

Intended for
The Chemours Company
Wilmington, DE

Date
October 2017

CHRONIC TOXICITY TEST RESULTS – OUTFALL 002

PROJECT NUMBER: 38-42894A



Dr. Shawn Gannon, PhD, DABT
 Senior Research Toxicologist
 The Chemours Company
 1007 Market Street
 Wilmington, DE 19899

**TOXICITY TEST RESULTS – OUTFALL 002
 RAMBOLL ENVIRON PROJECT NO. 38-42894A**

Dear Mr. Gannon:

Attached are the results of the definitive (five-dilution) chronic (7-day and 3-brood) Whole Effluent Toxicity (WET) tests conducted with samples of Outfall 002 effluent collected from the Chemours Company – Fayetteville Works, North Carolina facility. Single dilution tests of upstream river water intake samples were also tested. Effluent composite samples and river water grab samples were collected and shipped to Ramboll Environ on October 2, 4, and 6, 2017. The samples were received and utilized for testing with *Pimephales promelas* (fathead minnow) and *Ceriodaphnia dubia* (*C. dubia*) at Ramboll Environ's aquatic toxicology laboratory October 3, 5, and 7, 2017.

The tests were initiated upon receipt of the first sample. Sample receipt temperatures were below 6.0 °C. All samples were used within 36 hours of collection and for not longer than 72 hours after first use. Organisms were exposed at approximately 25.0 ±1.0 °C to effluent concentrations of 0.21, 0.4, 0.835, 1.65, and 3.3 percent effluent. Organisms in the river water tests were exposed at 100 percent river water (i.e., no dilution). Laboratory soft synthetic water was used as the primary control and dilution water. A laboratory moderately hard water control was also initiated for quality control purposes.

Chronic toxicity test methods followed EPA-821-R-02-013, *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* (Fourth Edition) methods 1000.0, 1001.0, and 1002.0. Test controls met USEPA criteria for test acceptability. Results of the toxicity tests are:

October 17, 2017

Ramboll Environ
 201 Summit View Dr Ste 300
 Brentwood, TN 37027
 USA

T +1 615 277 7570
 F +1 615 377 4976
www.ramboll-environ.com

NELAP Accredited or Laboratory Certification in the following United States: AR (02-008-0), AZ (0751), CA (2465), FL (E87896), IA (386), KS (E-10391), LA (02061), MN, NC (003), OK (9973), SC (84015), TX (T104704410-11-2), VA (460171), WI (399050850), WV (351).

Test Results contained in this report meet NELAP requirements.

TOXICITY TEST RESULTS for OUTFALL 002			
Test Endpoints	Fathead minnow – Survival and Teratogenicity	Fathead minnow – Survival and Growth	<i>C. dubia</i> – Survival and Reproduction
ChV	3.3	3.3	3.3
NOEC survival	3.3	3.3	3.3
LOEC survival	> 3.3	> 3.3	> 3.3
NOEC sublethal	Not an endpoint	3.3	3.3
LOEC sublethal	Not an endpoint	> 3.3	> 3.3
IC25	Not an endpoint	3.3	3.3
NOEC hatchout (% effluent)	3.3	Not an endpoint	Not an endpoint
LOEC hatchout (% effluent)	> 3.3	Not an endpoint	Not an endpoint
NOEC Proportion Normal (% effluent)	3.3	Not an endpoint	Not an endpoint
LOEC Proportion Normal (% effluent)	3.3	Not an endpoint	Not an endpoint
ChV – geometric mean between the NOEC and LOEC NOEC – No observed Effect concentration LOEC – Lowest observed effect concentration IC25 – statistical calculation of the effluent concentration which causes a 25% reduction in sublethal response (growth/reproduction) of test organisms			

Test results for Outfall 002 effluent indicated no lethal, sublethal, or abnormalities with the fathead minnow or *C. dubia* in any of the effluent concentrations. The chronic results, as NOEC and ChV values are 3.3 percent effluent (highest concentration tested) for all tests and both test species, respectively. There was no toxicity (lethal, sublethal or teratogenicity) observed in the river water tests.

The fathead minnow growth concentration-response curve for the fathead minnow is flat and not consistent with any of the patterns described in EPA 821-B-00-004, *Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing* (40 CFR Part 136). Test precision for growth results, as measured by Percent Minimum Significant Difference (PMSD), was 18 percent, which is within the USEPA PMSD bounds of 12 to 30 percent when alpha 0.05 was used for hypothesis testing. The monthly reference toxicant test also met all the test acceptability criteria.

The fathead minnow survival and teratogenicity tests did not yield any significant (> 10 percent) unusual results. There were no observations of deformed larvae with gross morphologic abnormalities. There was some fungus observed (and noted on the raw bench sheets) on eggs or dead fish. Fungus covered eggs or fish were removed daily so as to prevent the fungus from spreading.

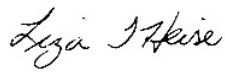
The reproduction concentration-response curve for the *C. dubia* is flat and not consistent with any of the patterns described in EPA 821-B-00-004. Test precision for reproduction results, as measured by PMSD,

was 21 percent, which is within the USEPA PMSD bounds of 13 to 47 percent when alpha 0.05 was used for hypothesis testing. The monthly reference toxicant test also met all the test acceptability criteria.

This report contains 49 pages, which include this summary report, the statistics and raw test data (Attachment 1), the chain-of-custody documentation and reference toxicant data and attachment and separator pages (Attachment 2).

Thank you for the opportunity to be of service to The Chemours Company. If you have any questions or concerns regarding this report, please feel free to contact Liza Heise at (615) 277-7517.

Yours sincerely



Liza Heise
Senior Consultant
Water Quality and Ecotoxicology

D +1 615 2777517
lheise@ramboll.com



Robin L. Richards, REM
Principal
Water Management and Planning

D +1 703 5162431
r-richards@ramboll.com

Data Review Form
Acute and Chronic WET Tests
Ramboll Environ

The raw data (i.e., laboratory bench sheets) and data in the applicable summary sheets have been checked and found to be complete. Additionally, test conditions and control performance meet test acceptability criteria specified by the US Environmental Protection Agency and the certifying state authority for the tests conducted¹.



Robin L. Richards, REM
Principal
Water Management and Planning

¹ Any data limitations regarding their applicability for determining NPDES permit compliance are discussed in the report cover letter.

ATTACHMENT 1
STATISTICAL RESULTS AND RAW TEST DATA

CETIS Analytical Report

Report Date: 17 Oct-17 08:41 (p 1 of 4)
 Test Code: 19022Fm | 16-4932-8973

Fathead Minnow 7-d Larval Survival and Growth Test

Ramboll Environ

Analysis ID: 06-7608-7922	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.8.4
Analyzed: 11 Oct-17 11:34	Analysis: Nonparametric-Control vs Treatments	Official Results: Yes
Batch ID: 11-8960-4717	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 03 Oct-17	Protocol: EPA/821/R-02-013 (2002)	Diluent: Soft Synthetic Water
Ending Date: 10 Oct-17	Species: Pimephales promelas	Brine: Not Applicable
Duration: 7d 0h	Source: Environmental Consult & Test	Age:
Sample ID: 07-7550-5859	Code: 2E3947C3	Client: Chemours
Sample Date: 02 Oct-17	Material: Industrial Effluent	Project: Special Studies
Receive Date: 03 Oct-17	Source: NA	
Sample Age: 24h	Station:	

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	NA	C > T	NA	NA	3.3	>3.3	NA	30.3	7.58%

Steel Many-One Rank Sum Test

Control	vs C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water	0.21	18	10	1	6	0.8333	Asymp	Non-Significant Effect
	0.4	18	10	1	6	0.8333	Asymp	Non-Significant Effect
	0.835	16	10	1	6	0.6105	Asymp	Non-Significant Effect
	1.65	18	10	1	6	0.8333	Asymp	Non-Significant Effect
	3.3	16	10	1	6	0.6105	Asymp	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02075619	0.004151239	5	0.8337	0.5427	Non-Significant Effect
Error	0.08962759	0.004979311	18			
Total	0.1103838		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	0.8337	4.248	0.5427	Equal Variances
Variances	Levene Equality of Variance	7.503	4.248	0.0006	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.6439	0.884	<0.0001	Non-normal Distribution

7d Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	1	1	1	1	1	1	0	0.0%	0.0%
0.21		4	1	1	1	1	1	1	0	0.0%	0.0%
0.4		4	1	1	1	1	1	1	0	0.0%	0.0%
0.835		4	0.95	0.7909	1	1	0.8	1	0.05	10.53%	5.0%
1.65		4	1	1	1	1	1	1	0	0.0%	0.0%
3.3		4	0.975	0.8954	1	1	0.9	1	0.025	5.13%	2.5%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	0.0%
0.21		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	0.0%
0.4		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	0.0%
0.835		4	1.336	1.093	1.578	1.412	1.107	1.412	0.07622	11.41%	5.4%
1.65		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	0.0%
3.3		4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	2.89%

Fathead Minnow 7-d Larval Survival and Growth Test

Ramboll Environ

Analysis ID: 06-7608-7922 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.8.4
Analyzed: 11 Oct-17 11:34 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	1	1
0.21		1	1	1	1
0.4		1	1	1	1
0.835		0.8	1	1	1
1.65		1	1	1	1
3.3		1	0.9	1	1

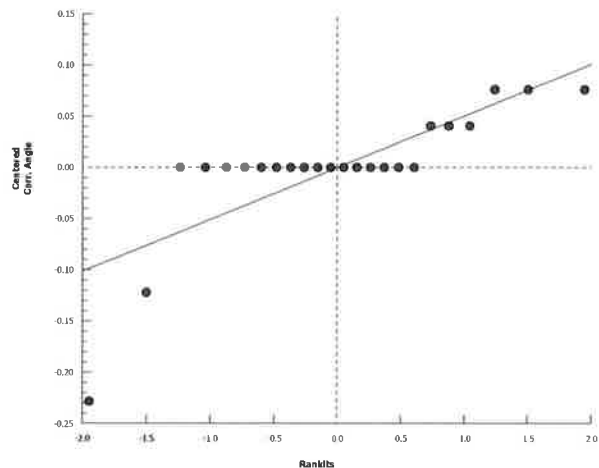
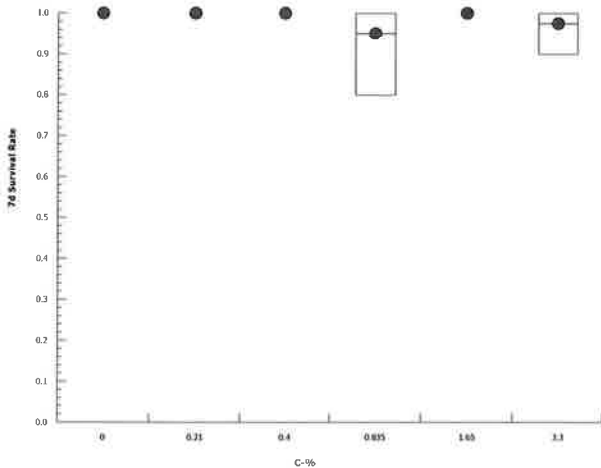
Angular (Corrected) Transformed Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1.412	1.412	1.412	1.412
0.21		1.412	1.412	1.412	1.412
0.4		1.412	1.412	1.412	1.412
0.835		1.107	1.412	1.412	1.412
1.65		1.412	1.412	1.412	1.412
3.3		1.412	1.249	1.412	1.412

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	10/10	10/10	10/10	10/10
0.21		10/10	10/10	10/10	10/10
0.4		10/10	10/10	10/10	10/10
0.835		8/10	10/10	10/10	10/10
1.65		10/10	10/10	10/10	10/10
3.3		10/10	9/10	10/10	10/10

Graphics



Fathead Minnow 7-d Larval Survival and Growth Test **Ramboll Environ**

Analysis ID: 01-7843-0011	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.8.4
Analyzed: 11 Oct-17 11:36	Analysis: Parametric-Control vs Treatments	Official Results: Yes
Batch ID: 11-8960-4717	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 03 Oct-17	Protocol: EPA/821/R-02-013 (2002)	Diluent: Soft Synthetic Water
Ending Date: 10 Oct-17	Species: Pimephales promelas	Brine: Not Applicable
Duration: 7d 0h	Source: Environmental Consult & Test	Age:
Sample ID: 07-7550-5859	Code: 2E3947C3	Client: Chemours
Sample Date: 02 Oct-17	Material: Industrial Effluent	Project: Special Studies
Receive Date: 03 Oct-17	Source: NA	
Sample Age: 24h	Station:	

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	NA	C > T	NA	NA	3.3	>3.3	NA	30.3	18.0%

Dunnett Multiple Comparison Test

Control	vs C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water	0.21	0.3213	2.407	0.06	6	0.7219	CDF	Non-Significant Effect
	0.4	0.4318	2.407	0.06	6	0.6767	CDF	Non-Significant Effect
	0.835	0.8335	2.407	0.06	6	0.4969	CDF	Non-Significant Effect
	1.65	0.2008	2.407	0.06	6	0.7675	CDF	Non-Significant Effect
	3.3	-0.1306	2.407	0.06	6	0.8689	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.3335	0.25 - NL	Yes	Passes Acceptability Criteria
PMSD	0.1797	0.12 - 0.3	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001448216	0.0002896433	5	0.2337	0.9426	Non-Significant Effect
Error	0.02230744	0.001239302	18			
Total	0.02375565		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	2.472	15.09	0.7807	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9186	0.884	0.0545	Normal Distribution

Mean Dry Biomass-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	0.3335	0.282	0.385	0.328	0.301	0.377	0.01617	9.7%	0.0%
0.21		4	0.3255	0.2952	0.3558	0.3165	0.315	0.354	0.00951	5.84%	2.4%
0.4		4	0.3228	0.2715	0.374	0.319	0.289	0.364	0.0161	9.98%	3.22%
0.835		4	0.3128	0.2319	0.3936	0.293	0.278	0.387	0.0254	16.24%	6.22%
1.65		4	0.3285	0.2687	0.3883	0.316	0.3	0.382	0.01878	11.43%	1.5%
3.3		4	0.3367	0.2864	0.3871	0.342	0.297	0.366	0.01582	9.39%	-0.97%

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.336	0.32	0.301	0.377
0.21		0.316	0.354	0.315	0.317
0.4		0.289	0.364	0.308	0.33
0.835		0.278	0.282	0.304	0.387
1.65		0.3	0.305	0.382	0.327
3.3		0.358	0.297	0.326	0.366

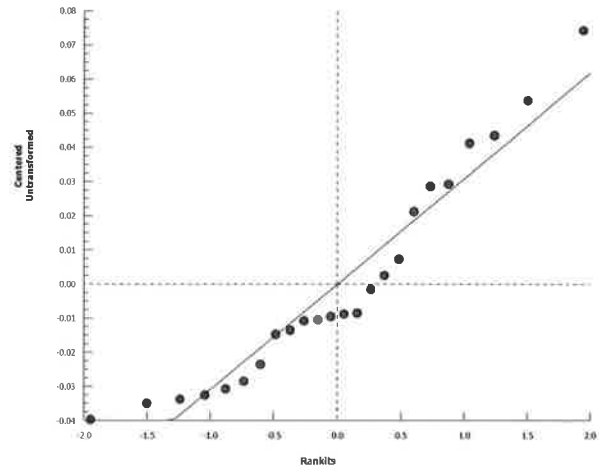
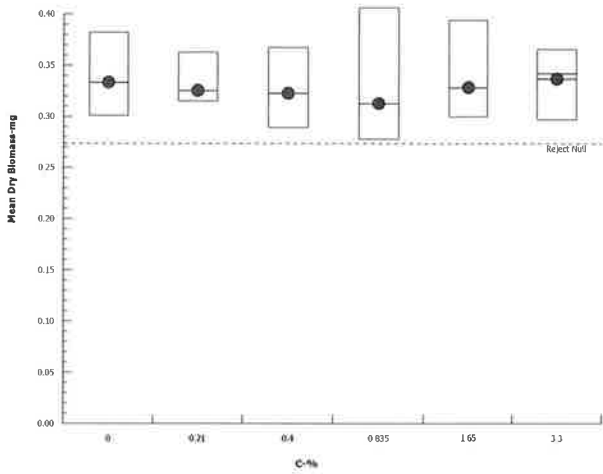
Fathead Minnow 7-d Larval Survival and Growth Test

Ramboll Environ

Analysis ID: 01-7843-0011 Endpoint: Mean Dry Biomass-mg
Analyzed: 11 Oct-17 11:36 Analysis: Parametric-Control vs Treatments

CETIS Version: CETISv1.8.4
Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 17 Oct-17 08:41 (p 1 of 1)
Test Code: 19022Fm | 16-4932-8973

Fathead Minnow 7-d Larval Survival and Growth Test

Ramboll Environ

Analysis ID: 07-3501-8951	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.8.4
Analyzed: 11 Oct-17 11:36	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes
Batch ID: 11-8960-4717	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 03 Oct-17	Protocol: EPA/821/R-02-013 (2002)	Diluent: Soft Synthetic Water
Ending Date: 10 Oct-17	Species: Pimephales promelas	Brine: Not Applicable
Duration: 7d 0h	Source: Environmental Consult & Test	Age:
Sample ID: 07-7550-5859	Code: 2E3947C3	Client: Chemours
Sample Date: 02 Oct-17	Material: Industrial Effluent	Project: Special Studies
Receive Date: 03 Oct-17	Source: NA	
Sample Age: 24h	Station:	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1789757	1000	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.3335	0.25 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC25	>3.3	N/A	N/A	<30.3	NA	NA

Mean Dry Biomass-mg Summary

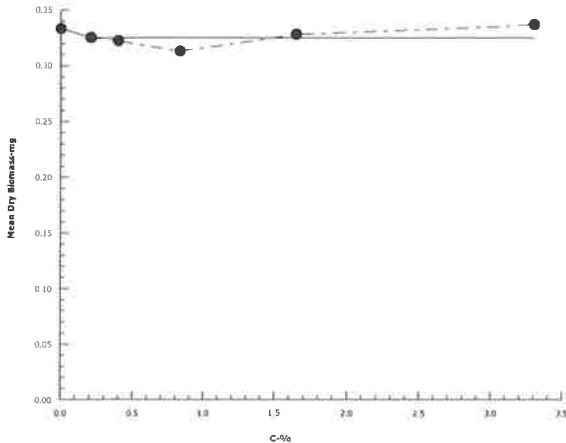
Calculated Variate

C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.3335	0.301	0.377	0.01617	0.03234	9.7%	0.0%
0.21		4	0.3255	0.315	0.354	0.00951	0.01902	5.84%	2.4%
0.4		4	0.3228	0.289	0.364	0.0161	0.0322	9.98%	3.22%
0.835		4	0.3128	0.278	0.387	0.0254	0.0508	16.24%	6.22%
1.65		4	0.3285	0.3	0.382	0.01878	0.03755	11.43%	1.5%
3.3		4	0.3367	0.297	0.366	0.01582	0.03163	9.39%	-0.97%

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.336	0.32	0.301	0.377
0.21		0.316	0.354	0.315	0.317
0.4		0.289	0.364	0.308	0.33
0.835		0.278	0.282	0.304	0.387
1.65		0.3	0.305	0.382	0.327
3.3		0.358	0.297	0.326	0.366

Graphics



RAMBOLL ENVIRON FATHEAD MINNOW SURVIVAL AND GROWTH 7-DAY CHRONIC TOXICITY TEST
EPA-821-R-02-013 Method 1000.0

TEST LOG NO.: 19022
 JOB NUMBER.: 3842894A
 INDUSTRY: Chemours
 EFFLUENT: Outfall 002
 DILUTION WATER: Soft
 NPDES: Yes No
 FOOD BATCH: 5994

BEGINNING: HRS: 1335 DATE: 10/3/17
 ENDING: HRS: 1400 DATE: 10/10/17
 TEST DILUTIONS: 0.21, 0.41, 0.835, 1.65, 3.3%
 ORGANISM AGE (date): 10/2/17
 ORGANISM SOURCE: _____
 SOURCE TEMP @ TEST START: 24.5
 RANDOMIZED BY: LM

PHOTOPERIOD: 16 hr light/8 hr dark
 FEEDING REGIME: _____
 0.15 mL Artemia @ 2 times/day
 TEST VESSEL CAPACITY: 450 mL
 TEST SOLUTION VOLUME: 250 - 300 mL
 NO. ORGANISMS/TREATMENT: 10
 NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#)							
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Soft "D"	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	E								
	Temp(°c):old/new	24.2	24.2/24.0	24.2/24.1	24.3/24.2	24.4/24.4	24.3/24.2	24.6/24.2	24.5
0.21%	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	E								
	Temp(°c):old/new	24.1	24.0/24.3	24.4/24.5	24.6/24.4	24.5/24.2	24.3/24.2	24.7/24.7	24.6
0.4%	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	E								
	Temp(°c):old/new	24.2	24.4/24.2	24.3/24.3	24.2/24.5	24.1/24.1	24.6/24.4	24.8/24.7	24.3
0.835%	A	10	10	9	9	9	10	10	8
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	E								
	Temp(°c):old/new	24.4	24.5/24.7	24.6/24.1	24.3/24.3	24.1/24.5	24.2/24.3	24.5/24.4	25.1
1.65%	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	E								
	Temp(°c):old/new	24.4	24.1/24.1	24.5/24.2	24.2/24.5	24.3/24.2	24.4/24.2	24.4/24.3	25.1
3.3%	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	9	10	10	9
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	E								
	Temp(°c):old/new	24.1	24.3/24.2	24.7/24.4	24.6/24.3	24.4/24.6	24.3/24.3	24.6/24.6	25.3
Test Renewal	Time	1335	1200	1200	1230	1358	1615	1220	1400
	Date	10/3	10/4/17	10/5/17	10/6/17	10/11/17	10/8	10/9/17	10/10/17
	Initials	LM	HM	HM	LM	HM	LTH	LM	LTH
morning feeding	Int/Time		LM1505	LM0715	LM0700	LM0700	LM1010	LM0709	
afternoon feeding	Int/Time	LM1530	LM1530	LM1530	LM1530	LM1530	LM1700	LM1530	

RAMBOLL ENVIRON FATHEAD MINNOW SURVIVAL AND GROWTH 7-DAY CHRONIC TOXICITY TEST
EPA-821-R-02-013 Method 1000.0

TEST LOG NO.: 19022
 JOB NUMBER: 3842894A
 INDUSTRY: Chemours
 EFFLUENT: Outfall 002
 DILUTION WATER: Soft
 NPDES: Yes No
 FOOD BATCH: 5994

PHOTOPERIOD: 16 hr light/8 hr dark
 FEEDING REGIME:
 0.15 mL Artemia @ 2 times/day
 TEST VESSEL CAPACITY: 450 mL
 TEST SOLUTION VOLUME: 250 - 300 mL
 NO. ORGANISMS/TREATMENT: 10
 NO. REPLICATES: 4

DIR CH 10/15

CONC (%)	REP ID	SURVIVAL (#)							
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
River Water "R"	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	9	8	8	8	8
	E								
	Temp(°c):old/new	24.0	24.3/24.0	24.2/24.2	24.1/24.2	24.1/24.2	24.2/24.1	24.0/24.9	25.3
Mod Hd "L"	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	E								
	Temp(°c):old/new	24.4	24.2/24.0	24.3/24.1	24.3/24.2	24.1/24.1	24.4/26.0	24.1/24.0	25.5
	A								
	B								
	C								
	D								
	E								
	Temp(°c):old/new								
	A								
	B								
	C								
	D								
	E								
	Temp(°c):old/new								
	A								
	B								
	C								
	D								
	E								
	Temp(°c):old/new								
Test Renewal	Time								
	Date								
	Initials								
morning feeding	Int/Time								
afternoon feeding	Int/Time								

renewal/food data on previous page

**RAMBOLL ENVIRON FATHEAD MINNOW SURVIVAL AND GROWTH 7-DAY CHRONIC TOXICITY TEST
EPA-821-R-02-013 Method 1000.0**

TEST LOG NO.: 19022 BEGINNING: HRS: 1335 DATE: 10/3/17
 JOB NO.: 3842894A ENDING: HRS: 1400 DATE: 10/10/17
 INDUSTRY: Chemours
 EFFLUENT: Outfall 002 NO. ORGANISMS/TREATMENT: 10
 NPDES: Yes No NO. REPLICATES: 4

PHOTOPERIOD: 16 hr light
 FEEDING REGIME:
 0.15 mL Artemia @ 2 times/day
 TEST VESSEL CAPACITY: 450 mL
 TEST SOLUTION VOLUME: 250 mL

GROWTH RESULTS							
CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Fish Wt (mg) Per Final # of Fish
Soft "D"	A	1	1.08000	1.08336	0.00336	10	0.336
	B	2	1.12187	1.12507	0.00320	10	0.320
	C	3	1.08770	1.09071	0.00301	10	0.301
	D	4	1.11645	1.12022	0.00377	10	0.377
	E						
AVG Control Fish wt. <u>0.3335</u> (using final #)							
0.21%	A	5	1.10865	1.11181	0.00316	10	
	B	6	1.10926	1.11230	0.00354	10	
	C	7	1.09350	1.09665	0.00315	10	
	D	8	1.10679	1.10996	0.00317	10	
	E						
Oven ID: <u>1</u>							
0.41%	A	9	1.09862	1.10151	0.00289	10	
	B	10	1.08454	1.08818	0.00364	10	
	C	11	1.08985	1.09293	0.00308	10	
	D	12	1.10655	1.10985	0.00330	10	
	E						
Tins In: Date: <u>10/10/17</u> Time: <u>1430</u> Temp (°C): <u>103</u> Initials: <u>LTH</u>							
0.835% <u>0.00282</u>	A	13	1.08562	1.08840	0.00278	8	
	B	14	1.09569	1.09851	0.00282	10	
	C	15	1.08892	1.09196	0.00304	10	
	D	16	1.08338	1.08725	0.00387	10	
	E						
Tins Out: Date: <u>10/11/17</u> Time: <u>0705</u> Temp (°C): <u>100</u> Initials: <u>LTH</u>							
1.65%	A	17	1.10348	1.10648	0.00300	10	
	B	18	1.08015	1.08320	0.00305	10	
	C	19	1.016934	1.07316	0.00382	10	
	D	20	1.07629	1.07956	0.00327	10	
	E						
3.3%	A	21	1.09054	1.09412	0.00358	10	
	B	22	1.10919	1.11216	0.00297	9	
	C	23	1.09193	1.09519	0.00326	10	
	D	24	1.07796	1.08162	0.00366	10	
	E						
FINAL WEIGHTS DATE: <u>10/11/17</u> INITIALS: <u>LTH</u>							
River Water "R"	A	25	1.09515	1.09877	0.00362	10	
	B	26	1.08379	1.08692	0.00313	10	
	C	27	1.09789	1.10118	0.00329	10	
	D	28	1.09940	1.10271	0.00331	8	
	E						
Initials / Date: <u>LTH</u>							

①
LTH
10/11/17

**RAMBOLL ENVIRON FATHEAD MINNOW SURVIVAL AND GROWTH 7-DAY CHRONIC TOXICITY TEST
EPA-821-R-02-013 Method 1000.0**

TEST LOG NO.: 19022
 JOB NO.: 3842894A
 INDUSTRY: Chemours
 EFFLUENT: Outfall 002
 NPDES: Yes ___ No X

PHOTOPERIOD: 16 hr light
 FEEDING REGIME:
 0.15 mL Artemia @ 2 times/day
 TEST VESSEL CAPACITY: 450 mL
 TEST SOLUTION VOLUME: 250 mL

GROWTH RESULTS							
CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Fish Wt (mg) Per Final # of Fish
MH	A	29	1.09960	1.10329	0.00369	10	0.369
"L"	B	30	1.03273	1.03556	0.00283	10	0.283
	C	31	1.10185	1.10478	0.00293	10	0.293
	D	32	1.11188	1.11514	0.00326	10	0.326
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	Initials / Date: <u>LM</u>						

AVG Control
Fish wt. 0.3178
(using final #)

Oven ID: ① previous page

Tins In:
Date: _____
Time: _____
Temp (°C): _____
Initials: _____

Tins Out:
Date: _____
Time: _____
Temp (°C): _____
Initials: _____

FINAL WEIGHTS
DATE: _____
INITIALS: _____

TEST LOG NO. 19022 CLIENT: Chemours DATE OF TEST: 10/3/17
 Job Number: 3842894A TEST TYPE(S) PERFORMED: Cd/FM/FM chronic

100% EFFLUENT

Batch #	Sample ID	Sample Date	1st Use Date	Hardness mg/L CaCO3	Alkalinity mg/L	TRC ^① mg/L	NH ₃ N mg/L
20847	DW1011002 RW	10/1-2/17	10/3/17	34.2	55	0.15/ND	ND (<0.1)
20848		10/2/17	10/3/17	28	30	0.02	0.02
20858	DW1011002 RW	10/3-4/17	10/5/17	28.8	45	0.14/ND	0.14
20859		10/4/17	10/5/17	24.8	31	0.66	<0.1(ND)
20866	DW1011002 RW	10/5-6/17	10/7/17	28.8	50	0.11/ND	0.12
20867		10/6/17	10/7/17	20.4	30	0.04	0.10

① measured on Hach, interferences present. TRC strip = ND

CONTROL / DILUTION WATER

Batch #	Sample ID	Sample Date	1st Use Date	Hardness mg/L CaCO3	Alkalinity mg/L	TRC mg/L
6622	Soft	9/24/17	9/26/17	40.8	39	40.02
6628	Soft	9/29/17	10/4/17	41.6	30	40.02
6630	MH	10/3/17	10/5/17	82.4	49	40.02
6632	MH	10/4/17	10/7/17	84.8	43	40.02
6631	Soft	10/4/17	10/6/17	40	27	40.02

CETIS Analytical Report

Report Date: 10 Oct-17 12:59 (p 1 of 6)
 Test Code: 19022terat | 01-8698-0652

Fathead Minnow 7-d Embryo-Larval Survival and Teratogenicity Test **Ramboll Environ**

Analysis ID: 10-5691-8090	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.8.4
Analyzed: 10 Oct-17 12:59	Analysis: Parametric-Control vs Treatments	Official Results: Yes
Batch ID: 12-1279-0302	Test Type: Survival-Teratogenicity (7d)	Analyst:
Start Date: 03 Oct-17	Protocol: EPA/600/4-91/002 (1994)	Diluent: Soft Synthetic Water
Ending Date: 10 Oct-17	Species: Pimephales promelas	Brine: Not Applicable
Duration: 7d 0h	Source: Environmental Consult & Test	Age:
Sample ID: 07-7550-5859	Code: 2E3947C3	Client: Chemours
Sample Date: 02 Oct-17	Material: Industrial Effluent	Project: Special Studies
Receive Date: 03 Oct-17	Source: NA	
Sample Age: 24h	Station:	

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	NA	C > T	NA	NA	3.3	>3.3	NA	30.3	19.9%

Dunnnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		0.21	-1.428	2.407	0.236	6	0.9949	CDF	Non-Significant Effect
		0.4	-0.236	2.407	0.236	6	0.8934	CDF	Non-Significant Effect
		0.835	-1.476	2.407	0.236	6	0.9956	CDF	Non-Significant Effect
		1.65	-1.428	2.407	0.236	6	0.9949	CDF	Non-Significant Effect
		3.3	-1.14	2.407	0.236	6	0.9883	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.08375718	0.01675143	5	0.8727	0.5186	Non-Significant Effect
Error	0.3455194	0.01919552	18			
Total	0.4292766		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.956	15.09	0.4212	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.949	0.884	0.2576	Normal Distribution

7d Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	0.8833	0.7499	1	0.8667	0.8	1	0.04194	9.5%	0.0%
0.21		4	0.9667	0.9054	1	0.9667	0.9333	1	0.01924	3.98%	-9.43%
0.4		4	0.8833	0.6327	1	0.9333	0.6667	1	0.07876	17.83%	0.0%
0.835		4	0.9667	0.8606	1	1	0.8667	1	0.03333	6.9%	-9.43%
1.65		4	0.9667	0.9054	1	0.9667	0.9333	1	0.01924	3.98%	-9.43%
3.3		4	0.95	0.8484	1	0.9667	0.8667	1	0.03191	6.72%	-7.55%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	1.236	1.007	1.464	1.197	1.107	1.441	0.07177	11.62%	0.0%
0.21		4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	-11.32%
0.4		4	1.259	0.8883	1.629	1.319	0.9553	1.441	0.1164	18.49%	-1.87%
0.835		4	1.38	1.186	1.575	1.441	1.197	1.441	0.06108	8.85%	-11.7%
1.65		4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	-11.32%
3.3		4	1.347	1.16	1.535	1.375	1.197	1.441	0.05894	8.75%	-9.04%

CETIS Analytical Report

Report Date: 10 Oct-17 12:59 (p 2 of 6)
 Test Code: 19022terat | 01-8698-0652

Fathead Minnow 7-d Embryo-Larval Survival and Teratogenicity Test **Ramboll Environ**

Analysis ID: 10-5691-8090 Endpoint: 7d Survival Rate CETIS Version: CETISv1.8.4
 Analyzed: 10 Oct-17 12:59 Analysis: Parametric-Control vs Treatments Official Results: Yes

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.8667	1	0.8	0.8667
0.21		1	0.9333	0.9333	1
0.4		1	0.6667	0.8667	1
0.835		0.8667	1	1	1
1.65		0.9333	1	1	0.9333
3.3		1	1	0.9333	0.8667

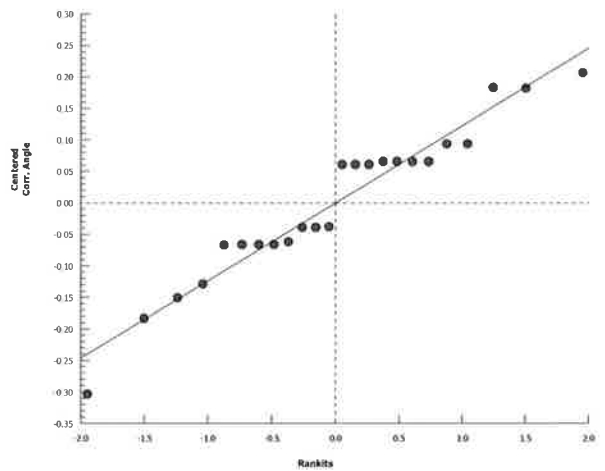
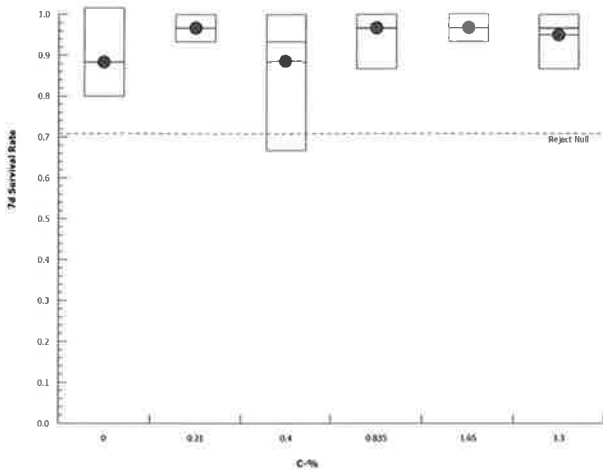
Angular (Corrected) Transformed Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1.197	1.441	1.107	1.197
0.21		1.441	1.31	1.31	1.441
0.4		1.441	0.9553	1.197	1.441
0.835		1.197	1.441	1.441	1.441
1.65		1.31	1.441	1.441	1.31
3.3		1.441	1.441	1.31	1.197

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	13/15	15/15	12/15	13/15
0.21		15/15	14/15	14/15	15/15
0.4		15/15	10/15	13/15	15/15
0.835		13/15	15/15	15/15	15/15
1.65		14/15	15/15	15/15	14/15
3.3		15/15	15/15	14/15	13/15

Graphics



CETIS Analytical Report

Report Date: 17 Oct-17 10:39 (p 1 of 2)
Test Code: 19022terat | 01-8698-0652

Fathead Minnow 7-d Embryo-Larval Survival and Teratogenicity Test

Ramboll Environ

Analysis ID: 11-8181-2303	Endpoint: Hatchout Rate	CETIS Version: CETISv1.8.4
Analyzed: 10 Oct-17 12:59	Analysis: Parametric-Control vs Treatments	Official Results: Yes
Batch ID: 12-1279-0302	Test Type: Survival-Teratogenicity (7d)	Analyst:
Start Date: 03 Oct-17	Protocol: EPA/600/4-91/002 (1994)	Diluent: Soft Synthetic Water
Ending Date: 10 Oct-17	Species: Pimephales promelas	Brine: Not Applicable
Duration: 7d 0h	Source: Environmental Consult & Test	Age:
Sample ID: 07-7550-5859	Code: 2E3947C3	Client: Chemours
Sample Date: 02 Oct-17	Material: Industrial Effluent	Project: Special Studies
Receive Date: 03 Oct-17	Source: NA	
Sample Age: 24h	Station:	

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	NA	C > T	NA	NA	3.3	>3.3	NA	30.3	17.5%

Dunnett Multiple Comparison Test

Control	vs C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water	0.21	-1.952	2.407	0.213	6	0.9990	CDF	Non-Significant Effect
	0.4	-0.2612	2.407	0.213	6	0.8987	CDF	Non-Significant Effect
	0.835	-1.634	2.407	0.213	6	0.9972	CDF	Non-Significant Effect
	1.65	-2.324	2.407	0.213	6	0.9997	CDF	Non-Significant Effect
	3.3	-2.324	2.407	0.213	6	0.9997	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1668037	0.03336074	5	2.128	0.1087	Non-Significant Effect
Error	0.2821468	0.01567482	18			
Total	0.4489506		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	2.394	4.248	0.0785	Equal Variances
Variances	Levene Equality of Variance	5.574	4.248	0.0028	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9143	0.884	0.0438	Normal Distribution

Hatchout Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	0.8833	0.7499	1	0.8667	0.8	1	0.04194	9.5%	0.0%
0.21		4	0.9833	0.9303	1	1	0.9333	1	0.01667	3.39%	-11.32%
0.4		4	0.8833	0.6327	1	0.9333	0.6667	1	0.07876	17.83%	0.0%
0.835		4	0.9667	0.8606	1	1	0.8667	1	0.03333	6.9%	-9.43%
1.65		4	1	1	1	1	1	1	0	0.0%	-13.21%
3.3		4	1	1	1	1	1	1	0	0.0%	-13.21%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	1.236	1.007	1.464	1.197	1.107	1.441	0.07177	11.62%	0.0%
0.21		4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	-13.98%
0.4		4	1.259	0.8883	1.629	1.319	0.9553	1.441	0.1164	18.49%	-1.87%
0.835		4	1.38	1.186	1.575	1.441	1.197	1.441	0.06108	8.85%	-11.7%
1.65		4	1.441	1.441	1.442	1.441	1.441	1.441	0	0.0%	-16.65%
3.3		4	1.441	1.441	1.442	1.441	1.441	1.441	0	0.0%	-16.65%

Fathead Minnow 7-d Embryo-Larval Survival and Teratogenicity Test

Ramboll Environ

Analysis ID: 11-8181-2303 **Endpoint:** Hatchout Rate
Analyzed: 10 Oct-17 12:59 **Analysis:** Parametric-Control vs Treatments

CETIS Version: CETISv1.8.4
Official Results: Yes

Hatchout Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.8667	1	0.8	0.8667
0.21		1	1	0.9333	1
0.4		1	0.6667	0.8667	1
0.835		0.8667	1	1	1
1.65		1	1	1	1
3.3		1	1	1	1

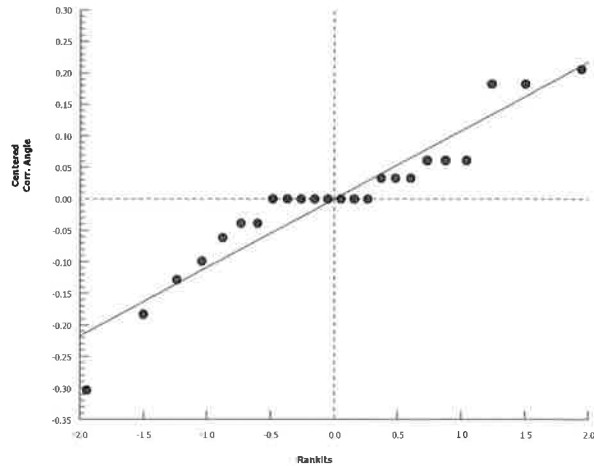
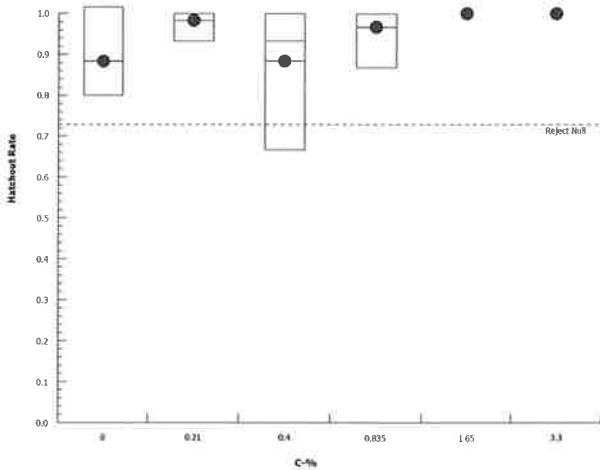
Angular (Corrected) Transformed Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1.197	1.441	1.107	1.197
0.21		1.441	1.441	1.31	1.441
0.4		1.441	0.9553	1.197	1.441
0.835		1.197	1.441	1.441	1.441
1.65		1.441	1.441	1.441	1.441
3.3		1.441	1.441	1.441	1.441

Hatchout Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	13/15	15/15	12/15	13/15
0.21		15/15	15/15	14/15	15/15
0.4		15/15	10/15	13/15	15/15
0.835		13/15	15/15	15/15	15/15
1.65		15/15	15/15	15/15	15/15
3.3		15/15	15/15	15/15	15/15

Graphics



CETIS Analytical Report

Report Date: 10 Oct-17 12:59 (p 5 of 6)
 Test Code: 19022terat | 01-8698-0652

Fathead Minnow 7-d Embryo-Larval Survival and Teratogenicity Test

Ramboll Environ

Analysis ID: 19-0294-4445	Endpoint: Proportion Normal	CETIS Version: CETISv1.8.4
Analyzed: 10 Oct-17 12:58	Analysis: Parametric-Control vs Treatments	Official Results: Yes
Batch ID: 12-1279-0302	Test Type: Survival-Teratogenicity (7d)	Analyst:
Start Date: 03 Oct-17	Protocol: EPA/600/4-91/002 (1994)	Diluent: Soft Synthetic Water
Ending Date: 10 Oct-17	Species: Pimephales promelas	Brine: Not Applicable
Duration: 7d 0h	Source: Environmental Consult & Test	Age:
Sample ID: 07-7550-5859	Code: 2E3947C3	Client: Chemours
Sample Date: 02 Oct-17	Material: Industrial Effluent	Project: Special Studies
Receive Date: 03 Oct-17	Source: NA	
Sample Age: 24h	Station:	

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	NA	C > T	NA	NA	3.3	>3.3	NA	30.3	15.0%

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		0.21	-2.219	2.407	0.187	6	0.9996	CDF	Non-Significant Effect
		0.4	-1.073	2.407	0.187	6	0.9859	CDF	Non-Significant Effect
		0.835	-1.569	2.407	0.187	6	0.9966	CDF	Non-Significant Effect
		1.65	-2.642	2.407	0.187	6	0.9999	CDF	Non-Significant Effect
		3.3	-2.642	2.407	0.187	6	0.9999	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1295938	0.02591875	5	2.137	0.1075	Non-Significant Effect
Error	0.2182726	0.01212626	18			
Total	0.3478664		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1.335	4.248	0.2942	Equal Variances
Variances	Levene Equality of Variance	5.61	4.248	0.0027	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9492	0.884	0.2601	Normal Distribution

Proportion Normal Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	0.8833	0.7499	1	0.8667	0.8	1	0.04194	9.5%	0.0%
0.21		4	0.9833	0.9303	1	1	0.9333	1	0.01667	3.39%	-11.32%
0.4		4	0.9333	0.8108	1	0.9333	0.8667	1	0.03849	8.25%	-5.66%
0.835		4	0.95	0.7909	1	1	0.8	1	0.05	10.53%	-7.55%
1.65		4	1	1	1	1	1	1	0	0.0%	-13.21%
3.3		4	1	1	1	1	1	1	0	0.0%	-13.21%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	1.236	1.007	1.464	1.197	1.107	1.441	0.07177	11.62%	0.0%
0.21		4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	-13.98%
0.4		4	1.319	1.095	1.544	1.319	1.197	1.441	0.07053	10.69%	-6.76%
0.835		4	1.358	1.092	1.624	1.441	1.107	1.441	0.08355	12.31%	-9.89%
1.65		4	1.441	1.441	1.442	1.441	1.441	1.441	0	0.0%	-16.65%
3.3		4	1.441	1.441	1.442	1.441	1.441	1.441	0	0.0%	-16.65%

Fathead Minnow 7-d Embryo-Larval Survival and Teratogenicity Test

Ramboll Environ

Analysis ID: 19-0294-4445 **Endpoint:** Proportion Normal
Analyzed: 10 Oct-17 12:58 **Analysis:** Parametric-Control vs Treatments

CETIS Version: CETISv1.8.4
Official Results: Yes

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.8667	1	0.8	0.8667
0.21		1	1	0.9333	1
0.4		1	0.8667	0.8667	1
0.835		0.8	1	1	1
1.65		1	1	1	1
3.3		1	1	1	1

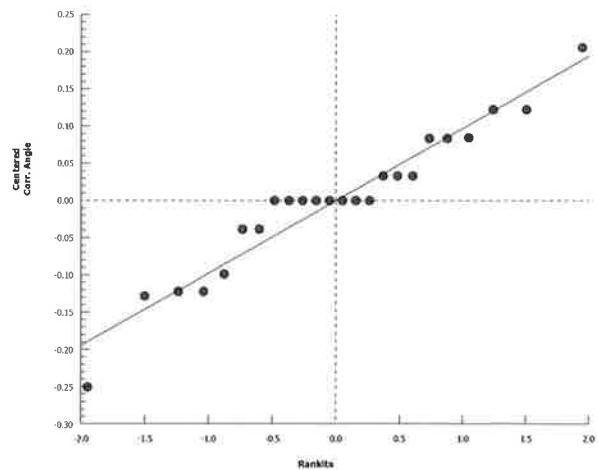
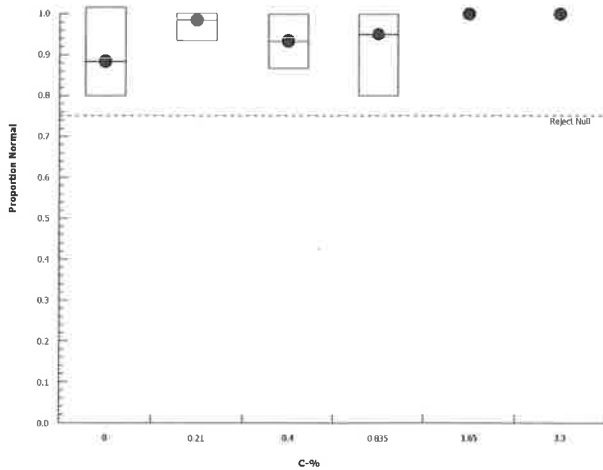
Angular (Corrected) Transformed Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1.197	1.441	1.107	1.197
0.21		1.441	1.441	1.31	1.441
0.4		1.441	1.197	1.197	1.441
0.835		1.107	1.441	1.441	1.441
1.65		1.441	1.441	1.441	1.441
3.3		1.441	1.441	1.441	1.441

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	13/15	15/15	12/15	13/15
0.21		15/15	15/15	14/15	15/15
0.4		15/15	13/15	13/15	15/15
0.835		12/15	15/15	15/15	15/15
1.65		15/15	15/15	15/15	15/15
3.3		15/15	15/15	15/15	15/15

Graphics



RAMBOLL ENVIRON FATHEAD MINNOW SURVIVAL AND TERATOGENICITY CHRONIC TOXICITY TEST
EPA-821-R-02-013 Method 1001.0

TEST LOG NO.: 19022
 JOB NUMBER: 3842894A
 INDUSTRY: Chemours
 EFFLUENT: Oufall 002
 DILUTION WATER: Soft
 NPDES: Yes No x

BEGINNING: HRS: 1230 DATE: 10/31/17
 ENDING: HRS: 1200 DATE: 10/10/17
 TEST DILUTIONS: 0.21, 0.41, 0.835, 1.65, 3.3%
 ORGANISM AGE (date): eggs
 ORGANISM SOURCE: EOT
 SOURCE TEMP @ TEST START: 24.1
 RANDOMIZED BY: LTH

PHOTOPERIOD: 16 hr light/8 hr dark
 FEEDING REGIME: NONE
 TEST VESSEL CAPACITY: 150 mL
 TEST SOLUTION VOLUME: 70 - 100 mL
 NO. ORGANISMS/TREATMENT: 15
 NO. REPLICATES: 4

CONC (%)	REP No	Condition of Embryo/larvae	Day							
			DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
Soft	1	Live/Dead	13/2(died) 13	13	13	13	13	13	13	
		Terta								
	2	Live/Dead	15	15	15	15	15	15	15	
		Terta								
0.21%	3	Live/Dead	14/DF(1)	13/IDE	13	13	13	12/1DE	12	
		Terta								
	4	Live/Dead	13/DF(2)	13	13	13	13	13	13	
		Terta								
Temp(°c):old/new			24.9	24.9/25.0	24.0/24.0	24.0/24.0	24.7/24.0	24.3/24.3	24.1/24.0	24.1
0.4%	1	Live/Dead	15	15	15	15	15	15	15	
		Terta								
	2	Live/Dead	15	14/1DE	14	14	14	14	14	
		Terta								
0.835%	3	Live/Dead	14/IDE	14	14	14	14	14	14	
		Terta								
	4	Live/Dead	15	15	15	15	15	15	15	
		Terta								
Temp(°c):old/new			24.8	24.0/24.7	24.1/24.1	24.0/24.0	24.1/24.1	24.2/24.3	24.1/24.0	24.2
1.65%	1	Live/Dead	15	15	15	15	15	15	15	
		Terta								
	2	Live/Dead	15	15	15	13	10/30	10	10	
		Terta								
1.65%	3	Live/Dead	15	14/1DE	13/1DE	13	13	13	13	
		Terta								
	4	Live/Dead	15	15	15	15	15	15	15	
		Terta								
Temp(°c):old/new			24.9	24.8/24.9	24.2/24.1	24.1/24.2	24.4/24.2	24.0/24.2	24.0/24.0	24.0
1.65%	1	Live/Dead	15	14/1DE	14	13/1	13	13	13	
		Terta								
	2	Live/Dead	15	15	15	15	15	15	15	
		Terta								
1.65%	3	Live/Dead	15	15	15	15	15	15	15	
		Terta								
	4	Live/Dead	15	15	15	15	15	15	15	
		Terta								
Temp(°c):old/new			24.8	24.8/24.9	24.7/24.2	24.2/24.6	24.3/24.3	24.2/24.1	24.1/24.0	24.1
1.65%	1	Live/Dead	14/1DF	14(1hatched)	14	14	14	14	14	
		Terta								
	2	Live/Dead	15	15	15	15	15	15	15	
		Terta								
1.65%	3	Live/Dead	15	15	15	15	15	15	15	
		Terta								
	4	Live/Dead	15	15	15	14/1DF	14	14	14	
		Terta								
Temp(°c):old/new			24.8	24.0/24.7	24.8/24.8	24.1/24.3	24.5/24.2	24.2/24.1	24.1/24.0	24.2
Test Renewal	Time		1230	1200	1145	1135	1325	1716	1153	1200
	Date		10/31/17	10/11/17	10/5/17	10/6/17	6/2/17	10/18/17	10/19/17	10/10/17
	Initials		LTH	LN	LN	LTH	LN	LTH	LTH	LTH

① Start temps

DF - dead hatched fish
 DE - dead embryo
 ⊕ Fungus

RAMBOLL ENVIRON FATHEAD MINNOW SURVIVAL AND GROWTH 7-DAY CHRONIC TOXICITY TEST
EPA-821-R-02-013 Method 1001.0

TEST LOG NO.: 19022
 JOB NUMBER: 3842894A
 INDUSTRY: Chemours
 EFFLUENT: Outfall 002
 DILUTION WATER: Soft
 NPDES: Yes No

BEGINNING: HRS: 1230 DATE: 10/3/17
 ENDING: HRS: 1200 DATE: 10/10/17

PHOTOPERIOD: 16 hr light/8 hr dark
 FEEDING REGIME: NONE
 TEST VESSEL CAPACITY: 150 mL
 TEST SOLUTION VOLUME: 70 - 100 mL
 NO. ORGANISMS/TREATMENT: 15
 NO. REPLICATES: 4

CONC (%)	REP No	Condition of Embryo/ larvae	Day						
			DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
3.3%	1	Live/Dead	15	15	15	15	15	15	15
		Terta							
	2	Live/Dead	15	15	15	15	15	15	15
		Terta							
	3	Live/Dead	15	15	15	15	15	14/1 ⁸	14
		Terta							
	4	Live/Dead	15	15	15	15	15	14/1 ¹⁰ 15 ¹	13/1 ¹⁰ 15 ¹
		Terta							
Temp(°c):old/new		24.8	24.9/24.2	24.5/24.1	24.2/24.2	24.2/24.4	24.2/24.1	24.1/24.0	24.1
River water	1	Live/Dead	14/1 ^{dead?}	14	14	14	14	14	14
		Terta							
	2	Live/Dead	15 eggs (1 ^{dead} 1 ^{deformed} ?)	14	14	14	14	14	14
		Terta							
	3	Live/Dead	15 eggs	15	15	15	15	15	15
		Terta							
	4	Live/Dead	15 eggs	15	15	15	15	15	15
		Terta							
Temp(°c):old/new		24.9	24.6/24.7	24.7/24.2	24.4/24.2	24.5/24.4	24.0/24.2	24.1/24.0	24.0
Mod Hd	1	Live/Dead	15 eggs	Spilled	-	-	-	-	-
		Terta							
	2	Live/Dead	15 eggs	15	15	15	15	15	14/1
		Terta							
	3	Live/Dead	15 eggs	15	15	15	15	15	14/1
		Terta							
	4	Live/Dead	14/1 ^{dead fish}	15 14	13/1	13	13	13	13
		Terta							
Temp(°c):old/new		24.8	24.3/24.1	24.2/24.1	24.3/24.2	24.2/24.2	24.2/24.2	24.1/24.1	24.0
Test Renewal	Time	1230	/	/	/	/	/	/	/
	Date	10/3/17	/	/	/	/	/	/	/
	Initials	LTH	/	/	/	/	/	/	/

At 25°C, hatching may begin on the fourth day. After hatching begins, count the number of dead and live embryos and the number of hatched, dead, live, and deformed larvae, daily. Deformed larvae are those with gross morphological abnormalities such as lack of appendages, lack of fusiform shape (non-distinct mass), lack of mobility, a colored, beating heart in an opaque mass, or other characteristics that preclude survival. Count and remove dead embryos and larvae as previously discussed and record the numbers for all of the test observations (Figure 2). Upon hatching, deformed larvae are counted as dead.

CETIS Analytical Report

Report Date: 10 Oct-17 12:40 (p 1 of 2)
Test Code: 19022cd | 15-1888-1922

Ceriodaphnia 7-d Survival and Reproduction Test

Ramboll Environ

Analysis ID: 03-2792-7781	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.8.4
Analyzed: 10 Oct-17 12:39	Analysis: STP 2x2 Contingency Tables	Official Results: Yes
Batch ID: 15-7686-9491	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 03 Oct-17	Protocol: EPA/821/R-02-013 (2002)	Diluent: Soft Synthetic Water
Ending Date: 10 Oct-17	Species: Ceriodaphnia dubia	Brine: Not Applicable
Duration: 7d 0h	Source: In-House Culture	Age:
Sample ID: 07-7550-5859	Code: 2E3947C3	Client: Chemours
Sample Date: 02 Oct-17	Material: Industrial Effluent	Project: Special Studies
Receive Date: 03 Oct-17	Source: NA	
Sample Age: 24h	Station:	

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed		C > T	NA	NA	3.3	>3.3	NA	30.3

Fisher Exact/Bonferroni-Holm Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Dilution Water		0.21	1	1.0000	Exact	Non-Significant Effect
		0.41	1	1.0000	Exact	Non-Significant Effect
		0.835	1	1.0000	Exact	Non-Significant Effect
		1.65	0.5	1.0000	Exact	Non-Significant Effect
		3.3	0.5	1.0000	Exact	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Dilution Water	10	0	10	1	0	0.0%
0.21		10	0	10	1	0	0.0%
0.41		10	0	10	1	0	0.0%
0.835		10	0	10	1	0	0.0%
1.65		9	1	10	0.9	0.1	10.0%
3.3		9	1	10	0.9	0.1	10.0%

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
0.21		1	1	1	1	1	1	1	1	1	1
0.41		1	1	1	1	1	1	1	1	1	1
0.835		1	1	1	1	1	1	1	1	1	1
1.65		1	1	1	1	0	1	1	1	1	1
3.3		1	1	1	0	1	1	1	1	1	1

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.21		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.41		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.835		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.65		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
3.3		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Report Date: 10 Oct-17 12:40 (p 2 of 2)
Test Code: 19022cd | 15-1888-1922

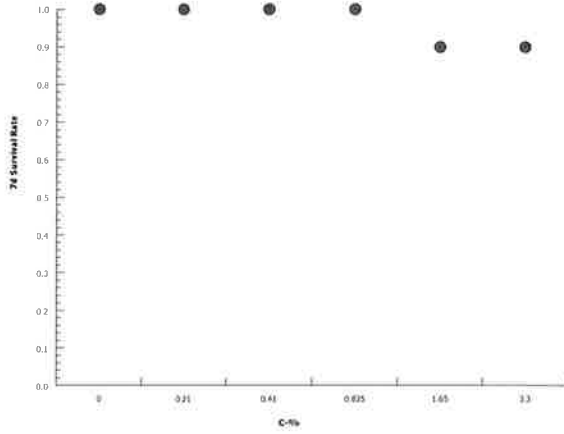
Ceriodaphnia 7-d Survival and Reproduction Test

Ramboll Environ

Analysis ID: 03-2792-7781 Endpoint: 7d Survival Rate
Analyzed: 10 Oct-17 12:39 Analysis: STP 2x2 Contingency Tables

CETIS Version: CETISv1.8.4
Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 10 Oct-17 12:40 (p 1 of 2)
Test Code: 19022cd | 15-1888-1922

Ceriodaphnia 7-d Survival and Reproduction Test **Ramboll Environ**

Analysis ID: 20-0555-2060	Endpoint: Reproduction	CETIS Version: CETISv1.8.4
Analyzed: 10 Oct-17 12:39	Analysis: Nonparametric-Control vs Treatments	Official Results: Yes
Batch ID: 15-7686-9491	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 03 Oct-17	Protocol: EPA/821/R-02-013 (2002)	Diluent: Soft Synthetic Water
Ending Date: 10 Oct-17	Species: Ceriodaphnia dubia	Brine: Not Applicable
Duration: 7d 0h	Source: In-House Culture	Age:
Sample ID: 07-7550-5859	Code: 2E3947C3	Client: Chemours
Sample Date: 02 Oct-17	Material: Industrial Effluent	Project: Special Studies
Receive Date: 03 Oct-17	Source: NA	
Sample Age: 24h	Station:	

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	NA	C > T	NA	NA	3.3	>3.3	NA	30.3	21.4%

Steel Many-One Rank Sum Test

Control	vs C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water	0.21	94.5	75	3	18	0.5100	Asymp	Non-Significant Effect
	0.41	122	75	3	18	0.9941	Asymp	Non-Significant Effect
	0.835	108	75	4	18	0.8923	Asymp	Non-Significant Effect
	1.65	116.5	75	4	18	0.9780	Asymp	Non-Significant Effect
	3.3	117	75	3	18	0.9803	Asymp	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	22.1	15 - NL	Yes	Passes Acceptability Criteria
PMSD	0.2137	0.13 - 0.47	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	61.35	12.27	5	0.5764	0.7178	Non-Significant Effect
Error	1149.5	21.28704	54			
Total	1210.85		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	17.33	15.09	0.0039	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8638	0.9459	<0.0001	Non-normal Distribution

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	10	22.1	19.35	24.85	22	15	28	1.215	17.39%	0.0%
0.21		10	20.8	18.93	22.67	21	16	24	0.8273	12.58%	5.88%
0.41		10	24.2	22.21	26.19	23	21	29	0.8794	11.49%	-9.5%
0.835		10	22.7	20.7	24.7	22	19	28	0.8825	12.29%	-2.72%
1.65		10	22.6	17.85	27.35	24.5	6	29	2.099	29.37%	-2.26%
3.3		10	22.9	18.02	27.78	23.5	6	30	2.157	29.79%	-3.62%

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	15	19	22	24	19	22	28	25	21	26
0.21		16	20	22	19	18	23	20	23	24	23
0.41		22	27	23	26	29	22	22	21	23	27
0.835		22	28	22	21	23	19	21	21	23	27
1.65		18	25	27	29	6	26	27	22	22	24
3.3		24	20	23	6	25	22	22	27	30	30

Ceriodaphnia 7-d Survival and Reproduction Test

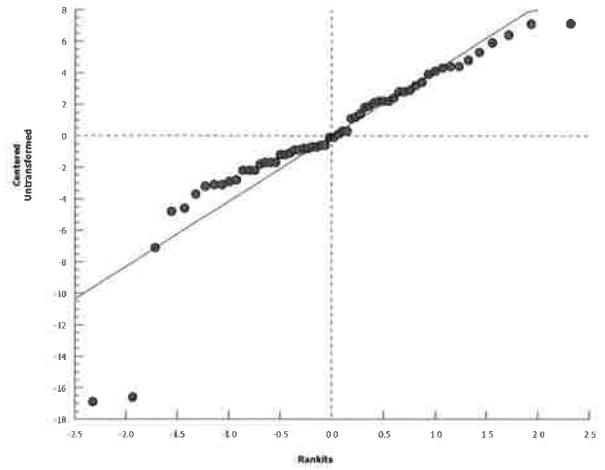
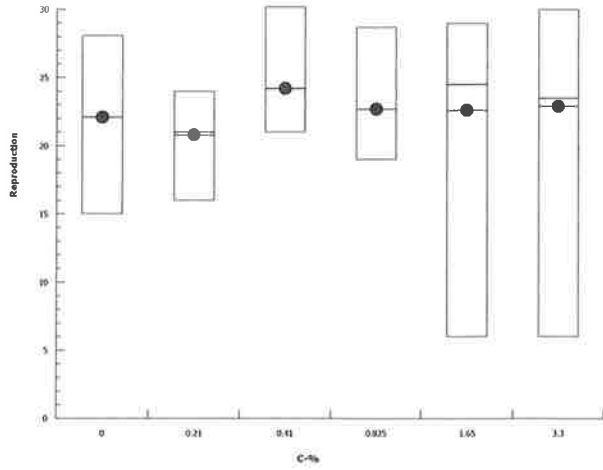
Ramboll Environ

Analysis ID: 20-0555-2060
Analyzed: 10 Oct-17 12:39

Endpoint: Reproduction
Analysis: Nonparametric-Control vs Treatments

CETIS Version: CETISv1.8.4
Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 10 Oct-17 12:40 (p 1 of 1)
 Test Code: 19022cd | 15-1888-1922

Ceriodaphnia 7-d Survival and Reproduction Test			Ramboll Environ		
Analysis ID: 16-3016-6970	Endpoint: Reproduction	CETIS Version: CETISv1.8.4			
Analyzed: 10 Oct-17 12:39	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes			
Batch ID: 15-7686-9491	Test Type: Reproduction-Survival (7d)	Analyst:			
Start Date: 03 Oct-17	Protocol: EPA/821/R-02-013 (2002)	Diluent: Soft Synthetic Water			
Ending Date: 10 Oct-17	Species: Ceriodaphnia dubia	Brine: Not Applicable			
Duration: 7d 0h	Source: In-House Culture	Age:			
Sample ID: 07-7550-5859	Code: 2E3947C3	Client: Chemours			
Sample Date: 02 Oct-17	Material: Industrial Effluent	Project: Special Studies			
Receive Date: 03 Oct-17	Source: NA				
Sample Age: 24h	Station:				

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1316638	1000	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	22.1	15 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC25	>3.3	N/A	N/A	<30.3	NA	NA

Reproduction Summary

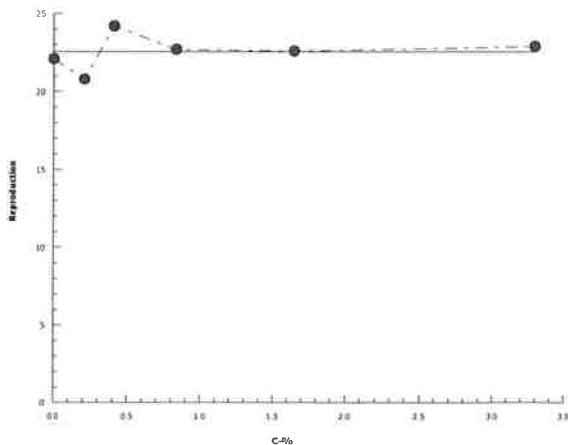
Calculated Variate

C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	22.1	15	28	1.215	3.843	17.39%	0.0%
0.21		10	20.8	16	24	0.8273	2.616	12.58%	5.88%
0.41		10	24.2	21	29	0.8794	2.781	11.49%	-9.5%
0.835		10	22.7	19	28	0.8825	2.791	12.29%	-2.72%
1.65		10	22.6	6	29	2.099	6.637	29.37%	-2.26%
3.3		10	22.9	6	30	2.157	6.822	29.79%	-3.62%

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	15	19	22	24	19	22	28	25	21	26
0.21		16	20	22	19	18	23	20	23	24	23
0.41		22	27	23	26	29	22	22	21	23	27
0.835		22	28	22	21	23	19	21	21	23	27
1.65		18	25	27	29	6	26	27	22	22	24
3.3		24	20	23	6	25	22	22	27	30	30

Graphics



RAMBOLL ENVIRON CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION 3-BROOD CHRONIC TOXICITY TEST

EPA-821-R-02-013 Method 1002.0

TEST LOG NO.: 19022 PHOTOPERIOD: 16 hr light/8 hr dark
 JOB NUMBER.: 3842894A FEEDING REGIME: 0.1 mL YCT / 0.1 mL P. subcapitata per 15 mL
 INDUSTRY: Chemours TEST VESSEL CAPACITY: 30 mL
 EFFLUENT: Outfall 002 TEST SOLUTION VOLUME: 15 mL
 DILUTION WATER: Soft NO. ORGANISMS/REPLICATE: 1
 NPDES (Y/N): Y NO. REPLICATES: 10

ORGANISM SOURCE INFORMATION:

AGE (date): 10/2/17
 TEMP @ TEST START: 24.5
 RANDOMIZED BY: HM
 TEST START:
 HOURS: 1139 DATE: 10/3/17
 TEST END:
 HOURS: 1128 DATE: 10/10/17

SOURCE ID:	AGE (time):
11913	(1200-1530)
11915	(1200-1530)
11916	(1200-1530)
11917	(1200-1530)

SURVIVAL AND REPRODUCTION DATA																
Test Start & Feeding/End Initials/Time	Daily Renewal & Feeding Initials/Time	Date	Control		REPLICATES										Notes	
			Soft	Temp (°C)	13		15		16		17					
Initials/Time	Initials/Time				1	2	3	4	5	6	7	8	9	10		
					Adult	7	15	11	6	12	10	20	3	1	4	
HM 1139		10/3	24.2		Day 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1129	10/4	24.4	24.1	Day 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1029	10/5	24.1	24.0	Day 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1010	10/6	24.3	24.1	Day 3	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1155	10/7	24.2	24.4	Day 4	✓	5	4	6	4	4	6	6	4	4	
	LTH 1340	10/8	24.3	24.4	Day 5	5	✓	✓	8	✓	✓	✓	✓	✓	12	
	LTH 1015	10/9	24.0	24.1	Day 6	✓	6	8	✓	7	8	10	9	7	✓	
LTH 1128		10/10		24.4	Day 7	7	8	10	10	8	10	12	10	10	10	
					Day 8											
			Total			15	19	22	24	19	22	28	25	21	26	221

✓ = Test Organism Alive 0 = Live neonates Miss = Lost or Missing
 D = Test Organism Dead (-0) = Dead neonates M = Male

TEST LOG # 19022

JOB # 3842894A

CLIENT/SAMPLE ID: Chemours

LAB/STATE: RAMBOLL ENVIRON / TN

SURVIVAL AND REPRODUCTION DATA																
Test Start & Feeding / End Initials/ Time	Daily Renewal & Feeding Initials/ Time	Date	Concentration 0.21		Temp (°C)	REPLICATES										Notes
						1	2	3	4	5	6	7	8	9	10	
						Adult										
HM 1139		10/3	24.3			Day 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1129	10/4	24.4	24.6		Day 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1079	10/5	24.4	24.3		Day 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1010	10/6	24.2	24.5		Day 3	3	✓	✓	✓	3	4	3	✓	✓	
	HM 1155	10/7	24.4	24.0		Day 4	✓	5	4	5	✓	✓	✓	4	3	
	LTH 1340	10/8	24.5	24.6		Day 5	5	✓	8	6	6	8	7	✓	✓	
	LTH 1015	10/9	24.0	24.2		Day 6	✓	5	✓	✓	✓	✓	✓	8	9	
LTH 1128		10/10		24.8		Day 7	8	10	10	8	9	11	10	11	12	
						Day 8										
			Total				16	20	22	19	18	23	20	23	24	
															208	

SURVIVAL AND REPRODUCTION DATA																
Test Start & Feeding / End Initials/ Time	Daily Renewal & Feeding Initials/ Time	Date	Concentration 0.41%		Temp (°C)	REPLICATES										Notes
						1	2	3	4	5	6	7	8	9	10	
HM 1139		10/3	24.4			Day 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1129	10/4	24.5	24.2		Day 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1079	10/5	24.3	24.4		Day 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1010	10/6	24.6	24.5		Day 3	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1155	10/7	24.4	24.7		Day 4	4	6	5	6	4	4	5	4	3	
	LTH 1340	10/8	24.1	24.4		Day 5	✓	10	✓	11	✓	✓	✓	✓	✓	
	LTH 1015	10/9	24.0	24.2		Day 6	6	✓	8	✓	13	8	8	7	8	
LTH 1128		10/10		24.7		Day 7	12	11	10	9	12	10	9	10	12	
						Day 8										
			Total				22	27	23	26	29	22	22	21	23	
															242	

✓ = Test Organism Alive 0 = Live neonates Miss = Lost or Missing
 D = Test Organism Dead (-) = Dead neonates M = Male

TEST LOG # 19022

JOB # 3842894A

CLIENT/SAMPLE ID : Chemours

LAB/STATE: RAMBOLLENVIRON / TN

SURVIVAL AND REPRODUCTION DATA																
Test Start & Feeding / End Initials/ Time	Daily Renewal & Feeding Initials/ Time	Date	Concentration 0.835%		REPLICATES										Notes	
				Temp (°C)	1	2	3	4	5	6	7	8	9	10		
					Adult											
HM 1139		10/3	24.2		Day 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1129	10/4	24.0	24.3	Day 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1029	10/5	24.4	24.4	Day 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1016	10/6	24.4	24.3	Day 3	✓	✓	✓	3	4	3	3	4	5	4	
	HM 1155	10/7	24.5	24.2	Day 4	4	0	5	✓	✓	✓	6	✓	✓	✓	
	LTH 1340	10/8	24.3	24.6	Day 5	✓	12	✓	6	6	6	✓	6	8	7	
	LTH 1015	10/9	24.0	24.3	Day 6	8	✓	7	✓	13	✓	✓	✓	✓	✓	
LTH 1128		10/10		24.6	Day 7	10	10	10	12	8	10	12	11	10	16	
					Day 8											
			Total			22	28	22	21	23	19	21	21	23	27	227

SURVIVAL AND REPRODUCTION DATA																	
Test Start & Feeding / End Initials/ Time	Daily Renewal & Feeding Initials/ Time	Date	Concentration 1.65%		REPLICATES										Notes		
				Temp (°C)	1	2	3	4	5	6	7	8	9	10			
HM 1139		10/3	24.2		Day 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	HM 1129	10/4	24.4	24.4	Day 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	HM 1029	10/5	24.7	24.5	Day 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	HM 1016	10/6	24.3	24.2	Day 3	3	✓		✓	✓	✓	✓	3	✓	✓		
	HM 1155	10/7	24.2	24.0	Day 4	✓	5	6	6	0	10	4	3	✓	4	5	
	LTH 1340	10/8	24.3	24.1	Day 5	5	✓	✓	✓		✓	✓	7	✓	✓		
	LTH 1015	10/9	24.0	24.5	Day 6	✓	11	10	11		12	13	✓	8	9		
LTH 1128		10/10		24.9	Day 7	10	9	11	12		10	11	12	10	10		
					Day 8												
			Total			18	25	27	29	0	16	26	27	22	22	24	226

✓ = Test Organism Alive 0 = Live neonates Miss = Lost or Missing
 D = Test Organism Dead (-) = Dead neonates M = Male

U:\Ecotoxlab\Labforms\ToxTestSheets\7DChronicCD.doc

TEST LOG # 19022

JOB # 3842894A

CLIENT/SAMPLE ID : Chemours

LAB/STATE: RAMBOLLENVIRON / TN

SURVIVAL AND REPRODUCTION DATA																
Test Start & Feeding / End Initials/ Time	Daily Renewal & Feeding Initials/ Time	Date	Concentration 3.3%		Temp (°C)	REPLICATES										Notes
						1	2	3	4	5	6	7	8	9	10	
						Adult										
HM 1139		10/3	24.2			Day 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1129	10/4	24.5	24.4		Day 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1029	10/5	24.3	24.7		Day 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1010	10/6	24.0	24.4		Day 3	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1155	10/7	24.2	24.3		Day 4	5	3	4	9/10	4	4	4	5	3	
	LTH 1340	10/8	24.1	24.5		Day 5	✓	6	9		10	✓	✓	✓	12	
	LTH 1015	10/9	24.0	24.5		Day 6	7	✓	✓		✓	8	6	10	11	
LTH 1128		10/10		25.0		Day 7	12	11	10		11	10	12	12	16	
						Day 8										
						Total	24	20	23	D/6	25	22	22	27	30	

SURVIVAL AND REPRODUCTION DATA																
Test Start & Feeding / End Initials/ Time	Daily Renewal & Feeding Initials/ Time	Date	Concentration River water		Temp (°C)	REPLICATES (100% screen)										Notes
						1	2	3	4	5	6	7	8	9	10	
HM 1139		10/3	24.4			Day 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1129	10/4	24.3	24.3		Day 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1029	10/5	24.4	24.0		Day 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1010	10/6	24.3	24.5		Day 3	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1155	10/7	24.7	24.5		Day 4	4	3	4	6	4	4	3	7	6	
	LTH 1340	10/8	24.5	24.0		Day 5	12	✓	8	13	7	10	8	17	10	
	LTH 1015	10/9	24.0	24.0		Day 6	✓	8	✓	✓	✓	✓	✓	✓	✓	
LTH 1128		10/10		24.6		Day 7	12	✓	15	14	11	16	18	19	14	
						Day 8										
						Total	28	11	27	33	22	30	29	43	30	

✓ = Test Organism Alive 0 = Live neonates Miss = Lost or Missing
 D = Test Organism Dead (-0) = Dead neonates M = Male

TEST LOG # 1902

JOB # 3842894A

CLIENT/SAMPLE ID : Chemours

LAB/STATE: RAMBOLLENVIRON / TN

SURVIVAL AND REPRODUCTION DATA																
Test Start & Feeding / End Initials/ Time	Daily Renewal & Feeding Initials/ Time	Date	Concentration MH%			REPLICATES										Notes
			Temp (°C)			1	2	3	4	5	6	7	8	9	10	
					Adult											
HM 1139		10/3	24.2		Day 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1129	10/4	24.5	24.1	Day 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1029	10/5	24.2	24.0	Day 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1060	10/6	24.3	24.4	Day 3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	HM 1155	10/7	24.2	24.1	Day 4	5	6	3	3	✓	5	5	5	5	3	
	WTH 1340	10/8	24.4	24.2	Day 5	✓	7	✓	✓	3	✓	✓	✓	✓	2	
	WTH 1015	10/9	24.0	24.3	Day 6	10	✓	7	8	7	9	10	11	12	8	
WTH 1128		10/10		24.6	Day 7	11	10	12	10	12	10	11	12	10	✓	
					Day 8											
			Total			26	23	23	21	22	24	26	28	27	13	233

SURVIVAL AND REPRODUCTION DATA																
Test Start & Feeding / End Initials/ Time	Daily Renewal & Feeding Initials/ Time	Date	Concentration			REPLICATES										Notes
			Temp (°C)			1	2	3	4	5	6	7	8	9	10	
					Day 0											
					Day 1											
					Day 2											
					Day 3											
					Day 4											
					Day 5											
					Day 6											
					Day 7											
					Day 8											
			Total													

✓ = Test Organism Alive 0 = Live neonates Miss = Lost or Missing
 D = Test Organism Dead (-0) = Dead neonates M = Male

L:/Ecotoxlab/Labforms/ToxTestSheets/7DchronicCD.doc

19022

CLIENT/SAMPLE ID: Chemours
TEST ORGANISM: C. dubia

TEST LOG NO. 3842894A

DATE: 10/13/17

Concentration	D.O. (mg/L)							pH (s.u.)	Conductivity (umhos/cm)
	Start	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6		
Soft	8.6	8.4	8.4	8.0	8.1	8.1	8.3	7.61	161
0.21%	8.4	8.4	8.6	7.8	8.6	8.6	8.5	7.49	153
0.41%	8.3	8.5	8.4	7.9	8.5	8.6	8.4	7.48	154
0.835%	8.4	8.2	8.5	7.9	8.4	8.6	8.2	7.48	155
1.65%	8.4	8.4	8.4	7.9	8.5	8.6	8.2	7.49	163
3.3%	8.5	8.4	8.4	7.8	8.5	8.5	8.1	7.49	171
River Water	8.5	8.4	8.4	7.9	8.5	8.5	8.1	7.62	217
MH	8.5	8.3	8.5	7.9	8.7	8.5	8.3	7.61	243
Concentration	Start	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
Soft	7.65	7.40	7.50	7.51	7.41	7.39	7.50	7.60	170
0.21%	7.22	7.50	7.52	7.36	7.49	7.36	7.44	7.55	153
0.41%	7.27	7.52	7.52	7.36	7.40	7.36	7.42	7.48	153
0.835%	7.31	7.52	7.52	7.37	7.44	7.38	7.42	7.53	154
1.65%	7.33	7.52	7.50	7.37	7.44	7.40	7.42	7.52	155
3.3%	7.38	7.51	7.50	7.40	7.44	7.42	7.45	7.53	163
River Water	7.06	7.06	7.50	7.40	7.40	7.16	7.45	7.53	171
MH	7.68	7.40	7.50	7.59	7.72	7.68	7.65	7.65	217
Concentration	Start	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
Soft	161	160	149	142	154	166	167	170	161
0.21%	153	157	149	158	153	156	167	168	149
0.41%	153	156	141	158	153	147	164	164	148
0.835%	154	154	141	154	142	147	164	163	144
1.65%	155	153	141	154	144	150	167	166	150
3.3%	157	150	148	164	150	155	171	171	154
River Water	217	218	193	189	190	222	214	215	196
MH	243	240	238	220	228	242	243	242	221
Params Int/Time:	17H 10:50	17H 10:33	17H 10:15	17H 09:53	17H 09:35	17H 09:17	17H 09:00	17H 08:43	
Dilutions Int/Time:	17H 10:55	17H 10:35	17H 09:15	17H 08:57	17H 08:39	17H 08:21	17H 08:04	17H 07:46	
Control Water Batch:	W0017002A	W0017002A	W0017002A	W0017002A	W0017002A	W0017002A	W0017002A	W0017002A	
Food Batch	W0017002A	W0017002A	W0017002A	W0017002A	W0017002A	W0017002A	W0017002A	W0017002A	

**ATTACHMENT 2
CHAIN-OF-CUSTODY DOCUMENTATION AND
REFERENCE TOXICANT DATA**

Sample Receipt Checklist:

Client: Chumbers

Date/Time received 10/21/17 0810 by HM

- | | | |
|---|--------------------------------------|-------------------------------------|
| 1. Cooler sealed and intact upon arrival? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| 2. Custody seals present? | <input checked="" type="radio"/> Yes | <input checked="" type="radio"/> No |
| 3. Samples received below 6 degrees Celsius? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| 4. Was ice present? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| 5. Is the COC filled out correctly including the sample date/time and signed? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| 6. Was the sample received within 36 hours of collection? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| 7. Did the sample(s) arrive in good condition? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| 8. Was pH and DO measured and in range? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| 9. Was residual chlorine present? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| ➤ 1.0 mg/L? (did dechlor occur) | <input checked="" type="radio"/> Yes | <input checked="" type="radio"/> No |

Comments:

Batch #	Sample ID	Temp (C°)	pH (s.u.)	DO (mg/L)	TRC (mg/L)
2580	002	1.0	7.49	7.9	0.15 ⁺
2580	Re-Intake	1.4	7.07	9.3	0.02

TRC Samp = NO

Sample Receipt Checklist:

Client: Chenoweth

Date/Time received 10/5/17 0830 by HM

- 1. Cooler sealed and intact upon arrival? Yes No
- 2. Custody seals present? Yes No
- 3. Samples received below 6 degrees Celsius? Yes No
- 4. Was ice present? Yes No
- 5. Is the COC filled out correctly including the sample date/time and signed? Yes No
- 6. Was the sample received within 36 hours of collection? Yes No
- 7. Did the sample(s) arrive in good condition? Yes No
- 8. Was pH and DO measured and in range? Yes No
- 9. Was residual chlorine present? Yes No
 - 1.0 mg/L? (did dechlor occur) Yes No

Comments:

Batch #	Sample ID	Temp (C°)	pH (s.u.)	DO (mg/L)	TRC (mg/L)
20858	052	0.8	7.18	8.9	0.14 (no strip)
20859	RwIntake	1.1	7.06 7.06	8.1	0.06
			HM 10/5		

Sample Receipt Checklist:

Client: Chowaus

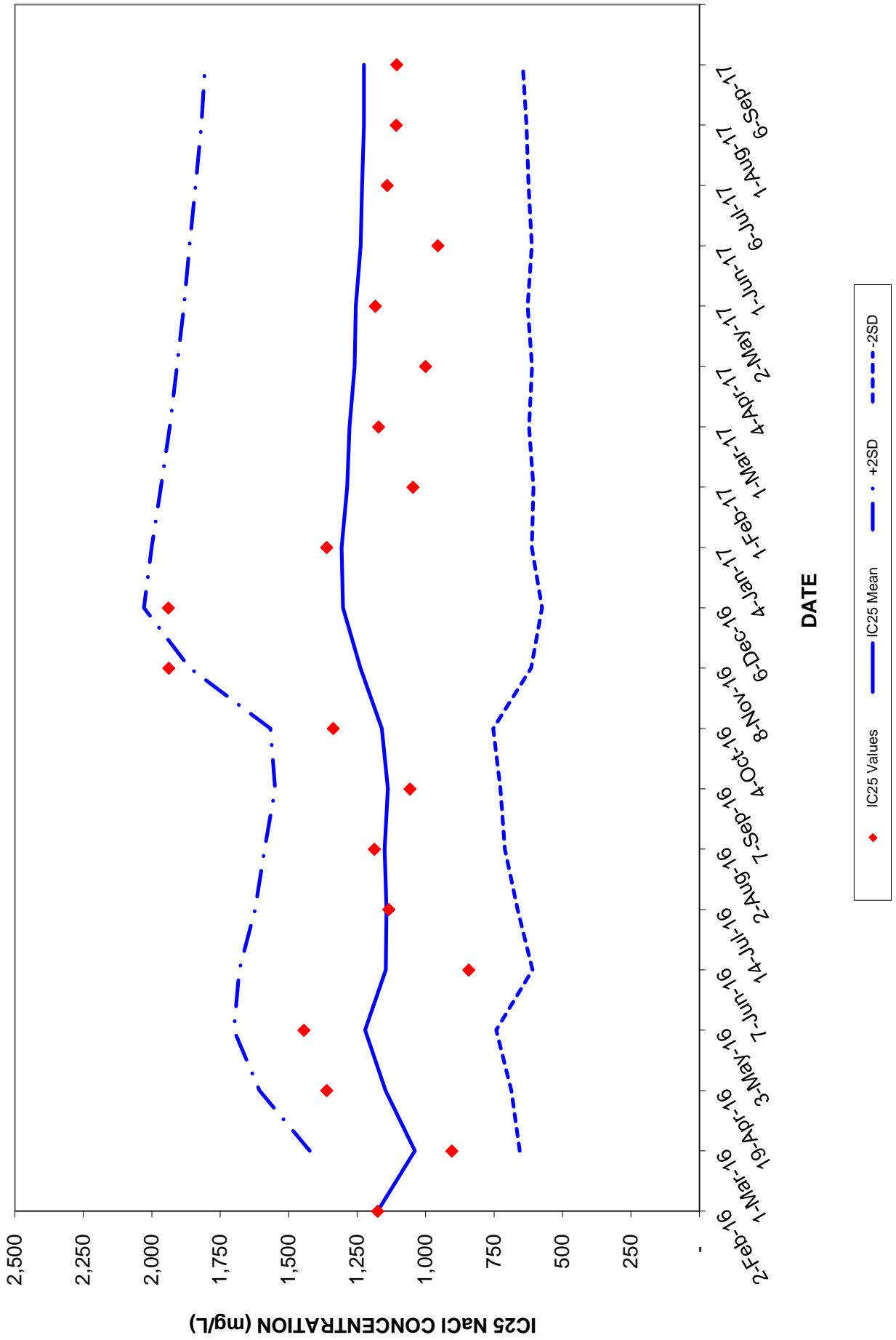
Date/Time received 10/7/17 0830 by HM

- | | | |
|---|--------------------------------------|-------------------------------------|
| 1. Cooler sealed and intact upon arrival? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| 2. Custody seals present? | <input type="radio"/> Yes | <input checked="" type="radio"/> No |
| 3. Samples received below 6 degrees Celsius? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| 4. Was ice present? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| 5. Is the COC filled out correctly including the sample date/time and signed? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| 6. Was the sample received within 36 hours of collection? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| 7. Did the sample(s) arrive in good condition? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| 8. Was pH and DO measured and in range? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| 9. Was residual chlorine present? | <input checked="" type="radio"/> Yes | <input type="radio"/> No |
| ➤ 1.0 mg/L? (did dechlor occur) | <input type="radio"/> Yes | <input checked="" type="radio"/> No |

Comments:

Batch #	Sample ID	Temp (C°)	pH (s.u.)	DO (mg/L)	TRC (mg/L)
20866	052	0.6	7.36	11.8	0.11 (strip=NS)
20867	RW	0.6	7.07	12.1	0.04

**CHRONIC REFERENCE TOXICANT TEST (NaCl) 2016 - 2017
FATHEAD MINNOWS**



Fathead Minnow CHRONIC REFERENCE TOXICANT TESTING-SODIUM CHLORIDE (NaCl) 2016 - 2017

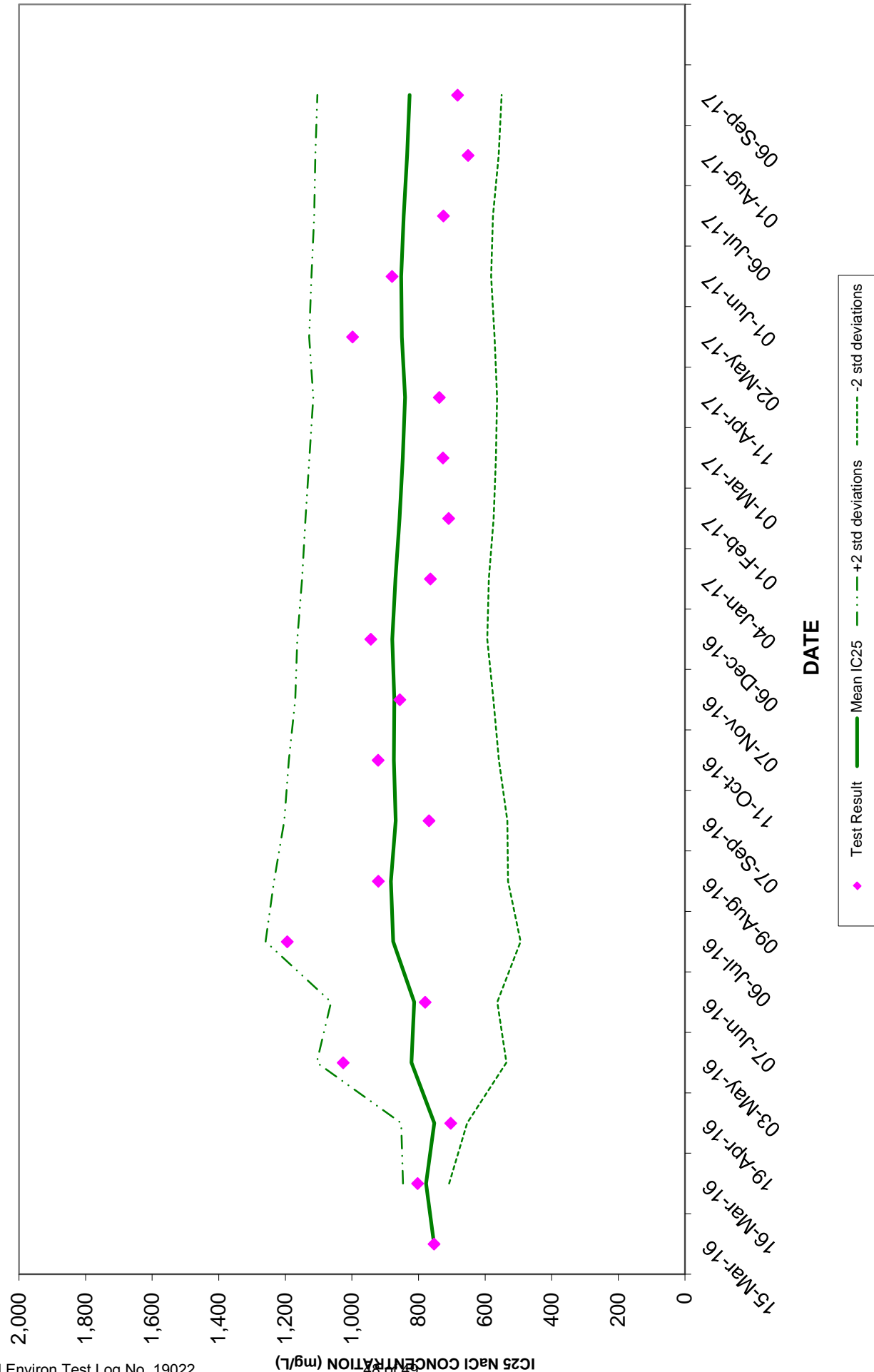
Test Number	Log Number	Test Initiation Date	Control Survival (%) (*)	Control Mean Dry Weight (mg/fish) (*)	SURVIVAL		GROWTH		PMSD (%)	IC25 VALUE (mg/L)	IC25 CUMULATIVE MEAN (mg/L)	IC25 ST. DEV. (mg/L)	IC25 2+ STD. DEV.	IC25 2- STD. DEV.	Coefficient of Variation (%)							
					NOEC (mg/L)	LOEC (mg/L)	NOEC (mg/L)	LOEC (mg/L)														
1	18025	02-Feb-16	100	0.377	750	1,500	750	1,500	26.0	1,175	1,175	192	1,423	656	13							
2	18074	01-Mar-16	100	0.672	750	1,500	750	1,500	22.0	904	1,040	230	1,606	687	16							
3	18185	19-Apr-16	100	0.516	750	1,500	750	1,500	20.6	1,361	1,147	239	1,700	742	17							
4	18205	03-May-16	100	0.399	750	1,500	750	1,500	27.5	1,444	1,221	268	1,681	610	21							
5	18275	07-Jun-16	100	0.541	750	1,500	750	1,500	28.5	842	1,145	240	1,622	664	19							
6	18340	14-Jul-16	100	0.347	750	1,500	750	1,500	22.0	1,134	1,143	219	1,588	711	18							
7	18361	02-Aug-16	100	0.459	750	1,500	750	1,500	23.9	1,187	1,150	206	1,549	727	17							
8	18425	07-Sep-16	95	0.403	750	1,500	750	1,500	22.2	1,057	1,138	203	1,567	753	17							
9	18456	04-Oct-16	100	0.411	1,500	3,000	750	1,500	21.9	1,337	1,160	312	1,861	614	24							
10	18579	08-Nov-16	100	0.514	1,500	3,000	1,500	3,000	23.8	1,937	1,238	364	2,029	575	27							
11	18626	06-Dec-16	100	0.458	1,500	3,000	1,500	3,000	24.3	1,939	1,302	347	2,001	612	25							
12	18675	04-Jan-17	100	0.406	750	1,500	750	1,500	24.0	1,361	1,307	340	1,966	606	25							
13	18711	01-Feb-17	95	0.396	1,500	3,000	750	1,500	18.2	1,046	1,286	328	1,934	622	25							
14	18752	01-Mar-17	97.5	0.471	750	1,500	750	1,500	15.2	1,171	1,278	324	1,908	611	25							
15	18809	04-Apr-17	100	0.413	750	1,500	750	1,500	18.3	1,000	1,260	314	1,883	627	24							
16	18850	02-May-17	97.5	0.564	1,500	3,000	375	750	16.8	1,183	1,255	312	1,862	612	25							
17	18897	01-Jun-17	100	0.351	750	1,500	750	1,500	19.8	955	1,237	304	1,840	624	24							
18	18934	06-Jul-17	97.5	0.358	750	1,500	750	1,500	21.0	1,140	1,232	297	1,819	632	24							
19	18973	01-Aug-17	100	0.364	750	1,500	750	1,500	18.0	1,107	1,225	290	1,806	645	23							
20	18910B	06-Sep-17	95	0.288	750	1,500	750	1,500	15.0	1,105	1,225											
Avg											99	0.435	938	1875	806	1613	21.5	1219	1206	280	1771	649

Notes:

Dilution series - 0.375 g/L - 6.0 g/L
 NOEC - No Observable Effect Concentration (survival or growth)
 LOEC - Lowest Observable Effect Concentration (survival or growth)
 ACCEPTABLE TEST RESULTS - A growth NOEC ranging from 750 mg/L to 3,000 mg/L.
 (*) used ABS fish
 Minimum USEPA CONTROL CRITERIA - 80 percent survival and average dry weight of 0.25 mg (weight based on surviving number of fish).

CHRONIC REFERENCE TOXICANT (NaCl) 2016-2017
***Ceriodaphnia dubia* IC25**

Ramboll Environ Test Log No. 19022



Ceriodaphnia dubia CHRONIC REFERENCE TOXICANT TESTING IC25 - SODIUM CHLORIDE (NaCl) 2016-2017

Test Number	Log Number	Test Initiation Date	Control Survival (%) (*)	3 Brood Production (%) (*)	Control Average Repto (*)	Survival		Reproduction			IC25 VALUE (mg/L)	IC25 CUMULATIVE MEAN (mg/L)	IC25 ST. DEV. (mg/L)	IC25 2+ STD. DEV.	IC25 2- STD. DEV.	Coefficient of Variation (%)
						NOEC (mg/L)	LOEC (mg/L)	NOEC (mg/L)	LOEC (mg/L)	PMSD						
1	18107	15-Mar-16	90	90	32.7	2,000	>2,000	500	1,000	22.6	753	753	35	847	708	0
2	18112	16-Mar-16	100	90	31.9	2,000	>2,000	500	1,000	16.4	802	778	50	852	684	3
3	18178	19-Apr-16	100	100	27.2	1,000	2,000	500	1,000	11.1	703	753	143	1,106	536	5
4	18206	03-May-16	100	100	29.3	1,000	2,000	500	1,000	13.4	1,026	821	125	1,062	563	15
5	18277	07-Jun-16	100	80	25.2	1,000	2,000	500	1,000	19.5	780	813	192	1,259	493	14
6	18328	06-Jul-16	100	100	28.8	2,000	>2,000	1,000	2,000	12.5	1,194	876	176	1,234	531	20
7	18372	09-Aug-16	100	100	29.0	1,000	2,000	500	1,000	16.7	920	883	168	1,203	533	18
8	18424	07-Sep-16	90	90	25.4	1,000	2,000	500	1,000	15.6	768	868	158	1,190	559	18
9	18468	11-Oct-16	100	100	32.5	2,000	>2,000	500	1,000	19.8	921	874	149	1,170	575	17
10	18580	07-Nov-16	100	90	26.4	1,000	2,000	1,000	2,000	24.1	856	872	143	1,164	593	16
11	18632	06-Dec-16	100	80	24.9	2,000	>2,000	500	1,000	23.9	943	879	140	1,149	589	15
12	18674	04-Jan-17	100	80	23.2	2,000	>2,000	500	1,000	34.5	764	869	141	1,139	574	15
13	18712	01-Feb-17	100	90	28.1	1,000	2,000	500	1,000	17.3	709	857	140	1,128	567	16
14	18751	01-Mar-17	100	90	24.1	2,000	>2,000	500	1,000	28.1	726	848	138	1,116	564	16
15	18830	11-Apr-17	100	90	27.4	2,000	>2,000	500	1,000	28.6	737	840	139	1,128	572	16
16	18849	02-May-17	100	80	25.3	2,000	>2,000	1,000	2,000	19.9	998	850	135	1,121	582	15
17	18893	01-Jun-17	90	80	24.6	2,000	>2,000	1,000	2,000	40.4	879	852	134	1,113	576	15
18	18935	06-Jul-17	100	90	25.9	2,000	>2,000	500	1,000	24.1	725	845	138	1,110	559	16
19	18972	01-Aug-17	90	80	28.2	1,000	2,000	500	1,000	33.9	651	834	138	1,104	550	16
20	18909B	06-Sep-17	100	90	26.4	2,000	>2,000	500	1,000	27.2	682	827	136	1,116	573	16
Avg			98	90	27.3	1600	2000	600	1200	22.5	827	840	136	1116	573	

Notes:
 NOEC - No Observable Effect Concentration (survival or reproduction)
 LOEC - Lowest Observable Effect Concentration (survival or reproduction)
 (*) Minimum USEPA CONTROL CRITERIA - 80 percent survival, 80 percent with 3 broods, and average reproduction of 15 neonates/adult.