. edili	34 09/2	AN OBIZER OF SAME THE		MEDIO VIC -	Alos H
				r; 	ŕ		021-14-200	202	COOLECTIC	5	cooler lemp	Level II Std QC	UC Package: [Check One Box Below]	E DOX DEN	TRRP Che	sektist
Logged by (Laboratory):	#	Date:	Time:	Checked	Checked by (Laboratory):	ary):							Level III Stu QC/Raw Date			
Preservative Key: 1-HCI	1-HCI 2-HNOs	3-H2SO4 4-N	4-NaOH 5-Na ₂ S ₂ O ₂		6-NaHSO.	7-Other	8-4°C	9-5035		-		0 Other	ine.)	ľ	

Page 18 of 23

num ĴD. 5

URCES MANAGEMENT	I, Michigan 49424-9263
ENVIRONMENTAL RESOURCES MANA	3352 128 th Avenue Holland

Phone: 616-399-3500 FAX: 616-399-3777

ER

AOUATIC TOXICITY LAB CHAIN OF CUSTODY FORM *

.

		A	JUAL.		Y LAB C	AQUALIC LUXICITY LAB CHAIN UF CUSTODY FURM	VUDIS	FUKM *			
CLIENT NAME:	WV	BN			SAMPLER	•					
ADDRESS:					PHONE NUMBER:						
SAMPLE DESCRIPTION (i.e. Outfall 001)	DATE (Begin End)	TIME (Begin End)	GRAB OR COMP	NUMBER AND SIZE OF CONTAINERS	FIELD PARAMETERS	LS SAMPLE ID NUMBER (Filled in by ERM)		INITIAL WATER QUALITY PARAMETERS UPON RECEIPT BY LABORATORY (Elled in by ERM)	TY PARAMET ORATORY	ERS	
001 offices	03/27/19 03/29/15/119	0610		259	pH= s.u. NH3= mg/	1-1/300 1/8m	Temp. S (• C)	D.O. 7, 3 mg/L	Hd Cil	Sq "	umhos/cm
Price 1 1 0	phraiso phease	0555 0555		255	pH= s.u. NH3= mg/	CJUDO 1/8m		D.O. mg/L	ns Sl	Cond L 5 9 unitos/cm	mtros/cm
				5	pH= s.u. NH3= mg/	ns.	×Temp. (∘ C) :- □ On Ice	D.O. mg/t	PH	Cond	umhos/cm
					pH= s.u. NH3= mg/	mg/L study	Temp. (• C)	D.O. mg/L	pH su	Cond	umhos/cm
					pH= s.u. NH3= mg/	mg/L States and states	Temp. (∘ C) □ On Ice	D.O. mg/L	.n.s	Cond	umhos/cm
					pH= s.u. NHs= mg/	n.s.	Temp. (° C) □ On Ice	D.O. mg/L	pH s.u.	Cond	umhos/cm
ANALYSES REQUESTED [check item(s)]	Test Material: Water, Sedim Produ	aterial: Water/Wastewater Sediment Product	ewater	Test Type: Acute Chronic	Test Species: Ceriodaphaia dubia Daphaia magna Daphaia pulex Fathead minnow	ia dubia	Rainbow Trout (Oncorhynchus mykiss) Sheepshead minnow (Cyprinodon variegatus) Silverside minnow (Menidia beryllina) iles promelas)	hynchus mykiss) (Cyprinodon vari lenidia beryllina)	(write	Americamysis bahia Hyalella azteca Chironomus dilutus in comments sectio	bahia utus ection)
COMMENT SECTION: She ALS COC 4201	ECTION:	Sre ALS	COC :	12011							
SAMPLET	SAMPLE TRANSFERS	10									
RELINQUISHED BY:	SHED BY:	: Signature,		Organization	DATE TIME		ACCEPTED BY: Signature /Organization	ture/Organ	ization	DATE	TIME

* See Instructions for Sample Collection on Back of Sheet

February 2018

Middletown, PA Salt Lake City, UT +1 217 944 5541 +1 801 266 7700	ALS Work Order #:	mete	sub to EK							DEFGH	0624619-1	C-8/86-57						00ther	150 H	Level III Std Out As Level III Std Out As Level IV SW845/0 TOther Other
		2 A 1.16	8	0 0	יש ב	r ()	x		5	#Bottles A B C	\times	1- aga 1 X 043						1.00	10	
COC ID: 42011	ALS Project Manager: mation	IT week		ВЛ						Pres.	106	P						Turnaround Time in Business Days (BD)	Jul 2	24:
	Project Information	1.11		Attn HIVIBIT	Address	e/Zip	Phone	Fax	dress	Time Matrix		04 9500					<	Shipment Metbod	Received by (Laboratory):	Checked by (Laboratory):
1 4 2 3 5 5 5 0 0 +1 6 1 5 3 9 5 0 7 0 1 + 1 6 1 5 3 9 5 0 7 0		Project Name	Projec	: <u>-</u>	Ado	City/State/Zip	ā.		e-Mail Address	Date		LIJOOX						Shipme	Time:	Time:
*	ormation		4 + 1-12							ription	Comp	Comp							Date: 7-38-19 Date:	Date:
(57)	ustomer Information		AMBH		0					Sample Description	1 001	10 1						e Print & Sign	2746	4
9 # 8	-H					Zip	hone	Fax	Address	Street	082619 Page 2	D-1 Pp	4	0	9	00	0	10 Sampler(s) Pleage I	Relinquished by	pgged by (Laboratory):

ERM.

ENVIRONMENTAL RESOURCES MANAGEMENT

3352 128th Avenue Holland, Michigan 49424-9263 Phone: 616- 399-3500 FAX: 616-399-3777

AQUATIC TOXICITY LAB CHAIN OF CUSTODY FORM *

)									
CLIENT NAME:	Arith .	lu - Di.	Ott		SAMPLER	an a	*					
ADDRESS:					PHONE NUMBER:	R:						
SAMPLE DESCRIPTION (i.e. Outfall 001)	DATE (Begin End)	TIME (Begin End)	GRAB OR COMP	NUMBER AND SIZE OF CONTAINERS	FIELD PARAMETERS	TERS	SAMPLE ID NUMBER (Filled in by ERM)	INITTAL WATER (UPON RECEIPT B (filled in by ERM)	INITIAL WATER QUALITY PARAN UPON RECEIPT BY LABORATORY (filled in by ERM)	INITIAL WATER QUALITY PARAMETERS UPON RECEIPT BY LABORATORY (filled in by ERM)	rers	
00	8/20/14	0622		152 + 2.550) pH= NH3=	s.u. mg/L	08309-1	°Temp. 2 (° C) ⊡ On Ice.	D.O.	Hd J. S. s.u.	USH 7	umhos/cm
110	8/20	0603	1	1 42.5ml	pH= NH3=	s.u. mg/L	06 3N9.1	Temp. 2. (° C) 1. On Ice	$\begin{array}{c c} Temp. \\ & \begin{array}{c} D.0. \\ & \begin{array}{c} 0 \\ 0 \\ \end{array} \end{array} & \begin{array}{c} 0 \\ \end{array} & \begin{array}{c} 0 \end{array} & \begin{array}{c} 0 \\ \end{array} & \begin{array}{c} 0 \\ \end{array} & \begin{array}{c} 0 \end{array} & \begin{array}{c} 0 \\ \end{array} & \end{array} & \begin{array}{c} 0 \end{array} & \begin{array}{c} 0 \\ \end{array} & \begin{array}{c} 0 \end{array} & \end{array} & \begin{array}{c} 0 \end{array} & \begin{array}{c} 0 \end{array} & \begin{array}{c} 0 \end{array} & \end{array} & \begin{array}{c} 0 \end{array} & \end{array} & \begin{array}{c} 0 \end{array} & \end{array} & \end{array} & \begin{array}{c} 0 \end{array} & \end{array} & \end{array} & \begin{array}{c} 0 \end{array} & \end{array}$	PH 2.4.	YUY .	umhos/cm
			:		pH= NH ₃ =	s.u. mg/L		Temp. D.O. (• C) [] On Ice	D.O. mg/L	n.s	Cond	umhos/cm
					pH= NH3=	s.u. mg/L		Temp. (• C)	D.O. mg/L	pH s.u.	Cond	umhós/cm
					=HId NH _d =	s.u. mg/L		Temp. (° C)	D.O. mg/L	pH su	Cond	umhos/cm
					PH= NH₃=	s.u. mg/L			D.O. mg/I	pH s.u.	Cond	umhos/cm
ANALYSES REQUESTED [check item(s)]	Test Material: Water Sedim Produ	aterial: Water/Wastewater Sediment Product	ewater	Test Type: Acute Chronic Other	Test Species: Ceriodapha Daphnia m Daphnia p Fathead n	t Species: Ceriodaphnia dubia Daphnia magna Daphnia pulex Fathead minnow (Pimephu	Trout (<i>Oncorh</i> ad minnow ((a mirunow (<i>Me</i> (as)	Rainbow Trout (Oncorhynchus mykiss) Sheepshead minnow (Cyprinodon variegatus) Silverside minnow (Menidia beryllina) ales promelas)Other	(write	Americamysis bahia Hyalella azteca Chironomus dilutus in comments sectio	bahia lutus section)
COMMENT SECTION: See ALS COC 42012	ECTION:	See ALS	COC 4.	2012								
SAMPLE TRANSFERS	RANSFER	S							V			
RELINQUISHED BY: Signature / Organization	SHED BY	: Signatu	tre / Orξ		DATE '	TIME	ACCEPPED BY: Signature /Organization	3Y: Signati	ure/Organ	uzation	DATE	TIME
							1111	8				

See Instructions for Sample Collection on Back of Sheet

February 2018

1230

6/34/29

Fier

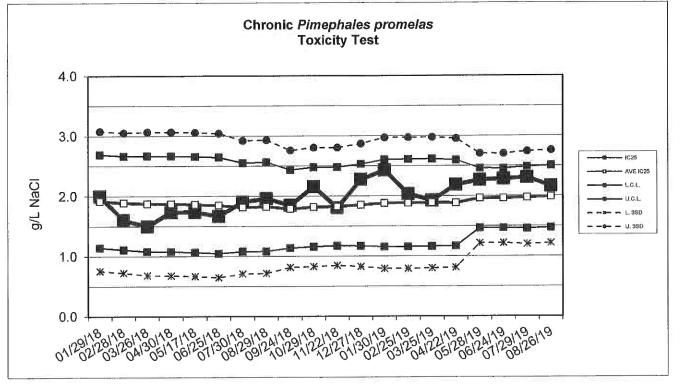
082619-1 Pp Page 21 of 23

	Cincinnati, OH +1 513 733 5336		Fort Collins, CO +1 970 490 1511	Chain	of Cust	Chain of Custody Form	L	Houston, TX +1 281 530 5656	Spring City, PA +1 610 948 4903	South Charleston, WV +1 304 356 3168
	Everett, WA +1 425 356 2600		Holland, MI +1 616 399 6070	Page		Π		Middletown, PA +1 717 944 5541	Saft Lake City, UT +1 801 266 7700	York, PA +1 717 505 5280
ALS			c	Ö	coc ID: 4	42012				
				A	ALS Project Manager:	Manager:		A	ALS Work Order #:	
Custom	Customer Information		Proj	Project Information	tion			Parameter/	Parameter/Method Request for Analysis	Analysis
Purchase Order		Project Name		AMBH WET	L	week 2	JUJ A	ETT	sub dus	ERM
Work Order		Project Number	1000				8			
Company Name An	AMBH - EPT	Bill To Company	fuedu	AMB1	H		O			
Send Report To		Invoice Attn	e Attn				D			
Address		Ad	Address				u u			
City/State/Zip		City/State/Zip	dīZ/a				- 0			
Phone			Phone				T			
Fax			Fax				-			
e-Mail Address		e-Mail Address	dress				5		-	
	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A B	о С	E F G H	PIOH L I
NATIO	ool Comp	P-12-8 x	0630	2 Ad	80	3-34l	×	043019-1		
10 118400 FT 22 01	11 Cont	× 8-29-19	0108	AQ	80	3-341	×	2-2010-2-00		
Pp ⁷⁹ 23			>							
4							-			
5										
9				-						
7										
80										
Ø										
10							_			
Sampler(s) Please Print & Sign	in the second se	Shipm	Shipment Method	Tur	teround Time	Turnsround Time in Business Days (BD)	Days (BD)	Other	-	Results Due Date:
1.0	2	1			0801	0580	1380	02 80	0180	
Relinquisand by: Delinantiched har	Pris-6	Time	Barran Barran	Bacaro every for K con	Ţ	Eam	Notes: Xlennosih.	he sample ende	sample ands on Option 19 at same time	the -59 Balozia
			ł	- It many			COORELID	Coorer temp	UC Packaget (Creck Une box below)	OX BEIOW)
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):	Laboratory):						
Preservative Key: 1-HCI	2-HNO ₃ 3-H ₂ SO ₄	4-NaOH 5-Na ₂ S ₂ O _a	Oa 6-NaHSO4	O ₄ 7-Other	r 8-4°C	9-5035				
Note: 1. Any changes must be 2. Unless otherwise agre	 Any changes must be mude in writing once samples and COC Form have been submitted to ALS Environmental. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse. The Choir of Custody is a local document All information must be committed accusted on conditions stated on the reverse. 	s and COC Form having the second s	e been submitt Environmenta	ed to ALS Env	ironmental. limited to the	terms and con	aditions state	ed on the reverse.	Copyright 20	Copyright 2012 by ALS Environmental.



Environmental Resources Management

Standard Reference Toxicant Data



Chronic Pimephales promelas Toxicity Test Data

		on on on o	inopilaroo p		,	CONTROL	
Date	IC25	AVE IC25	CONTR	OL LIMIT	Survival	Growth	CV
	(g/L. NaCl)	(g/L NaCl)	Lower	Upper	(%)	(mg)	(%)
					07.5	0.00	4.0
01/29/18	2.0	1.9	1.1	2.7	97.5	0.39	4.8
02/28/18	1.6	1.9	1.1	2.7	92.5	0.44	10.7
03/26/18	1.5	1.9	1.1	2.7	97.5	0.47	3.5
04/30/18	1.7	1.9	1.1	2.7	95	0.45	11.4
05/17/18	1.7	1.9	1.1	2.7	100	0.54	10.8
06/25/18	1.7	1.8	1.0	2.6	95	0.56	17.8
07/30/18	1.9	1.8	1.1	2.6	97.5	0.43	4.3
08/29/18	2.0	1.8	1.1	2.6	100	0.58	9.4
09/24/18	1.8	1.8	1.1	2.4	97.5	0.46	8.2
10/29/18	2.2	1.8	1.2	2.5	97.5	0.45	7.7
11/22/18	1.8	1.8	1.2	2.5	95	0.65	5.2
12/27/18	2.3	1.8	1.2	2.5	97.5	0.64	7.4
01/30/19	2.4	1.9	1.2	2.6	100	0.53	10.5
02/25/19	2.0	1.9	1.2	2.6	95	0.53	10.2
03/25/19	1.9	1.9	1.2	2.6	97.5	0.63	6.0
04/22/19	2.2	1.9	1.2	2.6	100	0.57	2.0
05/28/19	2.3	2.0	1.5	2.5	100	0.68	10.4
06/24/19	2.3	2.0	1.5	2.5	92.5	0.48	11.0
07/29/19	2.3	2.0	1.5	2.5	100	0.51	5.6
08/26/19	2.2	2.0	1.5	2.5	100	0.38	15.0
		- 10					