

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

STORMWATER MONITORING PROGRAM

TOXICITY TESTING REPORT

SAMPLE DATE: August 22, 2018

TEST DATE: August 22, 2018

TEST NUMBER: 1808072C.C

TEST MATERIAL: Station RW-SMB-2

TEST SPECIES: *Ceriodaphnia dubia*

PROTOCOL: EPA/821/R-02-013 (2002)

TEST TYPE: Chronic

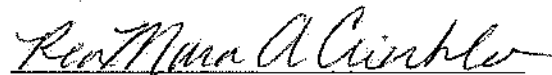
REFERENCE TOXICANT TEST: 1808RT2A.C

RESULT:

Survival
Reproduction

Pass, 0% effect
Fail, 35.4% effect

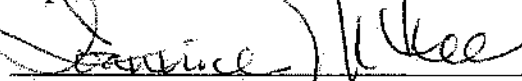
Rea Mara A Crinklaw
Analyst


Signature

Water Biologist III
Title

9/28/18
Date

Ioannice Lee
Supervisor


Signature

Acting Laboratory Manager I
Title

10/2/2018
Date

CETIS Summary Report

 Report Date: 28 Sep-18 16:19 (p 1 of 1)
 Test Code: 1808072C.G | 16-6406-3868

Ceriodaphnia 7-d Survival and Reproduction Test						Hyperion Treatment Plant Laboratory					
Batch ID:	10-8054-5022	Test Type:	Reproduction-Survival (7d)	Analyst:	Rea Mara Crinklaw						
Start Date:	22 Aug-18 16:25	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Mod-Hard Synthetic Water						
Ending Date:	29 Aug-18 12:00	Species:	Ceriodaphnia dubia	Brine:							
Duration:	6d 20h	Source:	In-House Culture	Age:	<8h 8/22/18 (08:58-14:10)						
Sample ID:	13-2032-3448	Code:	3110201	Client:	Watershed Protection Division						
Sample Date:	22 Aug-18 09:40	Material:	Stormwater Monitoring Sample	Project:	MS4						
Receive Date:	22 Aug-18 11:38	Source:	Stormwater (STORMWATER)								
Sample Age:	7h (13.4 °C)	Station:	RW-SMB-2	Batch: 1088; HBN: 59766							
Sample Renewals											
Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C						
1	3110201	22 Aug-18 09:40	22 Aug-18 11:38	23 Aug-18 15:50	13.4						
2	3110201	22 Aug-18 09:40	22 Aug-18 11:38	24 Aug-18 11:10	13.4						
3	3110201	22 Aug-18 09:40	22 Aug-18 11:38	25 Aug-18 12:45	13.4						
4	3110201	22 Aug-18 09:40	22 Aug-18 11:38	26 Aug-18 12:36	13.4						
5	3110201	22 Aug-18 09:40	22 Aug-18 11:38	27 Aug-18 12:26	13.4						
6	3110201	22 Aug-18 09:40	22 Aug-18 11:38	28 Aug-18 10:45	13.4						
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
19-5733-0712	7d Survival Rate	100	>100	N/A	N/A	1	TST-Welch's t Test				
02-9920-6989	Reproduction	<100	100	N/A	N/A	>1	TST-Welch's t Test				
Test Acceptability											
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision					
19-5733-0712	7d Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria					
02-9920-6989	Reproduction	Control Resp	38.7	15 - NL	Yes	Passes Acceptability Criteria					
7d Survival Rate Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%
Reproduction Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	38.7	38.17	39.23	36	41	0.4485	1.418	3.66%	0.0%
100		10	25	22.61	27.39	15	33	2.028	6.412	25.65%	35.4%
7d Survival Rate Detail											
Conc-%	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
100		1	1	1	1	1	1	1	1	1	1
Reproduction Detail											
Conc-%	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	38	38	36	40	38	41	39	38	40	39
100		20	28	30	19	30	26	31	33	15	18

CETIS Analytical Report

Report Date: 28 Sep-18 16:19 (p 1 of 4)
 Test Code: 1808072C.C | 16-6406-3868

Ceriodaphnia 7-d Survival and Reproduction Test						Hyperion Treatment Plant Laboratory					
Analysis ID: 02-9920-6989		Endpoint: Reproduction		CETIS Version: CETISv1.8.1							
Analyzed: 20 Sep-18 15:21		Analysis: Parametric Bioequivalence-Two Sample		Official Results: Yes							
Batch ID: 10-8054-5022		Test Type: Reproduction-Survival (7d)		Analyst: Rea Mara Crinklaw							
Start Date: 22 Aug-18 16:25		Protocol: EPA/821/R-02-013 (2002)		Diluent: Mod-Hard Synthetic Water							
Ending Date: 29 Aug-18 12:00		Species: Ceriodaphnia dubia		Brine:							
Duration: 6d 20h		Source: In-House Culture		Age: <8h 8/22/18 (08:58-14:10)							
Sample ID: 13-2032-3448		Code: 3110201		Client: Watershed Protection Division							
Sample Date: 22 Aug-18 09:40		Material: Stormwater Monitoring Sample		Project: MS4							
Receive Date: 22 Aug-18 11:38		Source: Stormwater (STORMWATER)									
Sample Age: 7h (13.4 °C)		Station: RW-SMB-2									
Data Transform	Zeta	Alt Hyp	MC Trials	TST b	Test Result						
Untransformed	0	C*b > T	Not Run	0.75	Sample fails reproduction endpoint						
TST-Welch's t Test											
Control	vs	Conc-%	Test Stat	Critical	DF	MSD	P-Value	Decision(α:20%)			
Dilution Water		100	-1.958	0.8834	9		0.9591	Significant Effect			
Test Acceptability Criteria											
Attribute	Test Stat	TAC Limits	Overlap	Decision							
Control Resp	38.7	15 - NL	Yes	Passes Acceptability Criteria							
Auxiliary Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)						
Extreme Value	0	2.213	2.708	0.3710	No Outliers Detected						
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	938.45	938.45	1	43.53	<0.0001	Significant Effect					
Error	388.1	21.56111	18								
Total	1326.55	960.0111	19								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	20.44	6.541	0.0001	Unequal Variances						
Distribution	Shapiro-Wilk W Normality	0.9676	0.866	0.7027	Normal Distribution						
Reproduction Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	38.7	38.16	39.24	36	41	0.4485	1.418	3.66%	0.0%
100		10	25	22.56	27.44	15	33	2.028	6.412	25.65%	35.4%

CETIS Analytical Report

Report Date: 28 Sep-18 16:19 (p 2 of 4)

Test Code: 1808072C.C | 16-6406-3868

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 02-9920-6989
Analyzed: 20 Sep-18 15:21

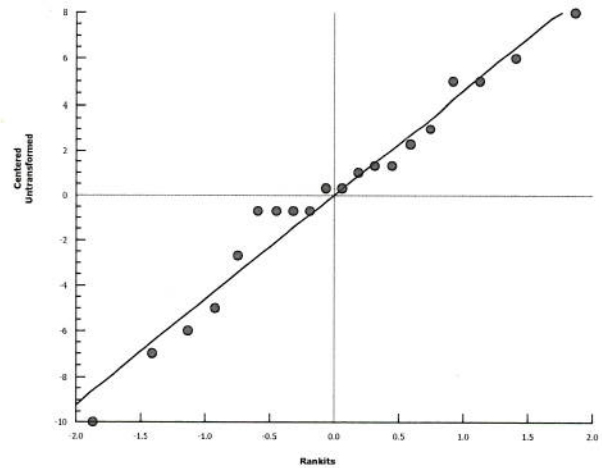
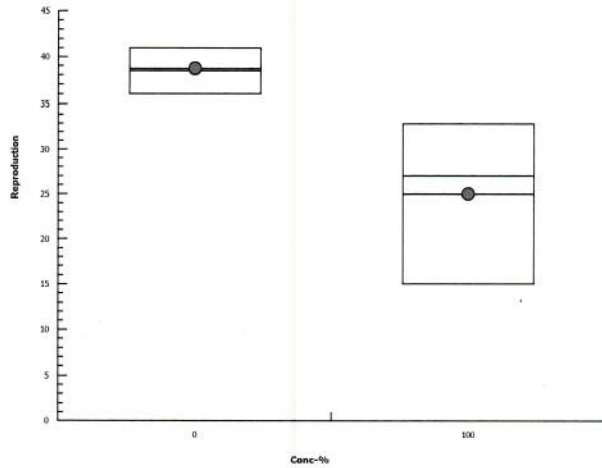
Endpoint: Reproduction
Analysis: Parametric Bioequivalence-Two Sample

CETIS Version: CETISv1.8.1
Official Results: Yes

Reproduction Detail

Conc-%	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	38	38	36	40	38	41	39	38	40	39
100		20	28	30	19	30	26	31	33	15	18

Graphics



CETIS Analytical Report

Report Date: 28 Sep-18 16:19 (p 3 of 4)
Test Code: 1808072C.C | 16-6406-3868

Ceriodaphnia 7-d Survival and Reproduction Test						Hyperion Treatment Plant Laboratory					
Analysis ID: 19-5733-0712		Endpoint: 7d Survival Rate		CETIS Version: CETISv1.8.1							
Analyzed: 20 Sep-18 15:21		Analysis: Parametric Bioequivalence-Two Sample		Official Results: Yes							
Batch ID: 10-8054-5022		Test Type: Reproduction-Survival (7d)		Analyst: Rea Mara Crinklaw							
Start Date: 22 Aug-18 16:25		Protocol: EPA/821/R-02-013 (2002)		Diluent: Mod-Hard Synthetic Water							
Ending Date: 29 Aug-18 12:00		Species: Ceriodaphnia dubia		Brine:							
Duration: 6d 20h		Source: In-House Culture		Age: <8h		8/22/18 (08:58-14:10)					
Sample ID: 13-2032-3448		Code: 3110201		Client: Watershed Protection Division							
Sample Date: 22 Aug-18 09:40		Material: Stormwater Monitoring Sample		Project: MS4							
Receive Date: 22 Aug-18 11:38		Source: Stormwater (STORMWATER)									
Sample Age: 7h (13.4 °C)		Station: RW-SMB-2									
Data Transform	Zeta	Alt Hyp	MC Trials	TST b	Test Result						
Angular (Corrected)	0	C*b > T	Not Run	0.75	Sample passes 7d survival rate endpoint						
TST-Welch's t Test											
Control	vs	Conc-%	Test Stat	Critical	DF	MSD	P-Value	Decision(α:20%)			
Dilution Water		100*	0.2618				<0.2	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	0	1	65540	<0.0001	Significant Effect					
Error	0	0	18								
Total	0	0	19								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Mod Levene Equality of Variance	65540	8.285	<0.0001	Unequal Variances						
7d Survival Rate Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%
Angular (Corrected) Transformed Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1.047	1.047	1.047	1.047	1.047	0	0	0.0%	0.0%
100		10	1.047	1.047	1.047	1.047	1.047	0	0	0.0%	0.0%

CETIS Analytical Report

Report Date: 28 Sep-18 16:19 (p.4 of 4)
Test Code: 1808072C.C | 16-6406-3868

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 19-5733-0712
Analyzed: 20 Sep-18 15:21

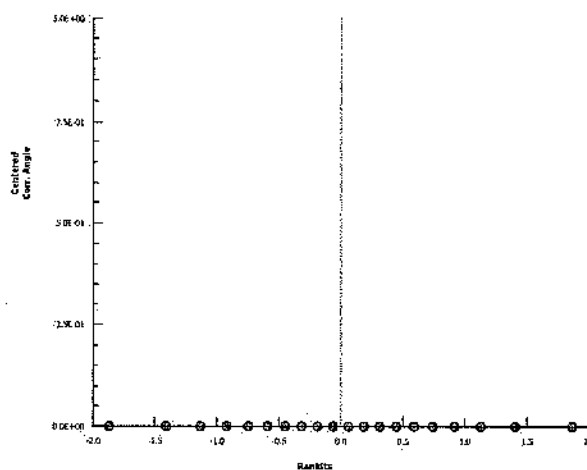
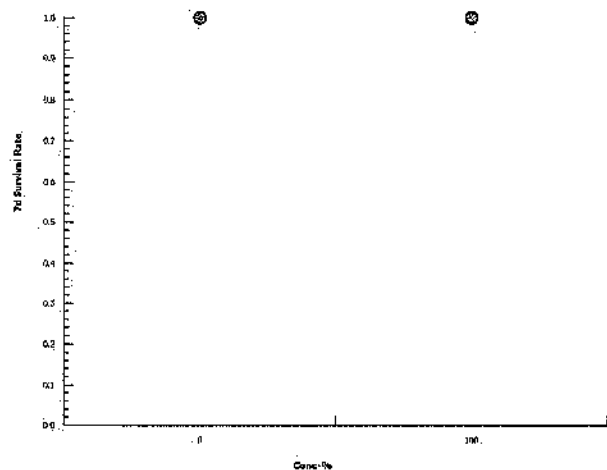
Endpoint: 7d Survival Rate
Analysis: Parametric Bioequivalence-Two Sample

CETIS Version: CETISv1.8.1
Official Results: Yes

7d Survival Rate Detail

Conc-%	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
100		1	1	1	1	1	1	1	1	1	1

Graphics



SMB

CETIS Test Data Worksheet

Report Date:

22 Aug-18 13:26 (p 1 of 1)

Test Code:

16-6406-3868/1808072C.C

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 22 Aug-18 ¹⁶²⁵ Species: Ceriodaphnia dubia
 End Date: 29 Aug-18 ¹²⁰⁰ Protocol: EPA/821/R-02-013 (2002)
 Sample Date: 22 Aug-18 Material: Stormwater Monitoring Sample

Sample Code: 4EB28978
 Sample Source: Stormwater
 Sample Station: RW-SMB-2

Conc-%	Code	Rep	Pos	# Exposed	1d Survival	2d Survival	3d Survival	4d Survival	5d Survival	6d Survival	7d Survival	Neonates	Male
0	D	1		1	0	0	0	5	0	13	20	38	
0	D	2		1	0	0	0	4	0	12	22	38	
0	D	3		1	0	0	0	6	13	0	17	36	
0	D	4		1	0	0	0	7	15	0	18	40	
0	D	5		1	0	0	0	4	14	0	20	38	
0	D	6		1	0	0	0	5	12	0	24	41	
0	D	7		1	0	0	0	6	13	0	20	39	
0	D	8		1	0	0	0	8	0	13	17	38	
0	D	9		1	0	0	0	4	0	15	21	40	
0	D	10		1	0	0	0	6	0	14	19	39	
100		1	39	1	0	0	0	4	8	0	8	20	
100		2	24	1	0	0	0	6	(8	1)	13	28	
100		3	37	1	0	0	0	5	9	0	16	30	
100		4	34	1	0	0	0	0	10	0	9	19	
100		5	32	1	0	0	0	5	0	11	14	30	
100		6	10	1	0	0	0	3	0	10	13	26	
100		7	17	1	0	0	0	5	11	0	15	31	
100		8	12	1	0	0	0	(4	1)	8	20	33	
100		9	8	1	0	0	0	4	0	0	11	15	
100		10	28	1	0	0	0	5	0	0	13	18	

8/22 8/23 8/24 8/25 8/26 8/27 8/28 8/29

Enk
@
1200
Rc

Fed

: 1435 1530
Rc Rc

1041 1234
Rc Rc

0930
(04)

1207
Rc

1035
Rc

Transferred: 1625 1550
Rc Rc

1110 1245
Rc Rc

1236
Rc

1226
Rc

1045
Rc

CETIS Measurement Worksheet

Report Date: 22 Aug-18 13:26 (p 1 of 2)
Test Code: 1808072C.C | 16-6406-3868

Ceriodaphnia 7-d Survival and Reproduction Test						Hyperion Treatment Plant Laboratory	
Start Date: 22 Aug-18		Species: Ceriodaphnia dubia		Sample Code: 4EB28978			
End Date: 29 Aug-18		Protocol: EPA/821/R-02-013 (2002)		Sample Source: Stormwater			
Sample Date: 22 Aug-18		Material: Stormwater Monitoring Sample		Sample Station: RW-SMB-2			

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Reading 1
0	D	AE - not measured 9/28/18 Kc
100		266
Measure Time:		
Instrument ID:		
Analyst:		

} see attached worksheet.

Conductivity-µmhos 8/22 8/23 8/24 8/25 8/26 8/27 8/28

Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	313	334	321	306	317	282	322
100		1507	1531	1509	1521	1505	1316	1497
Measure Time:		1436	1245	1025	1200	0930	1020	1010
Instrument ID:		#2	#2	#2	#2	#2	#1	#4
Analyst:		Kc	RD	Kc	Kc	Kc	Kc	RD

Final Dissolved Oxygen-mg/L 8/23 8/24 8/25 8/26 8/27 8/28 8/29

Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	7.49	7.86	8.15	8.33	7.65	7.87	7.87
100		7.93	7.96	8.14	8.22	8.16	8.10	8.27
Measure Time:		1553	1120	1317	1236	1448	1140	1043
Instrument ID:		#3	#3	#3	#3	#3	#3	#3
Analyst:		Kc	Kc	Kc	Kc	Kc	RD	Kc

Initial Dissolved Oxygen-mg/L 8/23 8/24 8/25 8/26 8/27 8/28

Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	7.63	7.71	8.03	7.89	8.04	8.17	7.85
100		8.84	8.35	9.00	9.28	9.24	8.88	8.92
Measure Time:		1436	1245	1025	1200	0930	1020	1010
Instrument ID:		#3	#3	#3	#3	#3	#3	#3
Analyst:		Kc	RD	Kc	Kc	Kc	Kc	RD

Hardness (CaCO3)-mg/L

Conc-%	Code	Reading 1
0	D	AE - not measured 9/28/18 Kc
100		404
Measure Time:		
Instrument ID:		
Analyst:		

} see attached worksheet.

Final pH 8/23 8/24 8/25 8/26 8/27 8/28 8/29

Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	7.72	7.74	7.94	7.71	7.64	7.58	7.61
100		8.00	7.99	8.10	8.00	8.03	8.14	8.14
Measure Time:		1553	1120	1317	1236	1448	1140	1043
Instrument ID:		#1	#1	#1	#1	#1	#2	#2
Analyst:		Kc	Kc	Kc	Kc	Kc	RD	Kc

CETIS Measurement Worksheet

Report Date: 22 Aug-18 13:26 (p 2 of 2)
 Test Code: 1808072C.C | 16-6406-3868

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 22 Aug-18

Species: Ceriodaphnia dubia

Sample Code: 4EB28978

End Date: 29 Aug-18

Protocol: EPA/821/R-02-013 (2002)

Sample Source: Stormwater

Sample Date: 22 Aug-18

Material: Stormwater Monitoring Sample

Sample Station: RW-SMB-2

Initial pH		8/22	8/23	8/24	8/25	8/26	8/27	8/28
Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	7.85	7.86	7.95	7.86	8.06	7.77	7.67
100		8.15	8.30	8.24	8.16	8.24	8.11	8.24
Measure Time:		1436	1245	1025	1200	0930	1020	1010
Instrument ID:		#1	#1	#1	#1	#1	#1	#2
Analyst:		ke	ke	ke	ke	ke	ke	ke

Final Temperature-°C		8/23	8/24	8/25	8/26	8/27	8/28	8/29
Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	25.0	25.3	25.3	24.9	25.6	25.7	25.9
100		25.3	25.2	25.1	25.0	25.4	24.9	25.7
Measure Time:		1553	1120	1317	1236	1448	1140	1043
Instrument ID:		#1	#1	#1	#1	#1	#2	#2
Analyst:		ke	ke	ke	ke	ke	ke	ke

Initial Temperature-°C		8/22	8/23	8/24	8/25	8/26	8/27	8/28
Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	25.4	25.4	25.2	25.3	25.2	25.4	24.8
100		24.7	25.4	24.8	24.8	24.5	24.9	24.6
Measure Time:		1436	1245	1025	1200	0930	1020	1010
Instrument ID:		#1	#1	#1	#1	#1	#1	#2
Analyst:		ke	ke	ke	ke	ke	ke	ke

Alkalinity

Date/Time: 8/31/18, 1030Project: NPDESAnalyst: RODELINDA ESTIVATitrant: H₂SO₄Factor: 20 per 50 ml

Sample	Sample Amount	Titrant Amount (ml)	Titrant Amount x Factor (mg CaCO ₃ /L)
DW	50ml	5.7 ml	114
[200 ug/L]	50ml	5.7 ml	114
DCT eff 8/20/18	50ml	5.5 ml	110
DCT eff 8/22/18	50ml	5.3 ml	106
DCT eff 8/26/18	50ml	5.4 ml	108
TUJ	50ml	5.6 ml	112
WAS	50ml	6.8 ml	136
SMB	50ml	13.3 ml	266

Hardness

Date/Time: 8/31/18, 1030

Project: NPDES

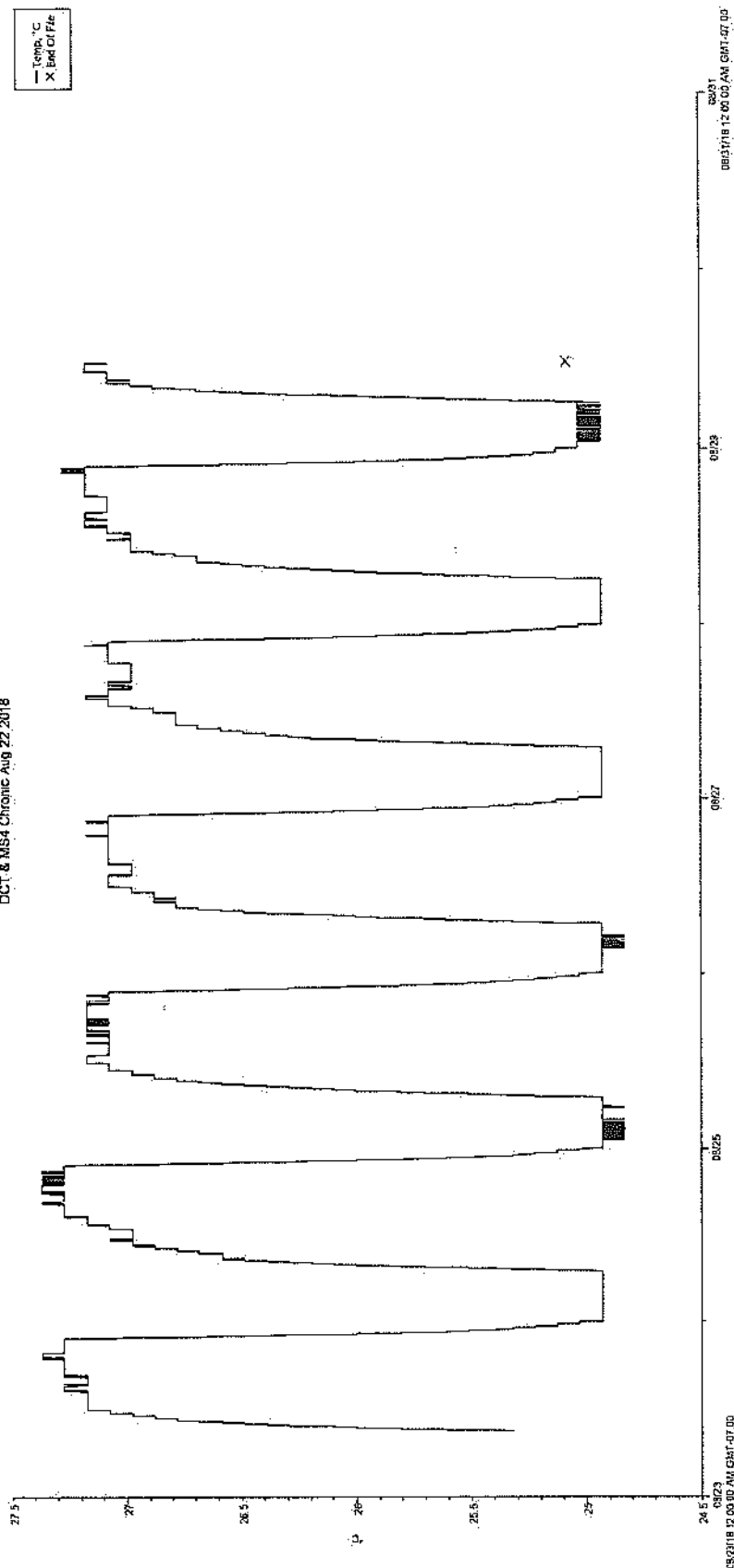
Analyst: ROSELINE ESTIVA

Titrant: EDTA

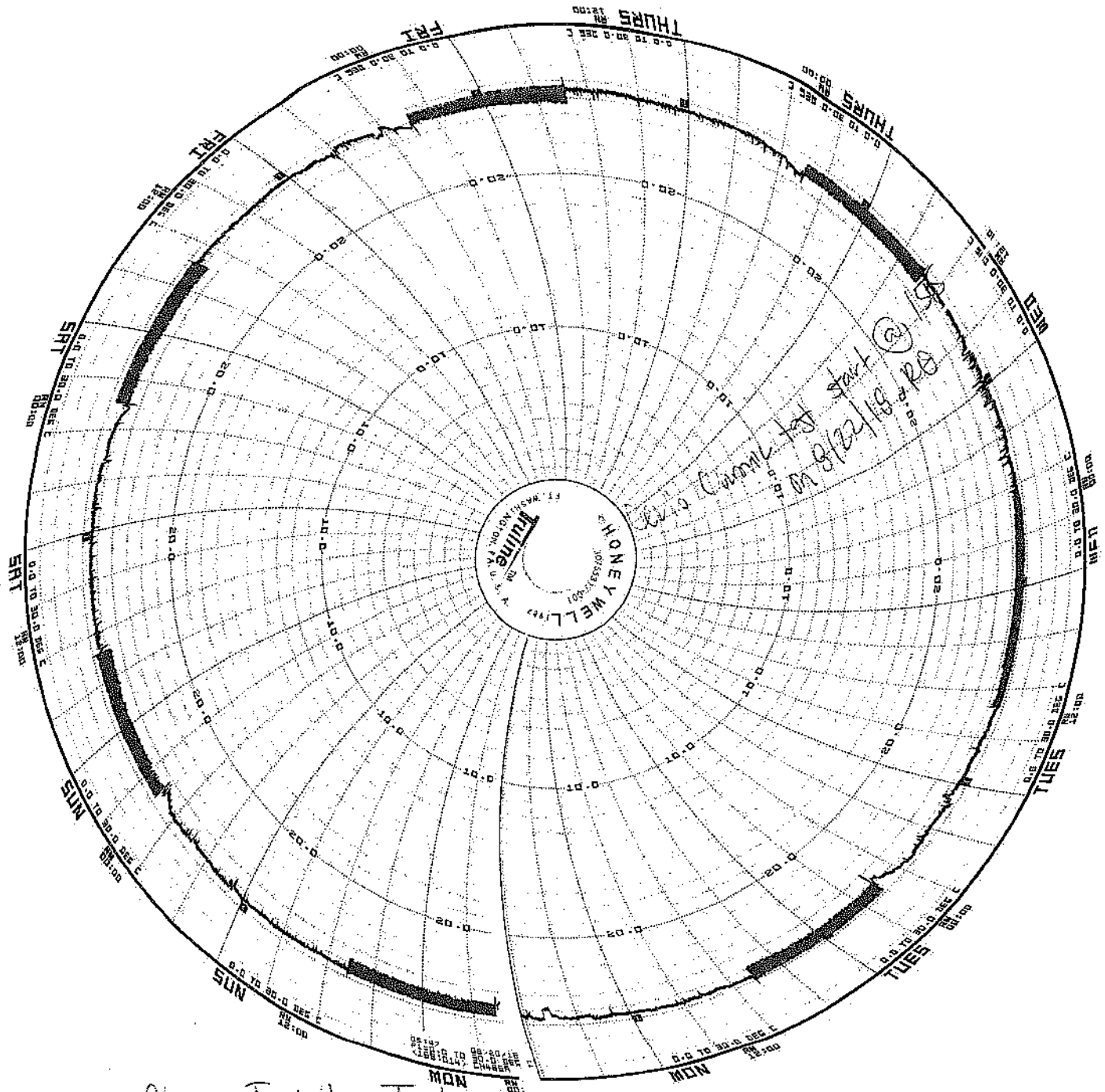
Factor: 20 per 50 ml

Sample	Sample Amount	Titrant Amount (ml)	Titrant Amount x Factor (mg CaCO ₃ /L)
DW	50ml	8.1ml	162
[200ug/L]	50ml	8.3ml	166
DCT eff 8/20/18	50ml	4.5ml	90
DCT eff 8/22/18	50ml	4.8ml	96
DCT eff 8/26/18	50ml	4.7ml	94
TuJ	50ml	6.1ml	122
WAS	50ml	8.9ml	178
SMB	50ml	20.2ml	404

DCT & MS4 Chronic Aug 22, 2018



Ceriodaphnia Chronic Toxicity Test
Test start: Wednesday, August 22, 2018
Test end: Wednesday, August 29, 2018



Ceriodaphnia Chronic Toxicity Test
 Test start : Wednesday, Aug 22, 2018
 Test end : Wednesday, Aug 29, 2018
 RT — 1808RTZA,C
 DCTeff — 180806ZA,C
 MS4 — 180807ZA-C,C

pg 1 of 2

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

REFERENCE TOXICANT

TOXICITY TESTING REPORT

SAMPLE DATE: August 22, 2018

TEST DATE: August 22, 2018

TEST NUMBER: 1808RT2A.C

TEST MATERIAL: Copper ($\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$)

TEST SPECIES: *Ceriodaphnia dubia*

PROTOCOL: EPA/821/R-02-013 (2002)

TEST TYPE: Chronic

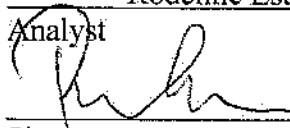
RESULT:

NOEC = 25 $\mu\text{g/L}$ (Survival)

NOEC = 12.5 $\mu\text{g/L}$ (Reproduction)

EC₅₀ = 35.4 $\mu\text{g/L}$ (Survival)


IC₂₅ = 19.4 $\mu\text{g/L}$ (Reproduction)

Rodeline Estiva
Analyst


Signature

Water Biologist II
Title
September 5, 2018

Date

Rea Crinklaw
Supervisor


Signature

Water Biologist III
Title
9/11/18

Date

CETIS Summary Report

Report Date: 12 Sep-18 10:57 (p 1 of 2)
Test Code: 1808RT2A.C | 11-5251-4189

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Batch ID: 20-6254-4092	Test Type: Reproduction-Survival (7d)	Analyst: Rodeline Estiva
Start Date: 22 Aug-18 15:40	Protocol: EPA/821/R-02-013 (2002)	Diluent: Hard Synthetic Water
Ending Date: 29 Aug-18 07:50	Species: Ceriodaphnia dubia	Brine:
Duration: 6d 16h	Source: In-House Culture	Age: <8hr 8/22/18 (0850-1410)
Sample ID: 07-8425-5864	Code: Cu RT	Client: Donald C. Tillman WRP RE 9/12/18
Sample Date: 22 Aug-18 10:10	Material: Copper chloride	Project: NPDES
Receive Date: 22 Aug-18 10:10	Source: Reference Toxicant	
Sample Age: 6h	Station: Reference Toxicant	

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	Cu RT	22 Aug-18 10:10	22 Aug-18 10:10	23 Aug-18 10:40	
2	Cu RT	22 Aug-18 10:10	22 Aug-18 10:10	24 Aug-18 11:13	
3	Cu RT	22 Aug-18 10:10	22 Aug-18 10:10	25 Aug-18 13:08	
4	Cu RT	22 Aug-18 10:10	22 Aug-18 10:10	26 Aug-18 10:26	
5	Cu RT	22 Aug-18 10:10	22 Aug-18 10:10	27 Aug-18 12:38	
6	Cu RT	22 Aug-18 10:10	22 Aug-18 10:10	28 Aug-18 09:50	

Batch Note: Batch 1085 HBN 58010

Sample Note: Ideal concentration-response relationship for reproduction and all or nothing for survival. RE 9/12/2018

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
16-3727-8760	7d Survival Rate	25	50	35.36	N/A		Fisher Exact/Bonferroni-Holm Test
10-1567-4790	Reproduction	12.5	25	17.68	18.5%		Steel Many-One Rank Test
19-2995-5196		12.5	25	17.68	16.2%		Wilcoxon/Bonferroni Adj Test

Point Estimate Summary

Analysis ID	Endpoint	Level	µg/L	95% LCL	95% UCL	TU	Method
02-6103-0961	7d Survival Rate	EC5	25.89	25.89	25.89		Linear Interpolation (ICPIN)
		EC10	26.81	26.81	26.81		
		EC15	27.76	27.76	27.76		
		EC20	28.75	28.75	28.75		
		EC25	29.77	29.77	29.77		
		EC40	33.04	33.04	33.04		
07-5888-1093	Reproduction	EC50	35.41	35.41	35.41		Linear Interpolation (ICPIN)
		IC5	2.603	1.011	13.49		
		IC10	11.98	3.043	15.76		
		IC15	14.45	7.128	20.56		
		IC20	16.75	13.15	25.37		
		IC25	19.4	14.87	26.48		
		IC40	26.71	20.34	30.1		
		IC50	29.68	24.07	32.77		

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
02-6103-0961	7d Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria
16-3727-8760	7d Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria
07-5888-1093	Reproduction	Control Resp	39.4	15 - NL	Yes	Passes Acceptability Criteria
10-1567-4790	Reproduction	Control Resp	39.4	15 - NL	Yes	Passes Acceptability Criteria
19-2995-5196	Reproduction	Control Resp	39.4	15 - NL	Yes	Passes Acceptability Criteria
10-1567-4790	Reproduction	PMSD	0.185	0.13 - 0.47	Yes	Passes Acceptability Criteria
19-2995-5196	Reproduction	PMSD	0.1617	0.13 - 0.47	Yes	Passes Acceptability Criteria

CETIS Summary Report

Report Date: 12 Sep-18 10:57 (p 2 of 2)
Test Code: 1808RT2A.C | 11-5251-4189

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

7d Survival Rate Summary

Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1	1	1	1	1	0	0	0.0%	0.0%
12.5		10	1	1	1	1	1	0	0	0.0%	0.0%
25		9	1	1	1	1	1	0	0	0.0%	0.0%
50		10	0	0	0	0	0	0	0		100.0%
100		10	0	0	0	0	0	0	0		100.0%
200		10	0	0	0	0	0	0	0		100.0%

Reproduction Summary

Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	39.4	37.67	41.13	34	49	1.462	4.624	11.74%	0.0%
12.5		10	35.4	34.09	36.71	27	39	1.108	3.502	9.89%	10.15%
25		9	26.11	22.19	30.03	8	37	3.498	10.49	40.19%	33.73%
50		10	0	0	0	0	0	0	0		100.0%
100		10	0	0	0	0	0	0	0		100.0%
200		10	0	0	0	0	0	0	0		100.0%

7d Survival Rate Detail

Conc-µg/L	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
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1		1	1	1	1	1
50		0	0	0	0	0	0	0	0	0	0
100		0	0	0	0	0	0	0	0	0	0
200		0	0	0	0	0	0	0	0	0	0

Reproduction Detail

Conc-µg/L	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	37	35	41	39	41	39	44	49	35	34
12.5		34	36	36	39	39	27	33	37	36	37
25		31	17	37	31		8	28	37	32	14
50		0	0	0	0	0	0	0	0	0	0
100		0	0	0	0	0	0	0	0	0	0
200		0	0	0	0	0	0	0	0	0	0

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CETIS Summary Report

Report Date: 05 Sep-18 10:23 (p 2 of 2)
Test Code: 1808RT2A.C | 11-5251-4189

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

7d Survival Rate Summary

Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1	1	1	1	1	0	0	0.0%	0.0%
12.5		10	1	1	1	1	1	0	0	0.0%	0.0%
25		9	1	1	1	1	1	0	0	0.0%	0.0%
50		10	0	0	0	0	0	0	0		100.0%
100		10	0	0	0	0	0	0	0		100.0%
200		10	0	0	0	0	0	0	0		100.0%

Reproduction Summary

Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	39.4	37.67	41.13	34	49	1.462	4.624	11.74%	0.0%
12.5		10	35.4	34.09	36.71	27	39	1.108	3.502	9.89%	10.15%
25		9	26.11	22.19	30.03	8	37	3.498	10.49	40.19%	33.73%
50		10	0	0	0	0	0	0	0		100.0%
100		10	0	0	0	0	0	0	0		100.0%
200		10	0	0	0	0	0	0	0		100.0%

7d Survival Rate Detail

Conc-µg/L	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
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1		1	1	1	1	1
50		0	0	0	0	0	0	0	0	0	0
100		0	0	0	0	0	0	0	0	0	0
200		0	0	0	0	0	0	0	0	0	0

Reproduction Detail

Conc-µg/L	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	37	35	41	39	41	39	44	49	35	34
12.5		34	36	36	39	39	27	33	37	36	37
25		31	17	37	31		8	28	37	32	14
50		0	0	0	0	0	0	0	0	0	0
100		0	0	0	0	0	0	0	0	0	0
200		0	0	0	0	0	0	0	0	0	0

CETIS Analytical Report

Report Date: 04 Sep-18 09:48 (p 1 of 4)
Test Code: 1808RT2A.C | 11-5251-4189

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 10-1567-4790	Endpoint: Reproduction	CETIS Version: CETISv1.8.1
Analyzed: 29 Aug-18 8:23	Analysis: Nonparametric-Control vs Treatments	Official Results: Yes
Batch ID: 20-6254-4092	Test Type: Reproduction-Survival (7d)	Analyst: Rodeline Estiva
Start Date: 22 Aug-18 15:15	Protocol: EPA/821/R-02-013 (2002)	Diluent: Hard Synthetic Water
Ending Date: 29 Aug-18 10:15	Species: Ceriodaphnia dubia	Brine:
Duration: 6d 19h	Source: In-House Culture	Age: <8hr 8/22/18 (0855-1410)
Sample ID: 07-8425-5864	Code: 2EBECB78	Client: Donald C. Tillman WRP
Sample Date: 22 Aug-18 10:10	Material: Copper chloride	Project: NPDES
Receive Date: 22 Aug-18 10:10	Source: Reference Toxicant	
Sample Age: 5h	Station: Reference Toxicant	

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run	12.5	25	17.68		18.5%

Steel Many-One Rank Test

Control	vs. Conc-µg/L	Test Stat	Critical	DF	Ties	P-Value	Decision(α:5%)
Dilution Water	12.5	81.5	79	18	3	0.0674	Non-Significant Effect
	25*	62	79	18	1	0.0011	Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	39.4	15 - NL	Yes	Passes Acceptability Criteria
PMSD	0.185	0.13 - 0.47	Yes	Passes Acceptability Criteria

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	0	2.985	2.908	0.0353	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1368.067	684.0333	2	10.28	0.0005	Significant Effect
Error	1797.3	66.56667	27			
Total	3165.367	750.6	29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	16.41	9.21	0.0003	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9481	0.9031	0.1501	Normal Distribution

Reproduction Summary

Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	39.4	37.64	41.16	34	49	1.462	4.624	11.74%	0.0%
12.5		10	35.4	34.07	36.73	27	39	1.108	3.502	9.89%	10.15%
25		10	23.5	18.6	28.4	0	37	4.075	12.89	54.84%	40.36%
50		10	0	0	0	0	0	0	0		100.0%
100		10	0	0	0	0	0	0	0		100.0%
200		10	0	0	0	0	0	0	0		100.0%

CETIS Analytical Report

Report Date: 04 Sep-18 09:48 (p 2 of 4)
Test Code: 1808RT2A.C | 11-5251-4189

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

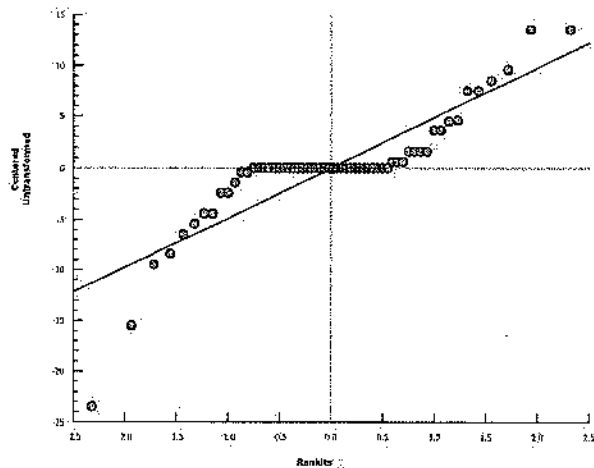
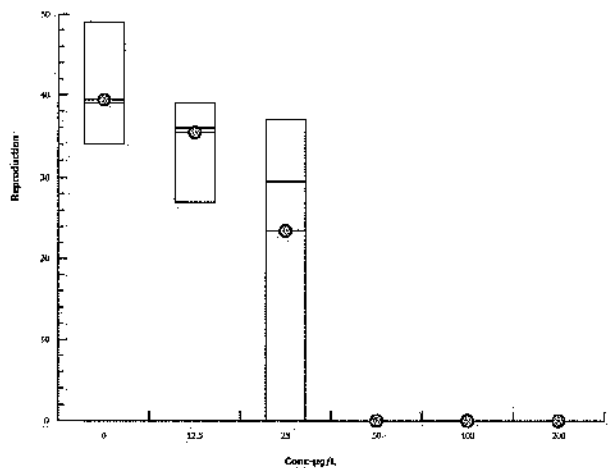
Analysis ID: 10-1567-4790
Analyzed: 29 Aug-18 8:23
Endpoint: Reproduction
Analysis: Nonparametric-Control vs Treatments

CETIS Version: CETISv1.8.1
Official Results: Yes

Reproduction Detail

Conc-µg/L	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	37	35	41	39	41	39	44	49	35	34
12.5		34	36	36	39	39	27	33	37	36	37
25		31	17	37	31	0	8	28	37	32	14
50		0	0	0	0	0	0	0	0	0	0
100		0	0	0	0	0	0	0	0	0	0
200		0	0	0	0	0	0	0	0	0	0

Graphics



CETIS Analytical Report

Report Date: 04 Sep-18 09:48 (p 3 of 4)
Test Code: 1808RT2A.C | 11-5251-4189

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 19-2995-5196	Endpoint: Reproduction	CETIS Version: CETISv1.8.1
Analyzed: 29 Aug-18 8:23	Analysis: Nonparametric-Multiple Comparison	Official Results: Yes
Batch ID: 20-6254-4092	Test Type: Reproduction-Survival (7d)	Analyst: Rodeline Estiva
Start Date: 22 Aug-18 15:15	Protocol: EPA/821/R-02-013 (2002)	Diluent: Hard Synthetic Water
Ending Date: 29 Aug-18 10:15	Species: Ceriodaphnia dubia	Brine:
Duration: 6d 19h	Source: In-House Culture	Age: <8hr 8/22/18 (0858-1410)
Sample ID: 07-8425-5864	Code: 2EBECB78	Client: Donald C. Tillman WRP
Sample Date: 22 Aug-18 10:10	Material: Copper chloride	Project: NPDES
Receive Date: 22 Aug-18 10:10	Source: Reference Toxicant	
Sample Age: 5h	Station: Reference Toxicant	

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	10000 Trials	12.5	25	17.68		16.2%

Wilcoxon/Bonferroni Adj Test

Control	vs	Conc-µg/L	Test Stat	Critical	DF	Ties	P-Value	Decision(α:5%)
Dilution Water		12.5	81.5		18	3	0.0672	Non-Significant Effect
		25*	52		17	1	0.0008	Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	39.4	15 - NL	Yes	Passes Acceptability Criteria
PMSD	0.1617	0.13 - 0.47	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	871.0008	435.5004	2	9.566	0.0008	Significant Effect
Error	1183.689	45.5265	26			
Total	2054.69	481.0269	28			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	10.98	9.21	0.0041	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9512	0.9004	0.1972	Normal Distribution

Reproduction Summary

Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	39.4	37.64	41.16	34	49	1.462	4.624	11.74%	0.0%
12.5		10	35.4	34.07	36.73	27	39	1.108	3.502	9.89%	10.15%
25		9	26.11	22.12	30.1	8	37	3.498	10.49	40.19%	33.73%
50		10	0	0	0	0	0	0	0		100.0%
100		10	0	0	0	0	0	0	0		100.0%
200		10	0	0	0	0	0	0	0		100.0%

CETIS Analytical Report

Report Date: 04 Sep-18 09:48 (p 4 of 4)
Test Code: 1808RT2A.C | 11-5251-4189

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

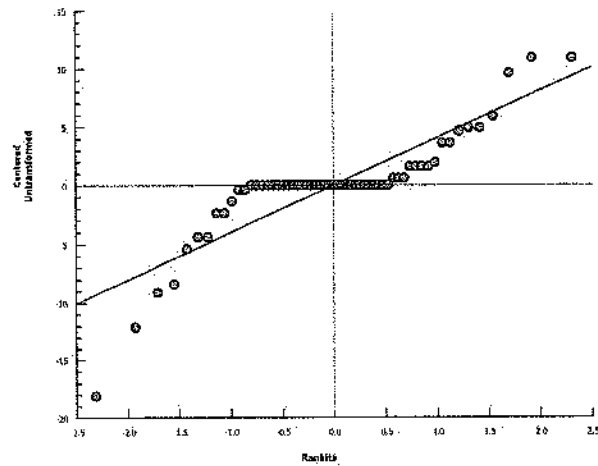
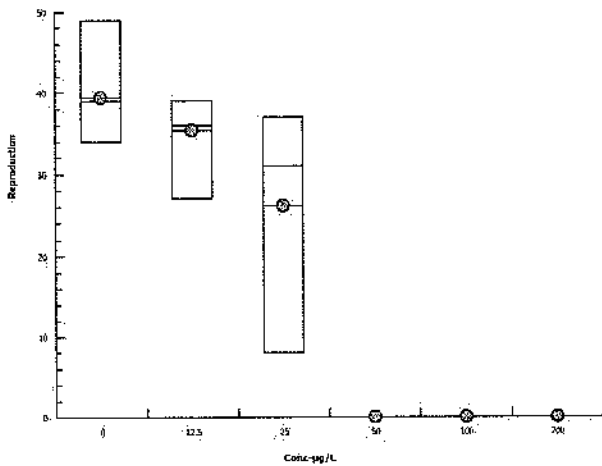
Analysis ID: 19-2995-5196 Endpoint: Reproduction
Analyzed: 29 Aug-18 8:23 Analysis: Nonparametric-Multiple Comparison

CETIS Version: CETISv1.8.1
Official Results: Yes

Reproduction Detail

Conc-µg/L	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	37	35	41	39	41	39	44	49	35	34
12.5		34	36	36	39	39	27	33	37	36	37
25		31	17	37	31	Outlier	8	28	37	32	14
50		0	0	0	0	0	0	0	0	0	0
100		0	0	0	0	0	0	0	0	0	0
200		0	0	0	0	0	0	0	0	0	0

Graphics



Ideal concentration-response relationship — reproduction,
PE 9/5/2018

CETIS Analytical Report

Report Date: 04 Sep-18 09:48 (p 1 of 2)

Test Code: 1808RT2A.C | 11-5251-4189

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 16-3727-8760	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.8.1
Analyzed: 29 Aug-18 8:21	Analysis: STP 2x2 Contingency Tables	Official Results: Yes
Batch ID: 20-6254-4092	Test Type: Reproduction-Survival (7d)	Analyst: Rodeline Estiva
Start Date: 22 Aug-18 15:15	Protocol: EPA/821/R-02-013 (2002)	Diluent: Hard Synthetic Water
Ending Date: 29 Aug-18 10:15	Species: Ceriodaphnia dubia	Brine:
Duration: 6d 19h	Source: In-House Culture	Age: <8hr 8/22/18 (0853-1410)
Sample ID: 07-8425-5864	Code: 2EBECB78	Client: Donald C. Tillman WRP
Sample Date: 22 Aug-18 10:10	Material: Copper chloride	Project: NPDES
Receive Date: 22 Aug-18 10:10	Source: Reference Toxicant	
Sample Age: 5h	Station: Reference Toxicant	

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU
Untransformed		C > T	Not Run	25	50	35.36	

Fisher Exact/Bonferroni-Holm Test

Control	vs	Conc-µg/L	Test Stat	P-Value	Decision(0.05)
Dilution Water		12.5	1	1.0000	Non-Significant Effect
		25	1	1.0000	Non-Significant Effect
		50	5.41E-06	<0.0001	Significant Effect
		100	5.41E-06	<0.0001	Significant Effect
		200	5.41E-06	<0.0001	Significant Effect

Test Acceptability Criteria

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

Data Summary

Conc-µg/L	Control Type	No-Resp	Resp	Total
0	Dilution Water	10	0	10
12.5		10	0	10
25		10	0	10
50		0	10	10
100		0	10	10
200		0	10	10

7d Survival Rate Detail

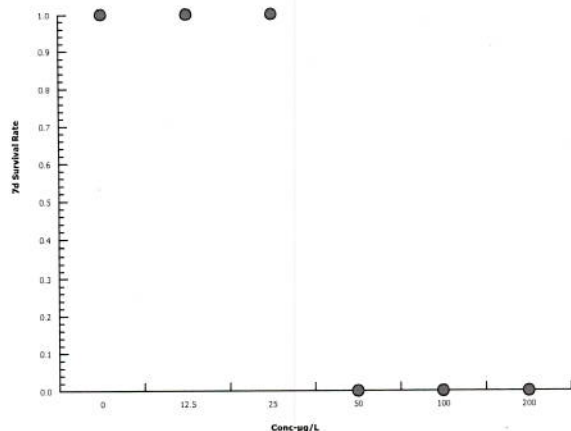
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		0	0	0	0	0	0	0	0	0	0
100		0	0	0	0	0	0	0	0	0	0
200		0	0	0	0	0	0	0	0	0	0

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 16-3727-8760
Analyzed: 29 Aug-18 8:21Endpoint: 7d Survival Rate
Analysis: STP 2x2 Contingency TablesCETIS Version: CETISv1.8.1
Official Results: Yes

Graphics



~~Ideal concentration-response relationship - survival~~

~~RE 9/5/2018~~ RE

All or nothing concentration-response relationship - survival

CETIS Analytical Report

 Report Date: 04 Sep-18 09:48 (p.1 of 4)
 Test Code: 1808RT2A.C | 11-5251-4189

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 02-6103-0961	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.8.1
Analyzed: 29 Aug-18 8:31	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes
Batch ID: 20-6254-4092	Test Type: Reproduction-Survival (7d)	Analyst: Rodeline Estiva
Start Date: 22 Aug-18 15:15	Protocol: EPA/821/R-02-013 (2002)	Diluent: Hard Synthetic Water
Ending Date: 29 Aug-18 10:15	Species: Ceriodaphnia dubia	Brine:
Duration: 6d 19h	Source: In-House Culture	Age: <8hr 8/22/18 (0858-1410)
Sample ID: 07-8425-5864	Code: ZEBECB78	Client: Donald C. Tillman WRP
Sample Date: 22 Aug-18 10:10	Material: Copper chloride	Project: NPDES
Receive Date: 22 Aug-18 10:10	Source: Reference Toxicant	
Sample Age: 5h	Station: Reference Toxicant	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	320383456	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

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

Point Estimates

Level	µg/L	95% LCL	95% UCL
EC5	25.89	25.89	25.89
EC10	26.81	26.81	26.81
EC15	27.76	27.76	27.76
EC20	28.75	28.75	28.75
EC25	29.77	29.77	29.77
EC40	33.04	33.04	33.04
EC50	35.41	35.41	35.41

7d Survival Rate Summary

Calculated Variate(A/B)

Conc-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	0	0	0	0	0		100.0%	0	10
100		10	0	0	0	0	0		100.0%	0	10
200		10	0	0	0	0	0		100.0%	0	10

7d Survival Rate Detail

Conc-µg/L	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
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		0	0	0	0	0	0	0	0	0	0
100		0	0	0	0	0	0	0	0	0	0
200		0	0	0	0	0	0	0	0	0	0

CETIS Analytical Report

Report Date: 04 Sep-18 09:48 (p 2 of 4)
Test Code: 1808RT2A.C | 11-5251-4189

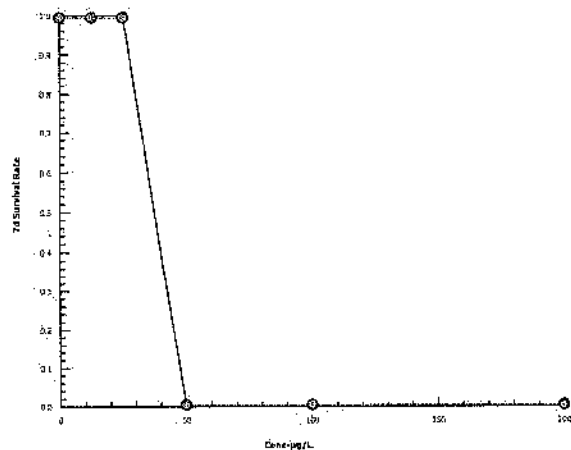
Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 02-6103-0961 Endpoint: 7d Survival Rate
Analyzed: 29 Aug-18 8:31 Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.1
Official Results: Yes

Graphics



CETIS Analytical Report

 Report Date: 04 Sep-18 09:48 (p 3 of 4)
 Test Code: 1808RT2A.C | 11-5251-4189

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 07-5888-1093	Endpoint: Reproduction	CETIS Version: CETISv1.8.1
Analyzed: 29 Aug-18 8:24	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes
Batch ID: 20-6254-4092	Test Type: Reproduction-Survival (7d)	Analyst: Rodeline Estiva
Start Date: 22 Aug-18 15:15	Protocol: EPA/821/R-02-013 (2002)	Diluent: Hard Synthetic Water
Ending Date: 29 Aug-18 10:15	Species: Ceriodaphnia dubia	Brine:
Duration: 6d 19h	Source: In-House Culture	Age: <8hr 8/22/18 (0858-1410)
Sample ID: 07-8425-5864	Code: 2EBECB78	Client: Donald C. Tillman WRP
Sample Date: 22 Aug-18 10:10	Material: Copper chloride	Project: NPDES
Receive Date: 22 Aug-18 10:10	Source: Reference Toxicant	
Sample Age: 5h	Station: Reference Toxicant	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	859822168	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	39.4	15 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	µg/L	95% LCL	95% UCL
IC5	2.603	1.011	13.49
IC10	11.98	3.043	15.76
IC15	14.45	7.128	20.56
IC20	16.75	13.15	25.37
IC25	19.4	14.87	26.48
IC40	26.71	20.34	30.1
IC50	29.68	24.07	32.77

Reproduction Summary

Calculated Variate

Conc-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	39.4	34	49	1.462	4.624	11.74%	0.0%
12.5		10	35.4	27	39	1.108	3.502	9.89%	10.15%
25		9	26.11	8	37	3.498	10.49	40.19%	33.73%
50		10	0	0	0	0	0		100.0%
100		10	0	0	0	0	0		100.0%
200		10	0	0	0	0	0		100.0%

Reproduction Detail

Conc-µg/L	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	37	35	41	39	41	39	44	49	35	34
12.5		34	36	36	39	39	27	33	37	36	37
25		31	17	37	31	8	28	37	32	14	
50		0	0	0	0	0	0	0	0	0	0
100		0	0	0	0	0	0	0	0	0	0
200		0	0	0	0	0	0	0	0	0	0

CETIS Analytical Report

Report Date: 04 Sep-18 09:48 (p 4 of 4)
Test Code: 1808RT2A.C | 11-5251-4189

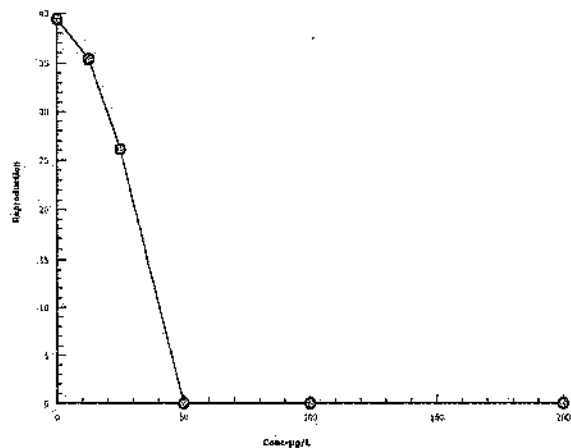
Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 07-5888-1093 Endpoint: Reproduction
Analyzed: 29 Aug-18 8:24 Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.1
Official Results: Yes

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Test Type: Reproduction-Survival (7d)

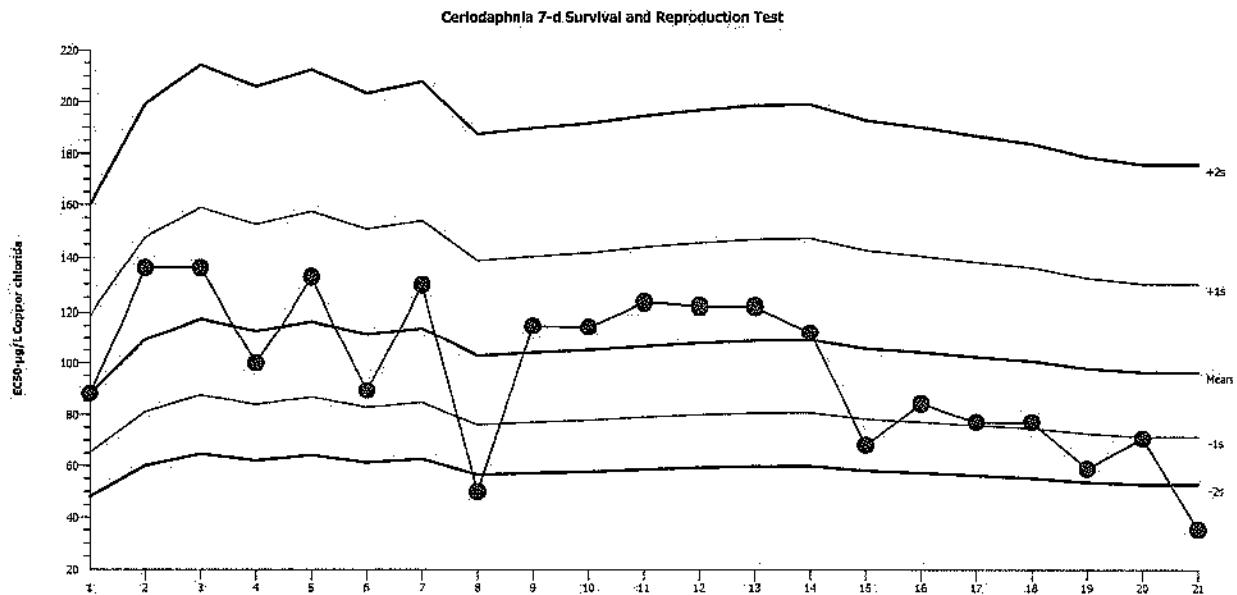
Organism: Ceriodaphnia dubia (Water Flea)

Material: Copper chloride

Protocol: EPA/821/R-02-013 (2002)

Endpoint: 7d Survival Rate

Source: Reference Toxicant-REF



Mean: 96.45

Count: 20

-1s Warning Limit: 71.42

-2s Action Limit: 52.92

Sigma: N/A

CV: 35.00%

+1s Warning Limit: 130.1

+2s Action Limit: 175.6

Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	May	25	87.85	-8.593	-0.3112			16-2272-5797	20-6787-6120
2		Jun	6	136.1	39.69	1.149	(+)		00-1105-6011	07-1957-9297
3			22	136.1	39.69	1.149	(+)		10-7002-0112	10-9615-6318
4		Jul	12	100	3.552	0.1206			13-9476-5989	08-1211-5310
5			27	132.6	36.13	1.061	(+)		00-3533-4104	07-3102-4627
6		Aug	9	89.13	-7.319	-0.2632			05-1646-5416	02-7143-5836
7			23	129.7	33.29	0.9887			18-0928-7994	14-9065-9379
8		Sep	6	50	-46.45	-2.191	(-)	(-)	04-1283-5528	07-2201-0667
9			20	114.9	18.46	0.5838			09-2547-5700	02-6449-6736
10		Oct	18	114.5	18.01	0.571			14-7896-4665	17-5474-2245
11		Nov	15	123.5	27.02	0.8235			09-2671-6353	07-5336-3496
12		Dec	13	121.9	25.5	0.7822			19-3949-3034	10-6518-1710
13	2018	Jan	4	121.9	25.5	0.7822			17-7500-8361	05-5922-1635
14		Feb	7	112.3	15.83	0.5067			04-8492-7543	17-6325-1645
15		Mar	2	68.1	-28.35	-1.161	(-)		11-4862-8707	06-1686-5917
16			15	84.14	-12.31	-0.4552			20-9677-0547	14-4393-4243
17		Apr	19	77.17	-19.28	-0.7435			18-2737-1194	07-4972-9760
18		May	16	77.17	-19.28	-0.7435			05-4955-8978	09-0510-7297
19		Jun	13	58.82	-37.63	-1.649	(-)		16-1570-3305	01-3881-0040
20		Jul	12	70.77	-25.68	-1.032	(-)		05-0138-0333	09-5921-7712
21		Aug	22	35.41	-61.03	-3.341	(-)	(-)	11-5251-4189	02-6103-0961

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Test Type: Reproduction-Survival (7d)

Organism: Ceriodaphnia dubia (Water Flea)

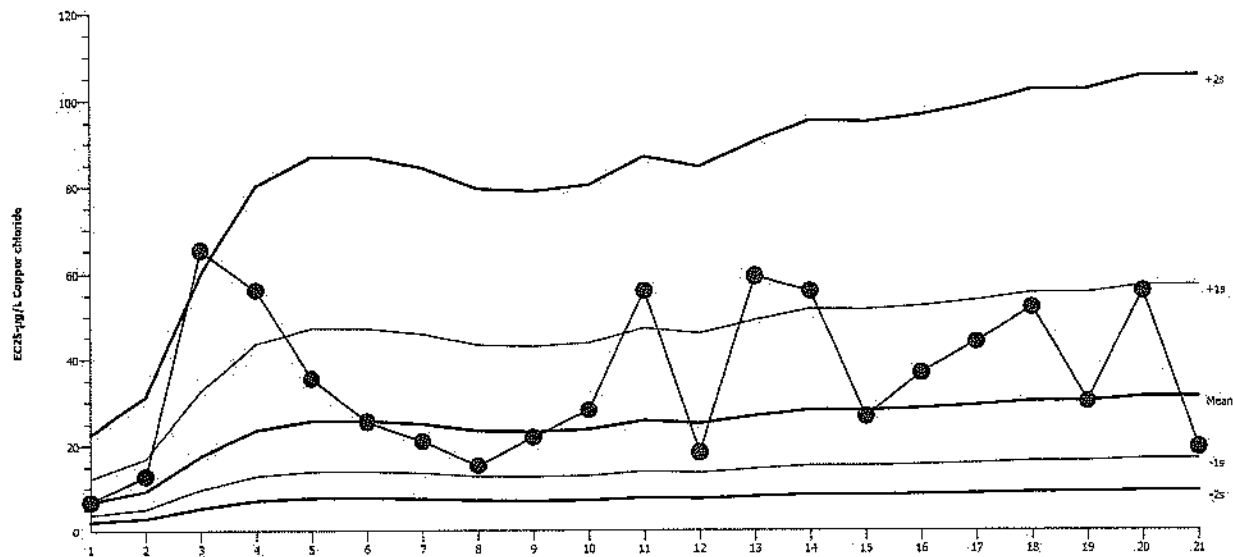
Material: Copper chloride

Protocol: EPA/821/R-02-013 (2002)

Endpoint: Reproduction

Source: Reference Toxicant-REF

Ceriodaphnia 7-d Survival and Reproduction Test



Mean: 31.03

Count: 20

-1s Warning Limit: 16.85

-2s Action Limit: 9.15

Sigma: N/A

CV: 84.10%

+1s Warning Limit: 57.13

+2s Action Limit: 105.2

Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	May	25	6.656	-24.38	-2.522	(-)	(-)	16-2272-5797	04-1379-9830
2		Jun	6	12.78	-18.25	-1.453	(-)		00-1105-6011	17-2178-2673
3			22	65.16	34.13	1.215	(+)		10-7002-0112	00-8698-9715
4		Jul	12	56.24	25.21	0.974			13-9476-5989	15-6562-8470
5			27	35.41	4.383	0.2164			00-3533-4104	15-5816-8081
6		Aug	9	25.45	-5.584	-0.3249			05-1646-5416	12-8828-7274
7			23	20.93	-10.1	-0.6449			18-0928-7994	01-4455-3838
8		Sep	6	15.28	-15.76	-1.161	(-)		04-1283-5528	07-4663-1403
9			20	21.83	-9.202	-0.5762			09-2547-5700	05-2225-6686
10		Oct	18	27.98	-3.053	-0.1696			14-7896-4665	10-2719-4408
11		Nov	15	55.96	24.93	0.966			09-2671-6353	12-1707-6477
12		Dec	13	18.28	-12.75	-0.8666			19-3949-3034	15-1089-9957
13	2018	Jan	4	59.22	28.19	1.058	(+)		17-7500-8361	03-9405-5395
14		Feb	7	55.8	24.77	0.9611			04-8492-7543	19-3721-5481
15		Mar	2	26.44	-4.588	-0.2621			11-4862-8707	08-2696-1620
16			15	36.61	5.582	0.271			20-9677-0547	09-0026-7515
17		Apr	19	43.76	12.73	0.5631			18-2737-1194	03-8342-1801
18		May	16	51.99	20.96	0.8452			05-4955-8978	06-0129-1380
19		Jun	13	29.96	-1.071	-0.05754			16-1570-3305	06-3152-2418
20		Jul	12	55.75	24.72	0.9597			05-0138-0333	18-3627-7518
21		Aug	22	19.4	-11.63	-0.7696			11-5251-4189	07-5888-1093

CETIS Test Data Worksheet



Report Date: 20 Aug-18 09:46 (p 1 of 2)
Test Code: 11-5251-4189/1808RT2A.C

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 22 Aug-18 1540 Species: Ceriodaphnia dubia
End Date: 29 Aug-18 750 Protocol: EPA/821/R-02-013 (2002)
Sample Date: 22 Aug-18 1010 Material: Copper chloride

Sample Code: 2EBECB78
Sample Source: Reference Toxicant
Sample Station: Reference Toxicant

Conc-µg/L	Code	Rep	Pos	# Exposed	1d Survival	2d Survival	3d Survival	4d Survival	5d Survival	6d Survival	7d Survival	Neonates	Male
0	D	1	59	1	0	0	0	6	11	0	20	37	
0	D	2	44	1	0	0	0	5	12	0	18	35	
0	D	3	21	1	0	0	0	7	14	0	20	41	
0	D	4	33	1	0	0	0	7	13	0	19	39	
0	D	5	19	1	0	0	0	6	12	0	23	41	
0	D	6	20	1	0	0	0	6	13	0	20	37	
0	D	7	36	1	0	0	0	7	13	0	24	44	
0	D	8	37	1	0	0	0	8	15	0	26	49	
0	D	9	32	1	0	0	0	5	0	11	29	35	
0	D	10	58	1	0	0	0	6	13	11	19	34	
12.5		1	31	1	0	0	0	5	0	12	17	34	
12.5		2	18	1	0	0	0	5	11	0	20	36	
12.5		3	48	1	0	0	0	5	11	0	20	36	
12.5		4	46	1	0	0	0	5	14	0	20	39	
12.5		5	40	1	0	0	0	5	13	0	24	39	
12.5		6	6	1	0	0	0	4	7	0	16	27	
12.5		7	1	1	0	0	0	6	12	0	15	33	
12.5		8	39	1	0	0	0	4	0	13	20	37	
12.5		9	47	1	0	0	0	4	14	0	18	36	
12.5		10	52	1	0	0	0	6	12	0	19	37	
25		1	60	1	0	0	0	5	12	0	14	31	
25		2	5	1	0	0	0	0	6	11	0	17	
25		3	2	1	0	0	0	6	13	18	0	37	
25		4	55	1	0	0	0	4	10	0	5	31	
25		5	42	1	0	0	0	0	0	0	0	0	
25		6	53	1	0	0	0	0	1	7	0	8	
25		7	13	1	0	0	0	6	12	0	10	28	
25		8	29	1	0	0	0	6	0	12	18	37	
25		9	41	1	0	0	0	4	0	10	18	32	
25		10	12	1	0	0	0	0	4	10	0	14	
50		1	3	1	0	0	0	0	0	0	0	0	
50		2	24	1	0	0	0	0	0	0	0	0	
50		3	25	1	0	0	0	0	0	0	0	0	
50		4	30	1	0	0	0	0	0	0	0	0	
50		5	23	1	0	0	0	0	0	0	0	0	
50		6	4	1	0	0	0	0	0	0	0	0	
50		7	8	1	0	0	0	0	0	0	0	0	
50		8	22	1	0	0	0	0	0	0	0	0	
50		9	56	1	0	0	0	0	0	0	0	0	
50		10	34	1	0	0	0	0	0	0	0	0	
100		1	50	1	0	0	0	0	0	0	0	0	
100		2	27	1	0	0	0	0	0	0	0	0	
100		3	28	1	0	0	0	0	0	0	0	0	
100		4	17	1	0	0	0	0	0	0	0	0	
100		5	38	1	0	0	0	0	0	0	0	0	
100		6	49	1	0	0	0	0	0	0	0	0	
100		7	43	1	0	0	0	0	0	0	0	0	

Outlier per Cetis 8/29/18

RT

CETIS Test Data Worksheet

 Report Date: 20 Aug-18 09:46 (p 2 of 2)
 Test Code: 11-5251-4189/1808RT2A.C

Conc-µg/L	Code	Rep	Pos	# Exposed	1d Survival	2d Survival	3d Survival	4d Survival	5d Survival	6d Survival	7d Survival	Neonates	Male
100		8	14	1	0 X	X	X	X	X	X	X	0	
100		9	9	1	0 X	X	X	X	X	X	X	0	
100		10	54	1	0 X	X	X	X	X	X	X	0	
200		1	15	1	0 X	X	X	X	X	X	X	0	
200		2	11	1	0 X	X	X	X	X	X	X	0	
200		3	57	1	0 X	X	X	X	X	X	X	0	
200		4	45	1	0 X	X	X	X	X	X	X	0	
200		5	35	1	0 X	X	X	X	X	X	X	0	
200		6	7	1	0 X	X	X	X	X	X	X	0	
200		7	51	1	0 X	X	X	X	X	X	X	0	
200		8	26	1	0 X	X	X	X	X	X	X	0	
200		9	16	1	0 X	X	X	X	X	X	X	0	
200		10	10	1	0 X	X	X	X	X	X	X	0	

Date:

 8/22/18 8/23/18 8/24/18 8/25/18 8-26-18 8/27/18 8/28/18 8/29/18
 1540 750

feed:

 1435 1000 1041 1234 0942 1207 930
 RD RD RC RC RC RC RD

transfer:

 1040 1113 1302 1024 1238 950
 RD RC RC RC RC RD

RD

RC

CETIS Measurement Worksheet



Report Date: 20 Aug-18 09:46 (p 1 of 2)
Test Code: 1808RT2A.C | 11-5251-4189

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 22 Aug-18 Species: Ceriodaphnia dubia Sample Code: 2EBECB78
End Date: 29 Aug-18 Protocol: EPA/821/R-02-013 (2002) Sample Source: Reference Toxicant
Sample Date: 22 Aug-18 Material: Copper chloride Sample Station: Reference Toxicant

Alkalinity (CaCO ₃)-mg/L 8/31/18									
Conc-µg/L	Code	Reading 1							
0	D	114							
200		114							
Measure Time:		1030							
Instrument ID:		TITRATE							
Analyst:		RA							

Conductivity-µmhos 8/22 8/23 8/24 8/25 8-26 8/27 8/28									
Conc-µg/L	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	
0	D	614	597	603	602	597	529	585	
12.5		606	600	602	602	597	535	587	
25		605	599	602	596	578	526	575	
50		604	599						
100		604	597						
200		584	571						
Measure Time:		1330	945	1005	1219	0842	1033	900	
Instrument ID:		#2	#2	#2	#2	2	#1	#4	
Analyst:		RA	RA	RA	RA	RA	RA	RA	

Final Dissolved Oxygen-mg/L 8/22 8/24 8/25 8-26 8/27 8/28 8/29									
Conc-µg/L	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	
0	D	7.43	7.88	8.03	8.19	7.89	7.74	7.76	
12.5		7.83	7.98	8.09	8.31	7.97	8.07	8.22	
25		7.90	8.02	8.14	8.26	8.03	8.18	8.31	
50		7.95							
100		8.00							
200		8.07							
Measure Time:		1230	1125	1332	1030	1454	1025	755	
Instrument ID:		#3	#3	#3	3	#3	#3	#3	
Analyst:		RA	RA	RA	RA	RA	RA	RA	

Initial Dissolved Oxygen-mg/L 8/22 8/23 8/24 8/25 8-26 8/27 8/28									
Conc-µg/L	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	
0	D	8.05	7.86	8.02	8.31	8.25	8.22	8.06	
12.5		8.08	8.15	8.15	8.26	8.31	8.25	8.28	
25		8.10	8.20	8.24	8.25	8.31	8.29	8.35	
50		8.12	8.26						
100		8.15	8.24						
200		8.15	8.25						
Measure Time:		1330	945	1005	1219	0842	1033	900	
Instrument ID:		#3	#3	#3	#3	3	#3	#3	
Analyst:		RA	RA	RA	RA	RA	RA	RA	

Hardness (CaCO ₃)-mg/L 8/31/18		
Conc-µg/L	Code	Reading 1
0	D	162
200		166
Measure Time:		1030
Instrument ID:		TITRATE
Analyst:		RA

CETIS Measurement Worksheet

RT

Report Date: 20 Aug-18 09:46 (p 2 of 2)
Test Code: 1808RT2A.C | 11-5251-4189

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 22 Aug-18 Species: Ceriodaphnia dubia Sample Code: 2EBECB78
End Date: 29 Aug-18 Protocol: EPA/821/R-02-013 (2002) Sample Source: Reference Toxicant
Sample Date: 22 Aug-18 Material: Copper chloride Sample Station: Reference Toxicant

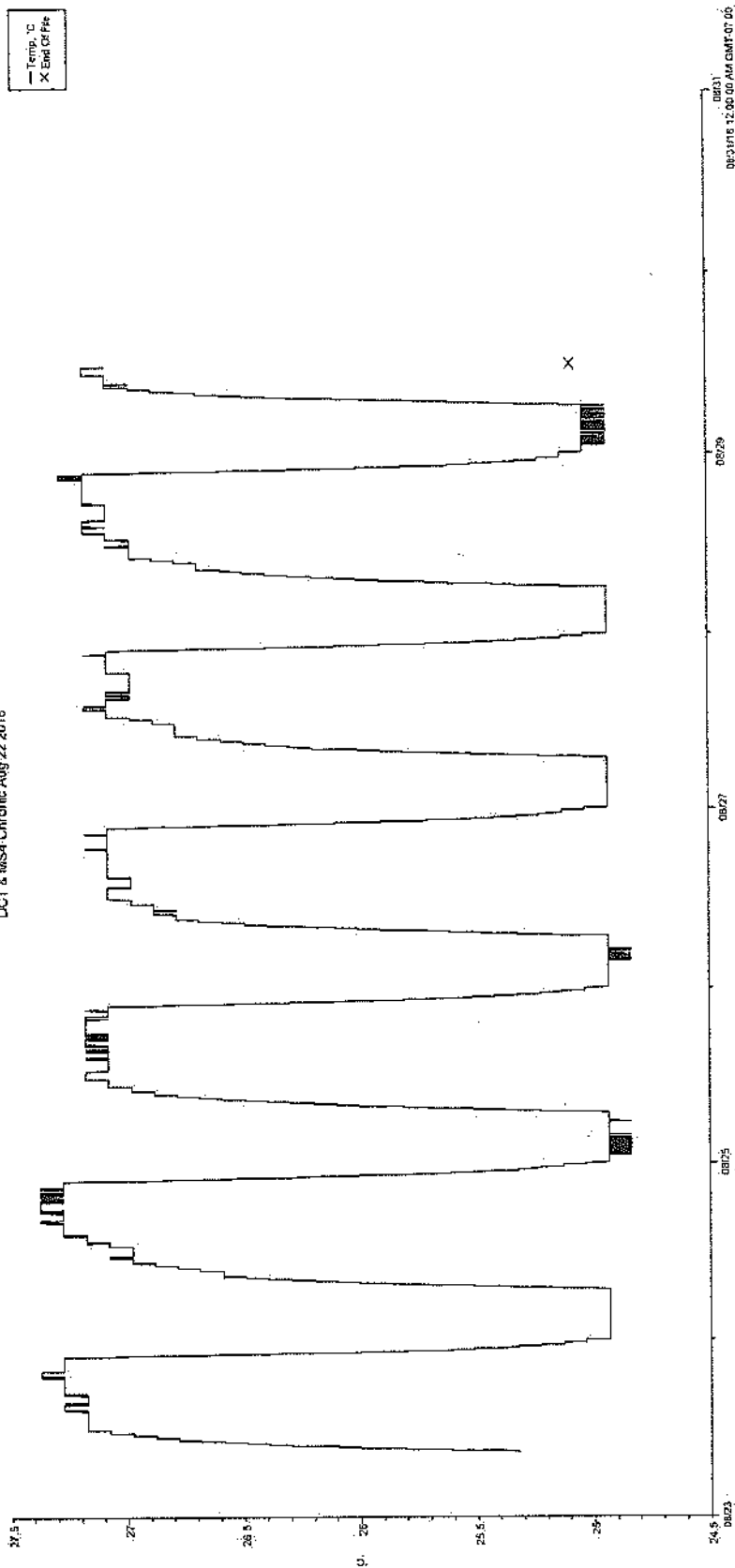
Final pH								
Conc-µg/L	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	7.97	8.06	8.15	8.08	8.03	7.96	7.85
12.5		8.05	8.10	8.19	8.13	8.10	8.06	8.00
25		8.03	8.10	8.18	8.08	8.11	8.08	8.01
50		8.03						
100		8.03						
200		8.05						
Measure Time:		1225	1125	1332	1036	1454	1025	755
Instrument ID:		#1	#1	#1	#1	#1	#2	#2
Analyst:		RA	RC	RC	DL	RC	RA	RA

Initial pH								
Conc-µg/L	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	7.83	7.98	8.06	8.13	8.14	8.06	7.73
12.5		7.72	8.01	8.07	8.15	8.14	8.05	7.84
25		7.70	8.01	8.07	8.15	8.14	8.04	7.89
50		7.68	8.01					
100		7.67	8.02					
200		7.63	8.00					
Measure Time:		1330	945	1005	1219	0842	1033	900
Instrument ID:		#1	#1	#1	#1	#1	#1	#2
Analyst:		RA	RA	RC	RC	DL	RC	RA

Final Temperature-°C								
Conc-µg/L	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	25.5	25.4	25.7	24.2	25.7	25.2	24.6
12.5		25.4	25.1	25.4	24.0	25.7	24.8	24.9
25		25.4	25.3	25.6	24.0	25.7	25.0	25.1
50		25.4						
100		25.3						
200		25.3						
Measure Time:		1225	1125	1332	1036	1454	1025	755
Instrument ID:		#1	#1	#1	#1	#1	#2	#2
Analyst:		RA	RC	RC	DL	RC	RA	RA

Initial Temperature-°C								
Conc-µg/L	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	25.8	25.0	24.9	25.4	25.0	25.5	25.3
12.5		25.8	25.1	24.9	25.4	25.0	25.3	25.4
25		25.8	25.1	24.9	25.4	24.8	25.2	25.2
50		25.7	25.0					
100		25.7	24.9					
200		25.6	24.8					
Measure Time:		1330	945	1005	1219	0842	1033	900
Instrument ID:		#1	#1	#1	#1	#1	#1	#2
Analyst:		RA	RA	RC	RC	DL	RC	RA

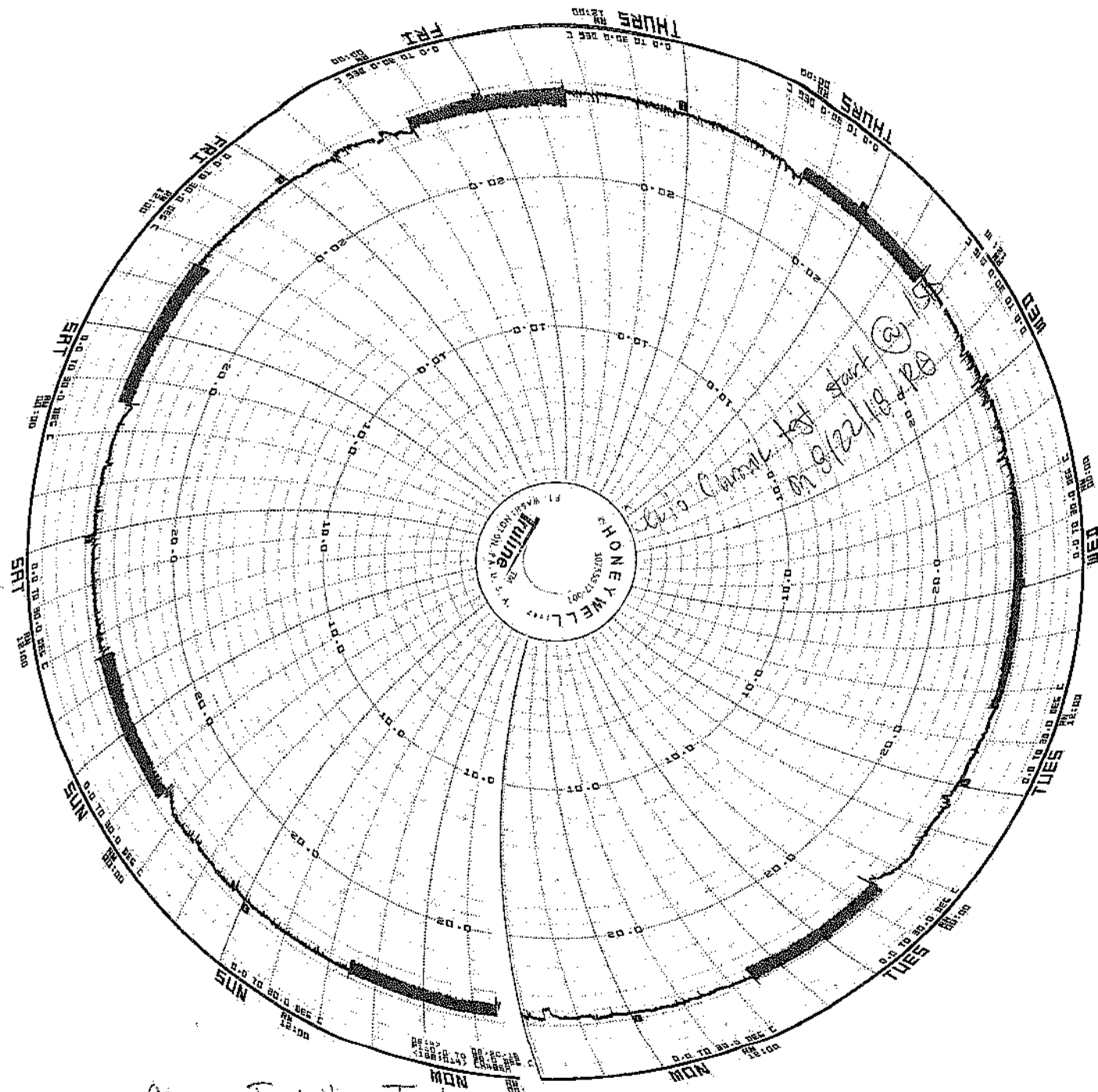
DCT & MS4 Chronic Aug 22 2018



Ceriodaphnia Chronic Toxicity Test

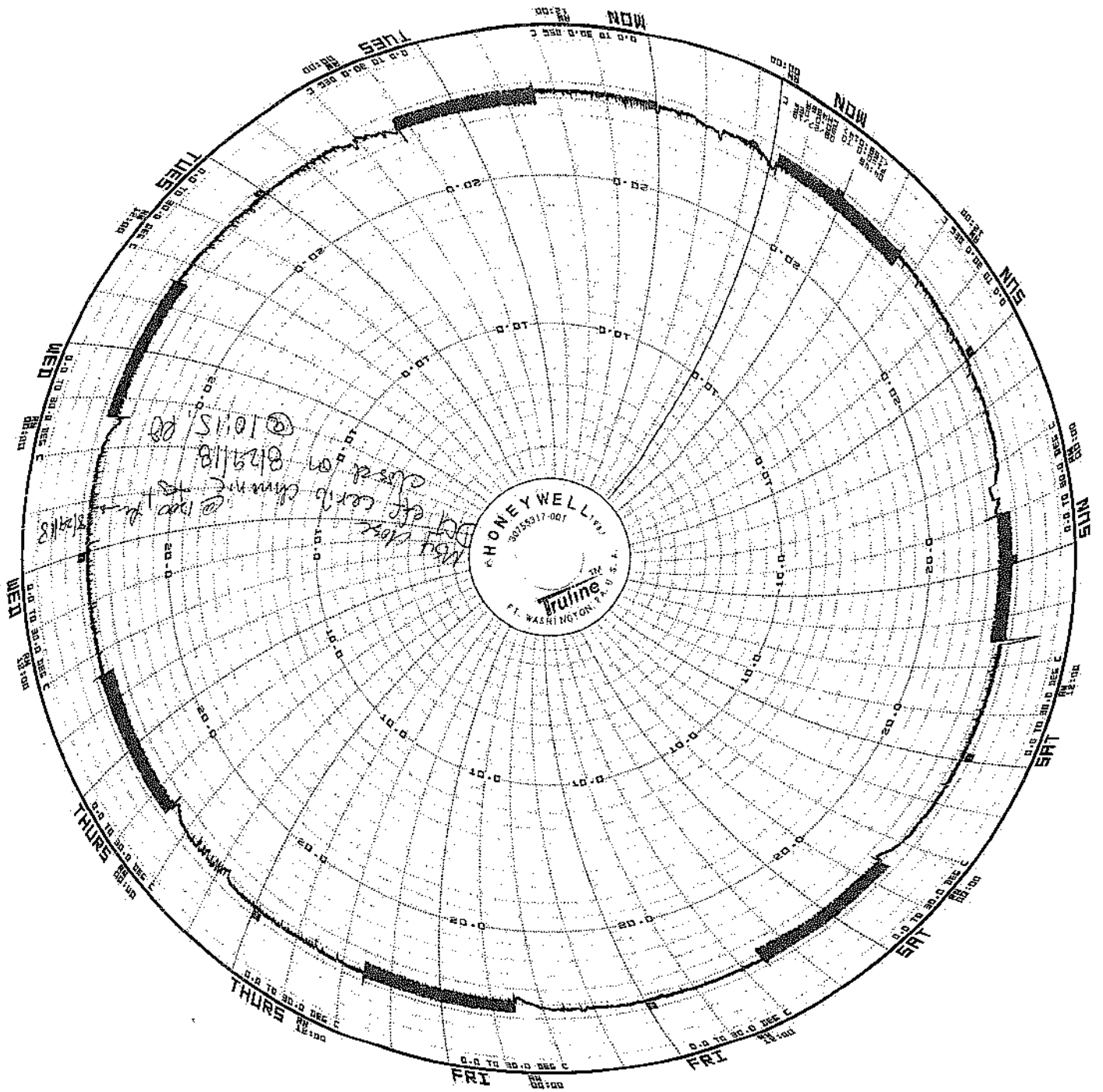
Test start: Wednesday, August 22, 2018

Test end: Wednesday, August 29, 2018



Ceriodaphnia Chronic Toxicity Test
 Test start : Wednesday, Aug 22, 2018
 Test end : Wednesday, Aug 29, 2018
 RT — 1808RTZA.C
 DCTeff — 180806ZA.C

Pg 1 of 2



pg 2 of 2

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

STORMWATER MONITORING PROGRAM

TOXICITY TESTING REPORT

SAMPLE DATE: November 22, 2018

TEST DATE: November 23, 2018

TEST NUMBER: 1811072F.C

TEST MATERIAL: Station RW-SMB-2

TEST SPECIES: *Ceriodaphnia dubia*

PROTOCOL: EPA/821/R-02-013 (2002)


TEST TYPE: Chronic

REFERENCE TOXICANT TEST: 1811RT2B.C


RESULT:

Survival
Reproduction

Pass, 0% effect
Pass, -23.7% effect

Rea Mara A Crinklaw
Analyst

Signature

Water Biologist III
Title
1/23/19
Date

Stacey Karnya
Supervisor

Signature

Acting Laboratory Manager I
Title
1-28-19
Date

CETIS Summary Report

Report Date: 23 Jan-19 15:52 (p 1 of 1)
Test Code: 1811072F.C | 02-8157-1369

Ceriodaphnia 7-d Survival and Reproduction Test						Hyperion Treatment Plant Laboratory					
Batch ID:	17-1558-0949	Test Type:	Reproduction-Survival (7d)			Analyst:	Rea Mara Crinklaw				
Start Date:	23 Nov-18 14:04	Protocol:	EPA/821/R-02-013 (2002)			Diluent:	Hard Synthetic Water				
Ending Date:	30 Nov-18 15:18	Species:	Ceriodaphnia dubia			Brine:					
Duration:	7d 1h	Source:	In-House Culture			Age:	<8h 11/23/18 (09:50-13:35)				
Sample ID:	00-4288-9094	Code:	3283903			Client:	Watershed Protection Division				
Sample Date:	22 Nov-18 04:46	Material:	Stormwater Monitoring Sample			Project:	MS4				
Receive Date:	22 Nov-18 08:05	Source:	Stormwater (STORMWATER)			Batch 1116; HBN 69941					
Sample Age:	33h (17.5 °C)	Station:	RW-SMB-2								
Sample Renewals											
Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C						
1	3283903	22 Nov-18 04:46	22 Nov-18 08:05	24 Nov-18 12:28	17.5						
2	3283903	22 Nov-18 04:46	22 Nov-18 08:05	25 Nov-18 12:42	17.5						
3	3283903	22 Nov-18 04:46	22 Nov-18 08:05	26 Nov-18 13:08	17.5						
4	3283903	22 Nov-18 04:46	22 Nov-18 08:05	27 Nov-18 11:57	17.5						
5	3283903	22 Nov-18 04:46	22 Nov-18 08:05	28 Nov-18 10:31	17.5						
6	3283903	22 Nov-18 04:46	22 Nov-18 08:05	29 Nov-18 12:41	17.5						
Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed.											
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
15-3004-9232	7d Survival Rate	100	>100	N/A	N/A	1	TST-Welch's t Test				
02-4052-2755	Reproduction	100	>100	N/A	N/A	1	TST-Welch's t Test				
Test Acceptability											
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision					
15-3004-9232	7d Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria					
02-4052-2755	Reproduction	Control Resp	31.8	15 - NL	Yes	Passes Acceptability Criteria					
7d Survival Rate Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%
Reproduction Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	31.8	29.81	33.79	22	39	1.685	5.329	16.76%	0.0%
100		9	39.33	36.19	42.48	22	47	2.809	8.426	21.42%	-23.69%
7d Survival Rate Detail											
Conc-%	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
100		1	1	1	1	1	1	1	1	1	1
Reproduction Detail											
Conc-%	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	35	32	22	39	24	36	34	33	29	34
100		35	34	46	44	47	35	45	46	22	

CETIS Analytical Report

Report Date: 23 Jan-19 15:52 (p 1 of 4)
Test Code: 1811072F.C | 02-8157-1369

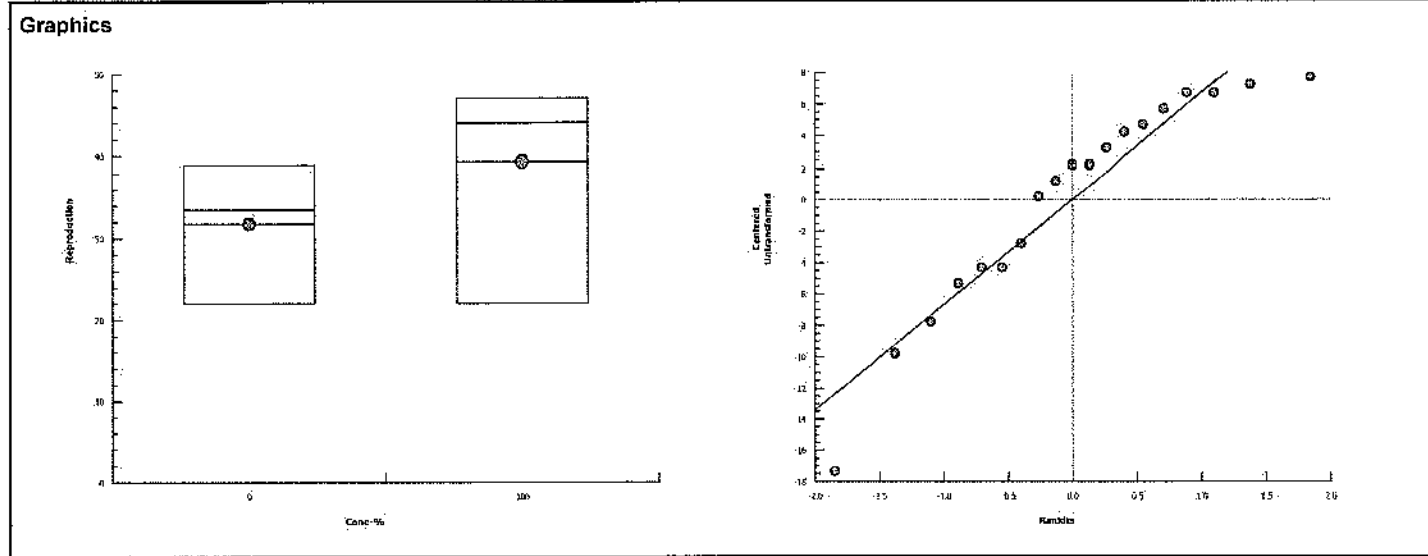
Ceriodaphnia 7-d Survival and Reproduction Test				Hyperion Treatment Plant Laboratory							
Analysis ID: 02-4052-2755	Endpoint: Reproduction	CETIS Version: CETISv1.8.1									
Analyzed: 04 Dec-18 10:02	Analysis: Parametric Bioequivalence-Two Sample	Official Results: Yes									
Batch ID: 17-1558-0949	Test Type: Reproduction-Survival (7d)	Analyst: Rea Mara Crinklaw									
Start Date: 23 Nov-18 14:04	Protocol: EPA/821/R-02-013 (2002)	Diluent: <i>Misc</i> Hard Synthetic Water									
Ending Date: 30 Nov-18 15:18	Species: Ceriodaphnia dubia	Brine:									
Duration: 7d 1h	Source: In-House Culture	Age: <8h <i>11/23/18 (09:50-13:35)</i>									
Sample ID: 00-4288-9094	Code: 3283903	Client: Watershed Protection Division									
Sample Date: 22 Nov-18 04:46	Material: Stormwater Monitoring Sample	Project: MS4									
Receive Date: 22 Nov-18 08:05	Source: Stormwater (STORMWATER)										
Sample Age: 33h (17.5 °C)	Station: RW-SMB-2										
Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed.											
Data Transform	Zeta	Alt Hyp	MC Trials	TST b	Test Result						
Untransformed	0	C*b > T	Not Run	0.75	Sample passes reproduction endpoint						
TST-Welch's t Test											
Control	vs	Conc-%	Test Stat	Critical	DF	MSD	P-Value	Decision(α:20%)			
Dilution Water		100*	5.027	0.8755	11		0.0002	Non-Significant Effect			
Test Acceptability Criteria											
Attribute	Test Stat	TAC Limits	Overlap	Decision							
Control Resp	31.8	15 - NL	Yes	Passes Acceptability Criteria							
Auxiliary Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)						
Extreme Value	0	2.562	2.681	0.0871	No Outliers Detected						
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	268.821	268.821	1	5.549	0.0308	Significant Effect					
Error	823.6	48.44706	17								
Total	1092.421	317.2681	18								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	2.5	6.693	0.1941	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9076	0.8605	0.0668	Normal Distribution						
Reproduction Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	31.8	29.77	33.83	22	39	1.685	5.329	16.76%	0.0%
100		9	39.33	36.13	42.54	22	47	2.809	8.426	21.42%	-23.69%

CETIS Analytical Report

Report Date: 23 Jan-19 15:52 (p 2 of 4)
 Test Code: 1811072F.C | 02-8157-1369

Ceriodaphnia 7-d Survival and Reproduction Test					Hyperion Treatment Plant Laboratory	
Analysis ID:	02-4052-2755	Endpoint:	Reproduction		CETIS Version:	CETISv1.8.1
Analyzed:	04 Dec-18 10:02	Analysis:	Parametric Bioequivalence-Two Sample		Official Results:	Yes

Reproduction Detail											
Conc-%	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	35	32	22	39	24	36	34	33	29	34
100		35	34	46	44	47	35	45	46	22	



CETIS Analytical Report

Report Date: 23 Jan-19 15:52 (p 3 of 4)
Test Code: 1811072F.C | 02-8157-1369

Ceriodaphnia 7-d Survival and Reproduction Test				Hyperion Treatment Plant Laboratory							
Analysis ID: 15-3004-9232	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.8.1									
Analyzed: 04 Dec-18 10:02	Analysis: Parametric Bioequivalence-Two Sample	Official Results: Yes									
Batch ID: 17-1558-0949	Test Type: Reproduction-Survival (7d)	Analyst: Rea Mara Crinklaw									
Start Date: 23 Nov-18 14:04	Protocol: EPA/821/R-02-013 (2002)	Diluent: <i>Med</i> Hard Synthetic Water									
Ending Date: 30 Nov-18 15:18	Species: Ceriodaphnia dubia	Brine:									
Duration: 7d 1h	Source: In-House Culture	Age: <8h <i>11/23/18 (09:50-13:35)</i>									
Sample ID: 00-4288-9094	Code: 3283903	Client: Watershed Protection Division									
Sample Date: 22 Nov-18 04:46	Material: Stormwater Monitoring Sample	Project: MS4									
Receive Date: 22 Nov-18 08:05	Source: Stormwater (STORMWATER)										
Sample Age: 33h (17.5 °C)	Station: RW-SMB-2										
Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed.											
Data Transform	Zeta	Alt Hyp	MC Trials	TST b	Test Result						
Angular (Corrected)	0	C*b > T	Not Run	0.75	Sample passes 7d survival rate endpoint						
TST-Welch's t Test											
Control	vs	Conc-%	Test Stat	Critical	DF	MSD	P-Value	Decision(α:20%)			
Dilution Water		100*	0.2618				<0.2	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	0	1	65540	<0.0001	Significant Effect					
Error	0	0	18								
Total	0	0	19								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Mod Levene Equality of Variance	65540	8.285	<0.0001	Unequal Variances						
7d Survival Rate Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%
Angular (Corrected) Transformed Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1.047	1.047	1.047	1.047	1.047	0	0	0.0%	0.0%
100		10	1.047	1.047	1.047	1.047	1.047	0	0	0.0%	0.0%

CETIS Analytical Report

Report Date: 23 Jan-19 15:52 (p 4 of 4)
Test Code: 1811072F.C | 02-8157-1369

Ceriodaphnia 7-d Survival and Reproduction Test							Hyperion Treatment Plant Laboratory				
Analysis ID: 15-3004-9232		Endpoint: 7d Survival Rate			CETIS Version: CETISv1.8.1						
Analyzed: 04 Dec-18 10:02		Analysis: Parametric Bioequivalence-Two Sample			Official Results: Yes						
7d Survival Rate Detail											
Conc-%	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
100		1	1	1	1	1	1	1	1	1	1
Graphics											
<div><div></div><div></div></div>											

CETIS Test Data Worksheet

Report Date: 21 Nov-18 11:04 (p 1 of 1)
 Test Code: 02-8157-1369/1811072F.C

Ceriodaphnia 7-d Survival and Reproduction Test										Hyperion Treatment Plant Laboratory			
Start Date:	23 Nov-18	Species:	Ceriodaphnia dubia	Sample Code:	28E6F86								
End Date:	30 Nov-18	Protocol:	EPA/821/R-02-013 (2002)	Sample Source:	Stormwater								
Sample Date:	21 Nov-18	Material:	Stormwater Monitoring Sample	Sample Station:	RW-SMB-2								

Conc-%	Code	Rep	Pos	# Exposed	1d Survival	2d Survival	3d Survival	4d Survival	5d Survival	6d Survival	7d Survival	Neonates	Male
0	D	1		1	0	0	0	5	8	0	22	35	
0	D	2		1	0	0	0	4	9	0	19	32	
0	D	3		1	0	0	0	3	9	10	0	22	
0	D	4		1	0	0	0	6	0	13	20	39	
0	D	5		1	0	0	0	4	7	0	13	24	
0	D	6		1	0	0	0	3	11	0	22	36	
0	D	7		1	0	0	0	5	9	20	0	34	
0	D	8		1	0	0	0	5	0	12	16	33	
0	D	9		1	0	0	0	4	10	0	15	29	
0	D	10		1	0	0	0	4	0	15	15	34	
100		1	12	1	0	0	0	4	7	24	0	35	
100		2	77	1	0	0	0	0	14	20	0	34	
100		3	42	1	0	0	0	5	0	15	26	46	
100		4	51	1	0	0	0	4	14	0	26	44	
100		5	1	1	0	0	0	6	16	0	25	47	
100		6	21	1	0	0	0	5	9	21	(+)	35	
100		7	61	1	0	0	0	7	15	0	(23) 24	45	
100		8	48	1	0	0	0	5	0	17	24	46	
100		9	20	1	0	0	0	3	15	0	4	22	
100		10	34	1	0	0	0	0	10	21	*(+)	exclude	* AE

11/23 11/24 11/25 11/26 11/27 11/28 11/29 11/30

End @ 1578
 3rd Brood not counted
 Discarded cup in error.
 11/30/18

Food Added: 138 1109 1210 1241 1010 0842 1127
 Fe Fe Fe Fe RL RL RL
 Transferred: 1404 1228 1242 1308 1157 1031 1241
 Fe Fe Fe Fe RL RL RL

CETIS Measurement Worksheet

Report Date: 21 Nov-18 11:04 (p 1 of 2)
Test Code: 1811072F.C | 02-8157-1369

Ceriodaphnia 7-d Survival and Reproduction Test						Hyperion Treatment Plant Laboratory		
Start Date: 23 Nov-18		Species: Ceriodaphnia dubia		Sample Code: 28E6F86				
End Date: 30 Nov-18		Protocol: EPA/821/R-02-013 (2002)		Sample Source: Stormwater				
Sample Date: 21 Nov-18		Material: Stormwater Monitoring Sample		Sample Station: RW-SMB-2				

Alkalinity (CaCO3)-mg/L								
Conc-%	Code	Reading 1						
0	D	60	} see attached worksheet.					
100		104						
Measure Time:								
Instrument ID:								
Analyst:								

Conductivity-µmhos								
Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	302	297	302	305	294	298	303
100		728	689	698	688	712	712	705
Measure Time:		1218	1052	1145	1107	1037	0925	1135
Instrument ID:		#3	#3	#3	#3	2	2	2
Analyst:		Re	Re	Re	Re	Re	Re	Re

Final Dissolved Oxygen-mg/L								
Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	7.61	7.73	7.73	7.43	7.82	7.52	7.60
100		7.10	7.34	7.65	7.57	7.69	7.34	7.36
Measure Time:		1239	1314	1327	1436	1030	1545	1730
Instrument ID:		#4	#4	#4	4	4	#4	#4
Analyst:		Re	Re	Re	Re	Re	Re	Re

Initial Dissolved Oxygen-mg/L								
Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	7.43	7.60	7.68	7.80	7.78	7.75	7.92
100		7.83	8.12	7.81	7.80	8.45	8.45	8.46
Measure Time:		1218	1052	1145	1107	1037	0925	1135
Instrument ID:		#4	#4	#4	#4	4	4	4
Analyst:		Re	Re	Re	Re	Re	Re	Re

Hardness (CaCO3)-mg/L		
Conc-%	Code	Reading 1
0	D	88
100		224
Measure Time:		
Instrument ID:		
Analyst:		

Final pH								
Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	7.87	7.31	7.71	8.01	7.82	7.84	7.96
100		7.86	7.55	7.99	7.99	7.51	7.87	8.01
Measure Time:		1239	1314	1327	1436	1030	1545	1730
Instrument ID:		#3	#3	#3	3	3	#3	#3
Analyst:		Re	Re	Re	Re	Re	Re	Re

7.87

CETIS Measurement Worksheet

Report Date: 21 Nov-18 11:04 (p 2 of 2)
 Test Code: 1811072F.C | 02-8157-1369

Ceriodaphnia 7-d Survival and Reproduction Test								Hyperion Treatment Plant Laboratory
Start Date: 23 Nov-18		Species: Ceriodaphnia dubia			Sample Code: 28E6F86			
End Date: 30 Nov-18		Protocol: EPA/821/R-02-013 (2002)			Sample Source: Stormwater			
Sample Date: 21 Nov-18		Material: Stormwater Monitoring Sample			Sample Station: RW-SMB-2			
Initial pH								
Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	7.79	7.60	7.88	7.83	8.08	7.97	8.06
100		7.53	7.48	7.47	7.50	7.46	7.50	7.63
Measure Time:		1218	1052	1145	1107	1037	0925	1135
Instrument ID:		#3	#3	#3	#3	3	3	3
Analyst:		PC	PC	PC	PC	DL	DL	DL
Final Temperature-°C								
Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	25.6	25.4	25.1	24.8	24.9	25.3	25.3
100		25.4	25.2	24.9	25.0	24.9	24.7	24.8
Measure Time:		1239	1314	1327	1426	1038	1545	1730
Instrument ID:		#3	#3	#3	3	3	#3	#3
Analyst:		PC	PC	PC	DL	DL	DL	PC
Initial Temperature-°C								
Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	25.3	25.1	25.2	24.8	24.5	24.8	25.1
100		24.5	24.9	24.6	24.4	24.0	24.5	25.4
Measure Time:		1218	1052	1145	1107	1037	0925	1135
Instrument ID:		#3	#3	#3	#3	3	3	3
Analyst:		PC	PC	PC	PC	DL	DL	DL

Alkalinity

Date/Time: 2/4/10, 1300Project: M34 Lt Fresh CelioAnalyst: 102Titrant: H₂SO₄Factor: 20 @ 50 ml

Sample	Sample ml Amount	Titrant Amount (ml)	Titrant Amount x Factor (mg CaCO ₃ /L)
MHSPW	25	1.5	60
[200] Cu		3.1	124
THJ		1.2	48
WAS		2.4	96
RHSLA		0.6	24
DOM		0.5	20
SMB		2.6	104
NAT		0.9	36
SAW	25	1.0	40

Date/Time: 12/4/18, BOB

Hardness

Project: M-54 1st Flush

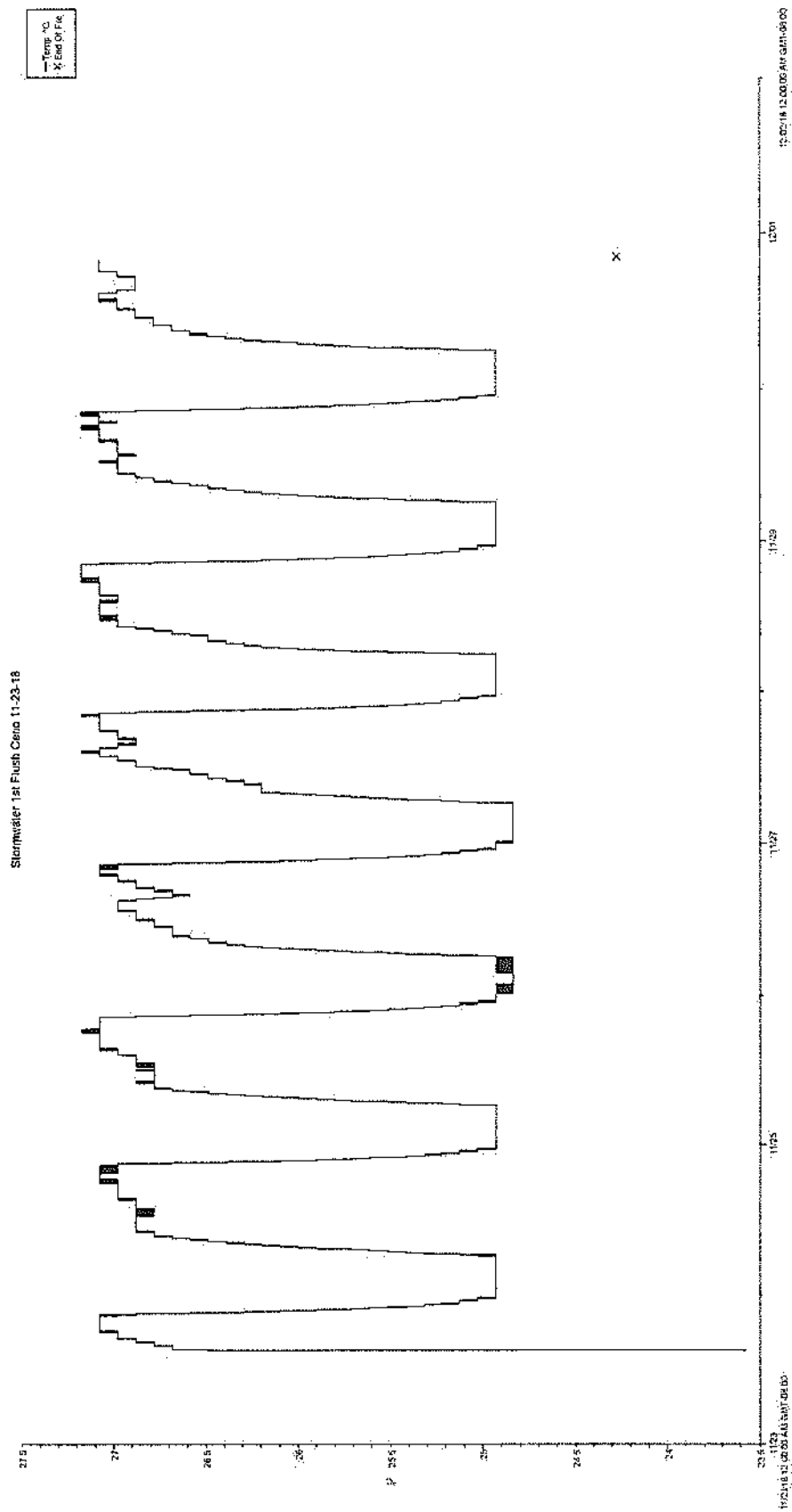
Analyst: BOZ

Cent

Titrant: EDTA

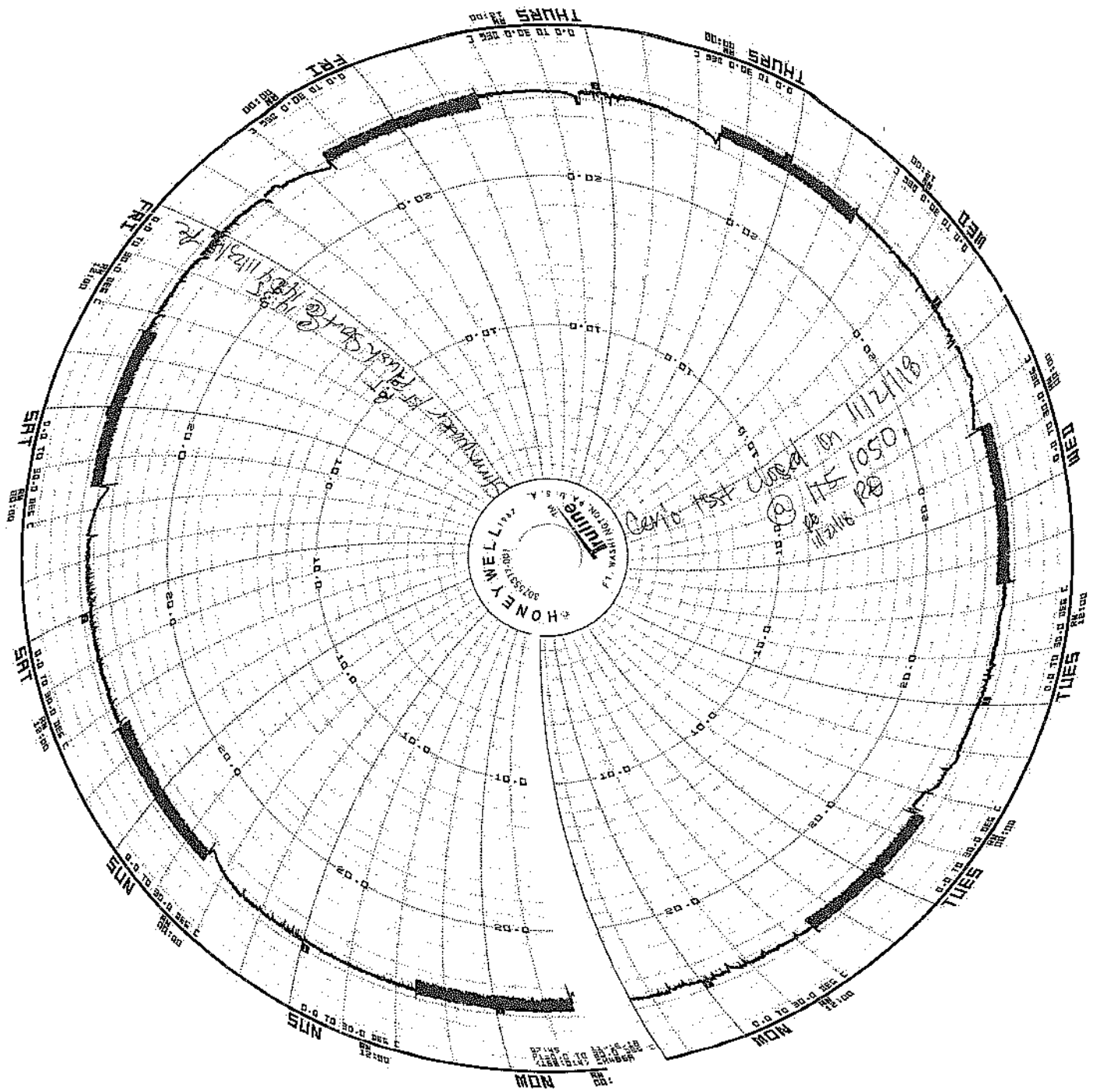
Factor: 20050 mL

Sample	Sample Amount (mL)	Titrant Amount (ml)	Titrant Amount x Factor (mg CaCO ₃ /L)
M.SFW	25	2.2	44
[200] CH	1	4.5	180
TWJ		1.7	60
WAS		3.6	144
PHLA		0.7	28
DOM		0.6	24
SMB		5.6	224
NAT		1.2	48
SAW	25	1.2	48

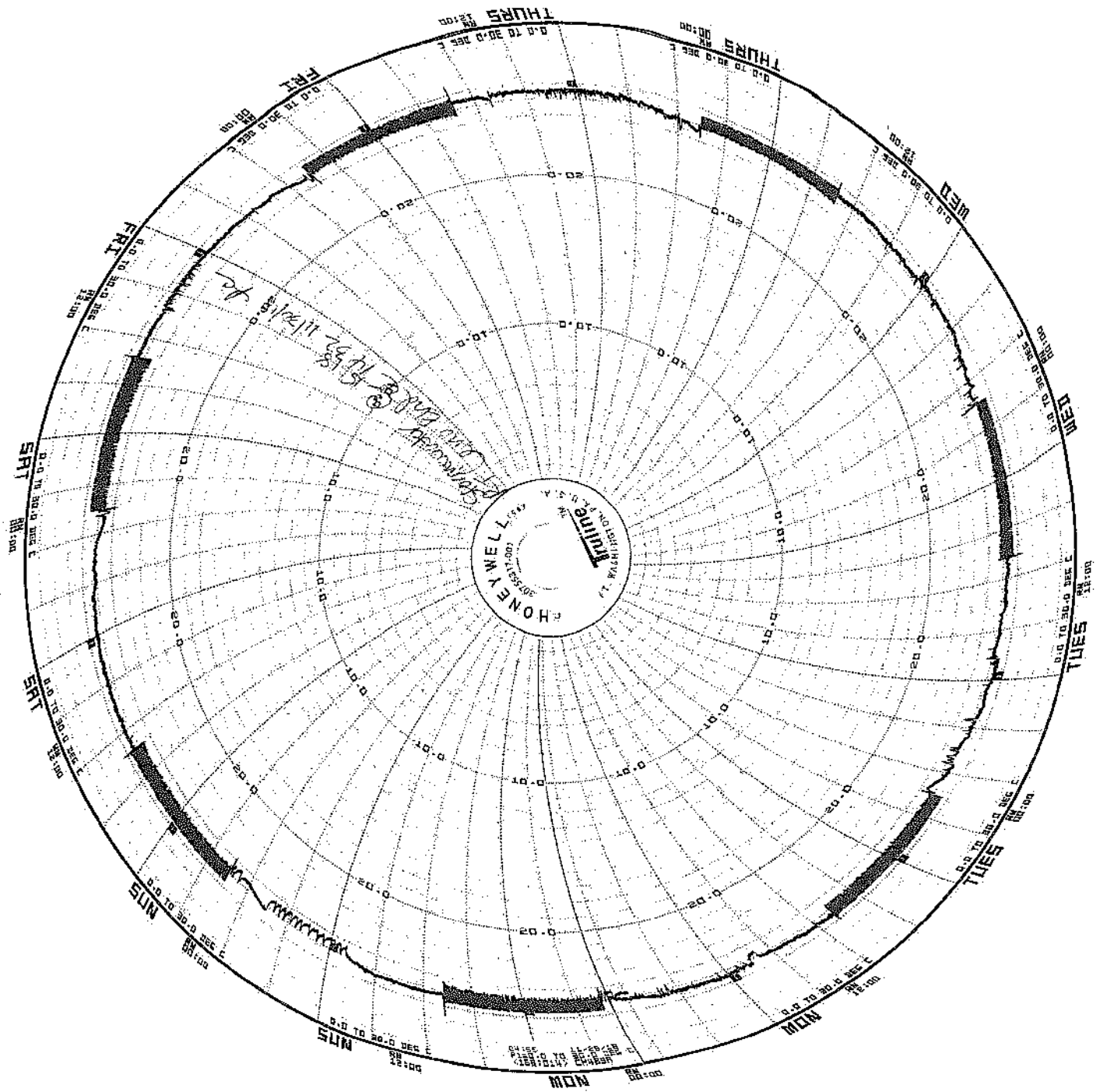


Test: 1811RT2B.C, 1811072A.C - G.C

Date: 11/23/18(14:04) - 11/30/18(15:18)



Test: 1811RT2B.C, 1811072A-G.C
 Date: 11/23/18(14:04) - 11/30/18(15:18)



Test: 1811 RTZB.C, 1811072A-G.C
 Date: 11/23/18 (14:04) - 11/30/18 (15:18)

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

REFERENCE TOXICANT

TOXICITY TESTING REPORT

SAMPLE DATE: November 23, 2018

TEST DATE: November 23, 2018

TEST NUMBER: 1811RT2B.C

TEST MATERIAL: Copper ($\text{CuCl}_2 \bullet 2\text{H}_2\text{O}$)

TEST SPECIES: *Ceriodaphnia dubia*

PROTOCOL: EPA/821/R-02-013 (2002)

TEST TYPE: Chronic

RESULT:

NOEC = 100 $\mu\text{g/L}$ (Survival)

NOEC = 50 $\mu\text{g/L}$ (Reproduction)

EC₅₀ = 142 $\mu\text{g/L}$ (Survival)

IC₂₅ = 58.8 $\mu\text{g/L}$ (Reproduction)

Rea Mara A Crinklaw

Analyst



Signature

Water Biologist III

Title

1/23/19

Date

Stacey Karnya

Supervisor



Signature

Acting Laboratory Manager I

Title

1-28-19

Date

CETIS Summary Report

Report Date: 27 Dec-18 15:00 (p 1 of 2)
 Test Code: 1811RT2B.C | 07-8581-3240

Ceriodaphnia 7-d Survival and Reproduction Test				Hyperion Treatment Plant Laboratory			
Batch ID:	17-1558-0949	Test Type:	Reproduction-Survival (7d)	Analyst:	Rea Mara Crinklaw		
Start Date:	23 Nov-18 14:34	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Hard Synthetic Water		
Ending Date:	30 Nov-18 14:32	Species:	Ceriodaphnia dubia	Brine:			
Duration:	7d	Source:	In-House Culture	Age:	<8h 11/23/18 (09:50 - 13:35)		
Sample ID:	00-5008-1686	Code:	Cu RT	Client:	Donald C. Tillman WRP		
Sample Date:	23 Nov-18 11:35	Material:	Copper chloride	Project:	NPDES		
Receive Date:	23 Nov-18 11:35	Source:	Reference Toxicant				
Sample Age:	3h	Station:					
Sample Renewals							
Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C		
1	Cu RT	23 Nov-18 11:35	23 Nov-18 11:35	24 Nov-18 11:24			
2	Cu RT	23 Nov-18 11:35	23 Nov-18 11:35	25 Nov-18 13:00			
3	Cu RT	23 Nov-18 11:35	23 Nov-18 11:35	26 Nov-18 13:23			
4	Cu RT	23 Nov-18 11:35	23 Nov-18 11:35	27 Nov-18 11:25			
5	Cu RT	23 Nov-18 11:35	23 Nov-18 11:35	28 Nov-18 09:22			
6	Cu RT	23 Nov-18 11:35	23 Nov-18 11:35	29 Nov-18 12:15			
Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed.							
Test Note: Concentration-response relationship is all or nothing for survival and ideal for reproduction.							
Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
10-5688-4561	7d Survival Rate	100	>100	N/A	N/A		Fisher Exact/Bonferroni-Holm Test
05-0217-4531	Reproduction	50	100	70.71	22.7%		Dunnett Multiple Comparison Test
Point Estimate Summary							
Analysis ID	Endpoint	Level	µg/L	95% LCL	95% UCL	TU	Method
03-2855-8063	7d Survival Rate	EC5	103.5	103.5	103.5		Linear Interpolation (ICPIN)
		EC10	107.2	107.2	107.2		
		EC15	111	111	111		
		EC20	114.9	114.9	114.9		
		EC25	119	119	119		
		EC40	132	132	132		
		EC50	141.5	141.5	141.5		
21-2452-6843	Reproduction	IC5	17.72	4.635	52.41		Linear Interpolation (ICPIN)
		IC10	24.95	16.27	55.18		
		IC15	52.54	20.05	58.1		
		IC20	55.58	23.49	61.07		
		IC25	58.79	49.13	64.29		
		IC40	69.55	60.94	75.96		
		IC50	77.79	68.91	87.21		
Test Acceptability							
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision	
03-2855-8063	7d Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria	
10-5688-4561	7d Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria	
05-0217-4531	Reproduction	Control Resp	34.2	15 - NL	Yes	Passes Acceptability Criteria	
21-2452-6843	Reproduction	Control Resp	34.2	15 - NL	Yes	Passes Acceptability Criteria	
05-0217-4531	Reproduction	PMSD	0.2269	0.13 - 0.47	Yes	Passes Acceptability Criteria	

CETIS Summary Report

Report Date: 27 Dec-18 15:00 (p 2 of 2)
Test Code: 1811RT2B.C | 07-8581-3240

Ceriodaphnia 7-d Survival and Reproduction Test								Hyperion Treatment Plant Laboratory			
7d Survival Rate Summary:											
Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	1	1	1	1	1	0	0	0.0%	0.0%
12.5		10	1	1	1	1	1	0	0	0.0%	0.0%
25		10	1	1	1	1	1	0	0	0.0%	0.0%
50		10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%
200		10	0	0	0	0	0	0	0		100.0%
Reproduction Summary											
Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	34.2	32.23	36.17	28	43	1.672	5.287	15.46%	0.0%
12.5		10	35.6	33.51	37.69	29	46	1.771	5.602	15.73%	-4.09%
25		10	31.4	27.13	35.67	11	42	3.612	11.42	36.38%	8.19%
50		10	31.2	28.38	34.02	20	42	2.384	7.54	24.17%	8.77%
100		10	9.6	6.755	12.44	0	25	2.409	7.619	79.36%	71.93%
200		10	0.3	0.1196	0.4804	0	1	0.1528	0.483	161.0%	99.12%
7d Survival Rate Detail											
Conc-µg/L	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
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1
200		0	0	0	0	0	0	0	0	0	0
Reproduction Detail											
Conc-µg/L	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	42	35	31	31	43	31	31	39	31	28
12.5		38	30	33	46	30	34	42	39	35	29
25		42	40	31	38	38	17	37	41	19	11
50		34	29	42	31	23	39	39	23	32	20
100		13	25	0	2	10	9	14	0	10	13
200		0	0	0	0	0	1	0	1	1	0

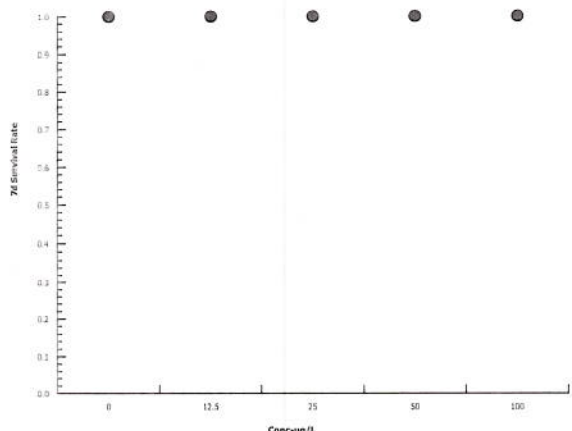
CETIS Analytical Report

Report Date: 27 Dec-18 15:00 (p 1 of 2)
 Test Code: 1811RT2B.C | 07-8581-3240

Ceriodaphnia 7-d Survival and Reproduction Test				Hyperion Treatment Plant Laboratory							
Analysis ID: 10-5688-4561	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.8.1									
Analyzed: 03 Dec-18 9:02	Analysis: STP 2x2 Contingency Tables	Official Results: Yes									
Batch ID: 17-1558-0949	Test Type: Reproduction-Survival (7d)	Analyst: Rea Mara Crinklaw									
Start Date: 23 Nov-18 14:34	Protocol: EPA/821/R-02-013 (2002)	Diluent: Hard Synthetic Water									
Ending Date: 30 Nov-18 14:32	Species: Ceriodaphnia dubia	Brine:									
Duration: 7d	Source: In-House Culture	Age: <8h 11/23/18 (09:50 - 13:35)									
Sample ID: 00-5008-1686	Code: Cu RT	Client: Donald C. Tillman WRP									
Sample Date: 23 Nov-18 11:35	Material: Copper chloride	Project: NPDES									
Receive Date: 23 Nov-18 11:35	Source: Reference Toxicant										
Sample Age: 3h	Station:										
Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed.											
Test Note: Concentration-response relationship is all or nothing for survival and ideal for reproduction.											
Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU				
Untransformed		C > T	Not Run	100	>100	N/A					
Fisher Exact/Bonferroni-Holm Test											
Control	vs	Conc-µg/L	Test Stat	P-Value	Decision(0.05)						
Dilution Water		12.5	1	1.0000	Non-Significant Effect						
		25	1	1.0000	Non-Significant Effect						
		50	1	1.0000	Non-Significant Effect						
		100	1	1.0000	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											
Conc-µg/L	Control Type	No-Resp	Resp	Total							
0	Dilution Water	10	0	10							
12.5		10	0	10							
25		10	0	10							
50		10	0	10							
100		10	0	10							
7d Survival Rate Detail											
Conc-µg/L	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
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

CETIS Analytical Report

Report Date: 27 Dec-18 15:00 (p 2 of 2)
Test Code: 1811RT2B.C | 07-8581-3240

Ceriodaphnia 7-d Survival and Reproduction Test		Hyperion Treatment Plant Laboratory													
Analysis ID: 10-5688-4561	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.8.1													
Analyzed: 03 Dec-18 9:02	Analysis: STP 2x2 Contingency Tables	Official Results: Yes													
Graphics															
 <table><thead><tr><th>Conc-µg/L</th><th>7d Survival Rate</th></tr></thead><tbody><tr><td>0</td><td>1.0</td></tr><tr><td>12.5</td><td>1.0</td></tr><tr><td>25</td><td>1.0</td></tr><tr><td>50</td><td>1.0</td></tr><tr><td>100</td><td>1.0</td></tr></tbody></table>				Conc-µg/L	7d Survival Rate	0	1.0	12.5	1.0	25	1.0	50	1.0	100	1.0
Conc-µg/L	7d Survival Rate														
0	1.0														
12.5	1.0														
25	1.0														
50	1.0														
100	1.0														

Concentration-response relationship is all or nothing,
12/27/18 *Rc*

CETIS Analytical Report

Report Date: 27 Dec-18 15:00 (p 1 of 2)
Test Code: 1811RT2B.C | 07-8581-3240

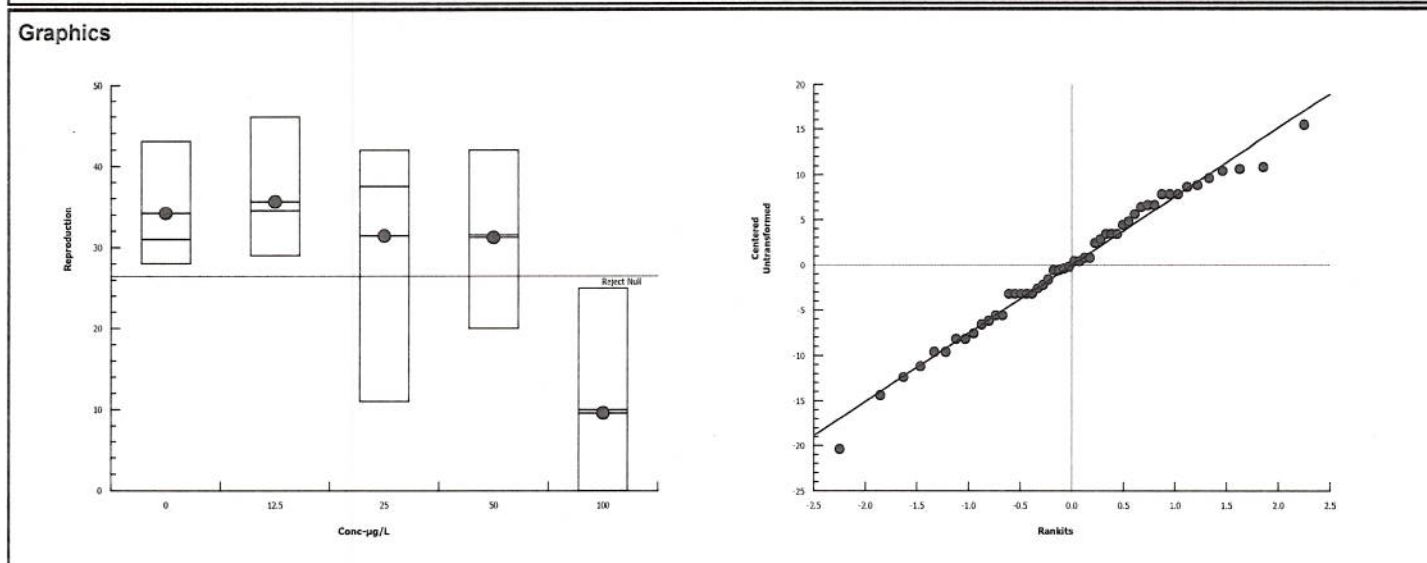
Ceriodaphnia 7-d Survival and Reproduction Test						Hyperion Treatment Plant Laboratory					
Analysis ID: 05-0217-4531		Endpoint: Reproduction		CETIS Version: CETISv1.8.1							
Analyzed: 03 Dec-18 9:02		Analysis: Parametric-Control vs Treatments		Official Results: Yes							
Batch ID: 17-1558-0949		Test Type: Reproduction-Survival (7d)		Analyst: Rea Mara Crinklaw							
Start Date: 23 Nov-18 14:34		Protocol: EPA/821/R-02-013 (2002)		Diluent: Hard Synthetic Water							
Ending Date: 30 Nov-18 14:32		Species: Ceriodaphnia dubia		Brine:							
Duration: 7d		Source: In-House Culture		Age: <8h 11/23/18 (09:50 - 13:35)							
Sample ID: 00-5008-1686		Code: Cu RT		Client: Donald C. Tillman WRP							
Sample Date: 23 Nov-18 11:35		Material: Copper chloride		Project: NPDES							
Receive Date: 23 Nov-18 11:35		Source: Reference Toxicant									
Sample Age: 3h		Station:									
Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed.											
Test Note: Concentration-response relationship is all or nothing for survival and ideal for reproduction.											
Data Transform		Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD		
Untransformed		0	C > T	Not Run	50	100	70.71		22.7%		
Dunnett Multiple Comparison Test											
Control	vs	Conc-µg/L	Test Stat	Critical	DF	MSD	P-Value	Decision(α:5%)			
Dilution Water		12.5	-0.401	2.222	18	7.759	0.9049	Non-Significant Effect			
		25	0.802	2.222	18	7.759	0.4647	Non-Significant Effect			
		50	0.8593	2.222	18	7.759	0.4388	Non-Significant Effect			
		100*	7.046	2.222	18	7.759	<0.0001	Significant Effect			
Test Acceptability Criteria											
Attribute	Test Stat	TAC Limits	Overlap	Decision							
Control Resp	34.2	15 - NL	Yes	Passes Acceptability Criteria							
PMSD	0.2269	0.13 - 0.47	Yes	Passes Acceptability Criteria							
Auxiliary Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)						
Extreme Value	0	2.727	3.128	0.2348	No Outliers Detected						
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	4557.6	1139.4	4	18.7	<0.0001	Significant Effect					
Error	2742.4	60.94222	45								
Total	7300	1200.342	49								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Bartlett Equality of Variance	6.894	13.28	0.1416	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9849	0.9367	0.7664	Normal Distribution						
Reproduction Summary											
Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	34.2	32.19	36.21	28	43	1.672	5.287	15.46%	0.0%
12.5		10	35.6	33.47	37.73	29	46	1.771	5.602	15.73%	-4.09%
25		10	31.4	27.05	35.75	11	42	3.612	11.42	36.38%	8.19%
50		10	31.2	28.33	34.07	20	42	2.384	7.54	24.17%	8.77%
100		10	9.6	6.702	12.5	0	25	2.409	7.619	79.36%	71.93%

CETIS Analytical Report

Report Date: 27 Dec-18 15:00 (p 2 of 2)
Test Code: 1811RT2B.C | 07-8581-3240

Ceriodaphnia 7-d Survival and Reproduction Test					Hyperion Treatment Plant Laboratory	
Analysis ID: 05-0217-4531	Endpoint: Reproduction	CETIS Version: CETISv1.8.1				
Analyzed: 03 Dec-18 9:02	Analysis: Parametric-Control vs Treatments	Official Results: Yes				

Reproduction Detail											
Conc-µg/L	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	42	35	31	31	43	31	31	39	31	28
12.5		38	30	33	46	30	34	42	39	35	29
25		42	40	31	38	38	17	37	41	19	11
50		34	29	42	31	23	39	39	23	32	20
100		13	25	0	2	10	9	14	0	10	13



Concentration-response relationship is ideal. 12/27/18 Re

CETIS Analytical Report

Report Date: 27 Dec-18 15:00 (p 1 of 4)

Test Code: 1811RT2B.C | 07-8581-3240

Ceriodaphnia 7-d Survival and Reproduction Test					Hyperion Treatment Plant Laboratory						
Analysis ID: 03-2855-8063		Endpoint: 7d Survival Rate		CETIS Version: CETISv1.8.1							
Analyzed: 03 Dec-18 9:02		Analysis: Linear Interpolation (ICPIN)		Official Results: Yes							
Batch ID: 17-1558-0949		Test Type: Reproduction-Survival (7d)		Analyst: Rea Mara Crinklaw							
Start Date: 23 Nov-18 14:34		Protocol: EPA/821/R-02-013 (2002)		Diluent: Hard Synthetic Water							
Ending Date: 30 Nov-18 14:32		Species: Ceriodaphnia dubia		Brine:							
Duration: 7d		Source: In-House Culture		Age: <8h		11/23/18 (09:50-13:35)					
Sample ID: 00-5008-1686		Code: Cu RT		Client: Donald C. Tillman WRP							
Sample Date: 23 Nov-18 11:35		Material: Copper chloride		Project: NPDES							
Receive Date: 23 Nov-18 11:35		Source: Reference Toxicant									
Sample Age: 3h		Station:									
Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed.											
Test Note: Concentration-response relationship is all or nothing for survival and ideal for reproduction.											
Linear Interpolation Options											
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method						
Log(X+1)	Linear	265187057	200	Yes	Two-Point Interpolation						
Test Acceptability Criteria											
Attribute	Test Stat	TAC Limits	Overlap	Decision							
Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria							
Point Estimates											
Level	µg/L	95% LCL	95% UCL								
EC5	103.5	103.5	103.5								
EC10	107.2	107.2	107.2								
EC15	111	111	111								
EC20	114.9	114.9	114.9								
EC25	119	119	119								
EC40	132	132	132								
EC50	141.5	141.5	141.5								
7d Survival Rate Summary											
		Calculated Variate(A/B)									
Conc-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10
200		10	0	0	0	0	0		100.0%	0	10
7d Survival Rate Detail											
Conc-µg/L	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
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1
200		0	0	0	0	0	0	0	0	0	0

CETIS Analytical Report

Report Date: 27 Dec-18 15:00 (p 2 of 4)
 Test Code: 1811RT2B.C | 07-8581-3240

Ceriodaphnia 7-d Survival and Reproduction Test

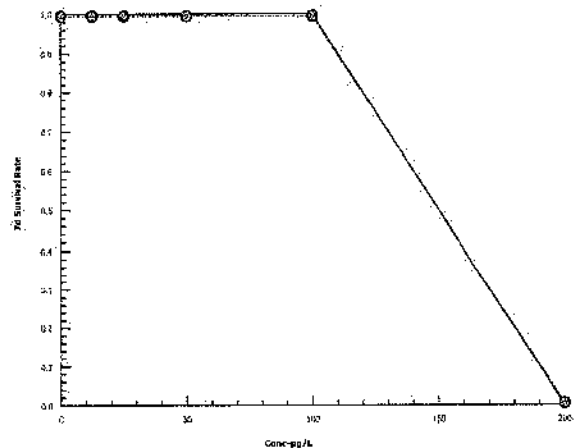
Hyperion Treatment Plant Laboratory

Analysis ID: 03-2855-8063
 Analyzed: 03 Dec-18 9:02

Endpoint: 7d Survival Rate
 Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.1
 Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 27 Dec-18 15:00 (p 3 of 4)
Test Code: 1811RT2B.C | 07-8581-3240

Ceriodaphnia 7-d Survival and Reproduction Test						Hyperion Treatment Plant Laboratory					
Analysis ID: 21-2452-6843		Endpoint: Reproduction		CETIS Version: CETISv1.8.1							
Analyzed: 03 Dec-18 9:02		Analysis: Linear Interpolation (ICPIN)		Official Results: Yes							
Batch ID: 17-1558-0949		Test Type: Reproduction-Survival (7d)		Analyst: Rea Mara Crinklaw							
Start Date: 23 Nov-18 14:34		Protocol: EPA/821/R-02-013 (2002)		Diluent: Hard Synthetic Water							
Ending Date: 30 Nov-18 14:32		Species: Ceriodaphnia dubia		Brine:							
Duration: 7d		Source: In-House Culture		Age: <8h 11/23/18 (09:50-13:35)							
Sample ID: 00-5008-1686		Code: Cu RT		Client: Donald C. Tillman WRP							
Sample Date: 23 Nov-18 11:35		Material: Copper chloride		Project: NPDES							
Receive Date: 23 Nov-18 11:35		Source: Reference Toxicant									
Sample Age: 3h		Station:									
Batch Note: Insufficient neonate production from the broodboards to use for the test. Neonates from Master Culture Beakers #2 & #4 (11/23/18 9:50 - 13:35) were used. Blocking by known parentage not performed.											
Test Note: Concentration-response relationship is all or nothing for survival and ideal for reproduction.											
Linear Interpolation Options											
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method						
Log(X+1)	Linear	1.536E+09	200	Yes	Two-Point Interpolation						
Test Acceptability Criteria											
Attribute	Test Stat	TAC Limits	Overlap	Decision							
Control Resp	34.2	15 - NL	Yes	Passes Acceptability Criteria							
Residual Analysis											
Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)						
Extreme Value	Grubbs Extreme Value	2.991	3.2	0.1148	No Outliers Detected						
Point Estimates											
Level	µg/L	95% LCL	95% UCL								
IC5	17.72	4.635	52.41								
IC10	24.95	16.27	55.18								
IC15	52.54	20.05	58.1								
IC20	55.58	23.49	61.07								
IC25	58.79	49.13	64.29								
IC40	69.55	60.94	75.96								
IC50	77.79	68.91	87.21								
Reproduction Summary											
		Calculated Variate									
Conc-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect		
0	Dilution Water	10	34.2	28	43	1.672	5.287	15.46%	0.0%		
12.5		10	35.6	29	46	1.771	5.602	15.73%	-4.09%		
25		10	31.4	11	42	3.612	11.42	36.38%	8.19%		
50		10	31.2	20	42	2.384	7.54	24.17%	8.77%		
100		10	9.6	0	25	2.409	7.619	79.36%	71.93%		
200		10	0.3	0	1	0.1528	0.483	161.0%	99.12%		
Reproduction Detail											
Conc-µg/L	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	42	35	31	31	43	31	31	39	31	28
12.5		38	30	33	46	30	34	42	39	35	29
25		42	40	31	38	38	17	37	41	19	11
50		34	29	42	31	23	39	39	23	32	20
100		13	25	0	2	10	9	14	0	10	13
200		0	0	0	0	0	1	0	1	1	0

CETIS Analytical Report

Report Date: 27 Dec-18 15:00 (p 4 of 4)
Test Code: 1811RT2B.C | 07-8581-3240

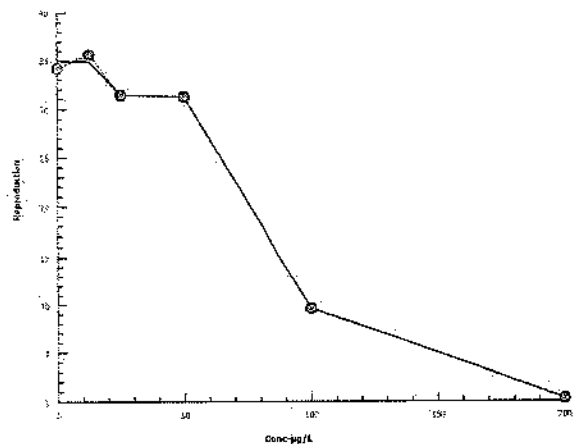
Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 21-2452-6843 Endpoint: Reproduction
Analyzed: 03 Dec-18 9:02 Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.1
Official Results: Yes

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Test Type: Reproduction-Survival (7d)

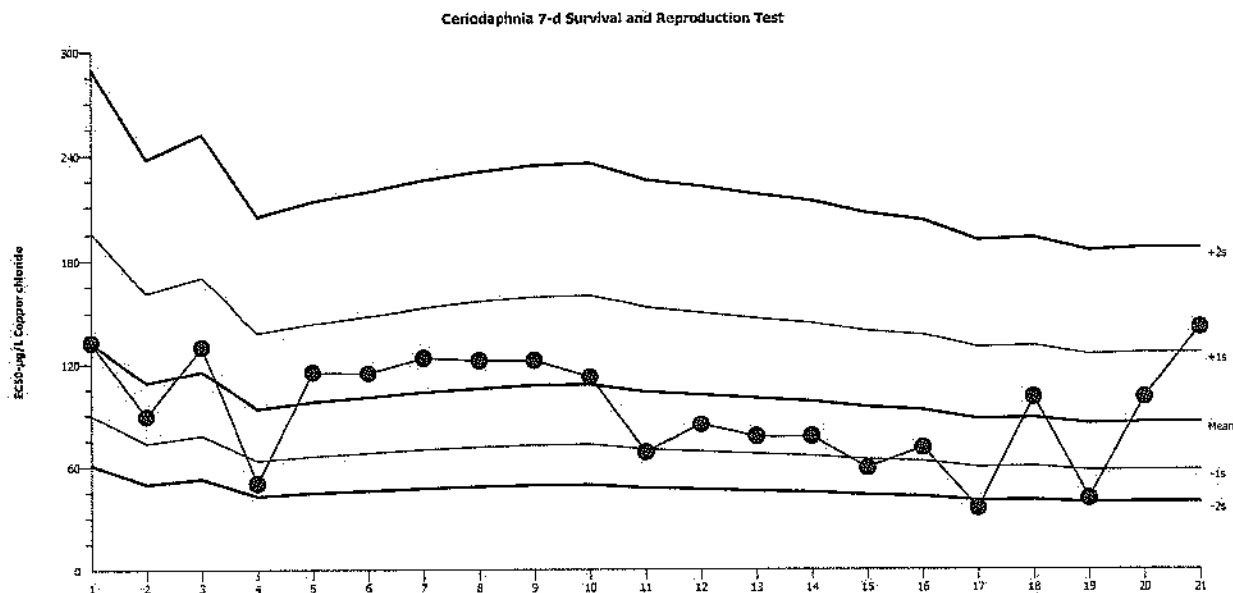
Organism: Ceriodaphnia dubia (Water Flea)

Material: Copper chloride

Protocol: EPA/821/R-02-013 (2002)

Endpoint: 7d Survival Rate

Source: Reference Toxicant-REF



Mean: 85.46

Count: 20

-1s Warning Limit: 57.8

-2s Action Limit: 39.1

Sigma: N/A

CV: 47.80%

+1s Warning Limit: 126.3

+2s Action Limit: 186.7

Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Jul	27	132.6	47.12	1.124	(+)		00-3533-4104	07-3102-4627
2		Aug	9	89.13	3.673	0.1077			05-1646-5416	02-7143-5836
3			23	129.7	44.28	1.068	(+)		18-0928-7994	14-9065-9379
4		Sep	6	50	-35.46	-1.371	(-)		04-1283-5528	07-2201-0667
5			20	114.9	29.45	0.7577			09-2547-5700	02-6449-6736
6		Oct	18	114.5	29.01	0.7478			14-7896-4665	17-5474-2245
7		Nov	15	123.5	38.01	0.9416			09-2671-6353	07-5336-3496
8		Dec	13	121.9	36.49	0.9099			19-3949-3034	10-6518-1710
9	2018	Jan	4	121.9	36.49	0.9099			17-7500-8361	05-5922-1635
10		Feb	7	112.3	26.82	0.6984			04-8492-7543	17-6325-1645
11		Mar	2	68.1	-17.36	-0.581			11-4862-8707	06-1686-5917
12			15	84.14	-1.316	-0.03971			20-9677-0547	14-4393-4243
13		Apr	19	77.17	-8.286	-0.261			18-2737-1194	07-4972-9760
14		May	16	77.17	-8.286	-0.261			05-4955-8978	09-0510-7297
15		Jun	13	58.82	-26.64	-0.956			16-1570-3305	01-3881-0040
16		Jul	12	70.77	-14.69	-0.4825			05-0138-0333	09-5921-7712
17		Aug	22	35.41	-50.04	-2.254	(-)	(-)	11-5251-4189	02-6103-0961
18		Sep	12	100	14.54	0.4022			10-4359-2259	02-9718-5741
19		Oct	17	41.07	-44.39	-1.875	(-)		09-6713-5129	03-7900-4433
20		Nov	14	100	14.54	0.4022			16-4205-8005	13-0463-7350
21			23	141.5	56.03	1.29	(+)		07-8581-3240	03-2855-8063

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Test Type: Reproduction-Survival (7d)

Organism: Ceriodaphnia dubia (Water Flea)

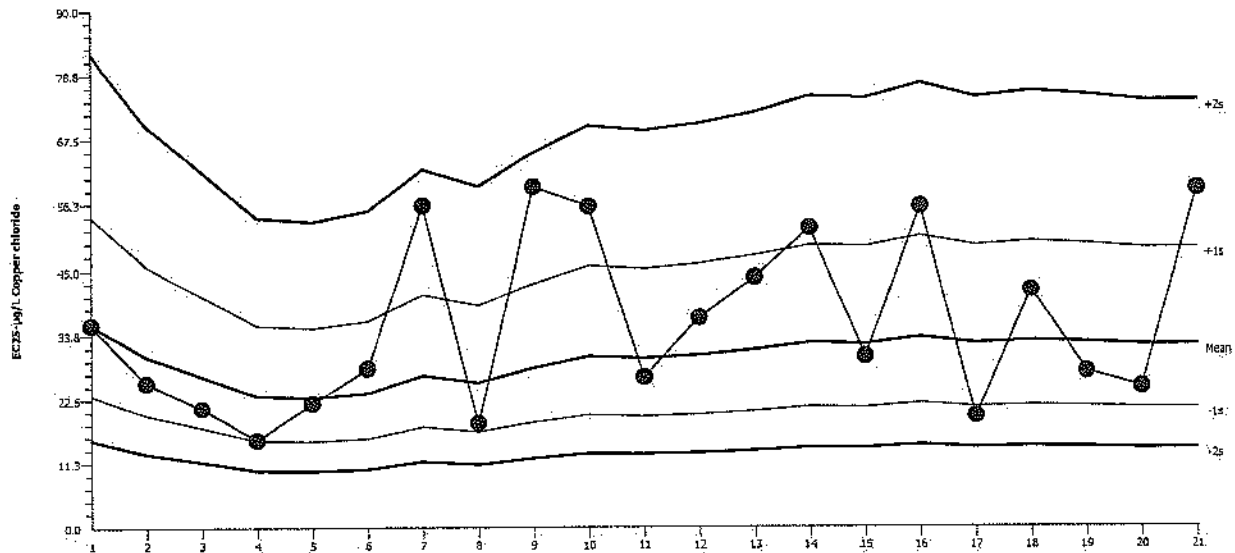
Material: Copper chloride

Protocol: EPA/821/R-02-013 (2002)

Endpoint: Reproduction

Source: Reference Toxicant-REF

Ceriodaphnia 7-d Survival and Reproduction Test



Mean: 31.88

Count: 20

-1s Warning Limit: 20.92

-2s Action Limit: 13.72

Sigma: N/A

CV: 52.50%

+1s Warning Limit: 48.63

+2s Action Limit: 74.15

Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Jul	27	35.41	3.534	0.2492			00-3533-4104	15-5816-8081
2		Aug	9	25.45	-6.433	-0.5343			05-1646-5416	12-8828-7274
3			23	20.93	-10.95	-0.9974			18-0928-7994	01-4455-3838
4		Sep	6	15.28	-16.6	-1.744	(-)		04-1283-5528	07-4663-1403
5			20	21.83	-10.05	-0.898			09-2547-5700	05-2225-6686
6		Oct	18	27.98	-3.902	-0.3095			14-7896-4665	10-2719-4408
7		Nov	15	55.96	24.08	1.334	(+)		09-2671-6353	12-1707-6477
8		Dec	13	18.28	-13.6	-1.318	(-)		19-3949-3034	15-1089-9957
9	2018	Jan	4	59.22	27.34	1.468	(+)		17-7500-8361	03-9405-5395
10		Feb	7	55.8	23.92	1.327	(+)		04-8492-7543	19-3721-5481
11		Mar	2	26.44	-5.437	-0.4433			11-4862-8707	08-2696-1620
12			15	36.61	4.733	0.3282			20-9677-0547	09-0026-7515
13		Apr	19	43.76	11.88	0.751			18-2737-1194	03-8342-1801
14		May	16	51.99	20.11	1.159	(+)		05-4955-8978	05-0129-1380
15		Jun	13	29.96	-1.92	-0.1473			16-1570-3305	06-3152-2418
16		Jul	12	55.75	23.87	1.325	(+)		05-0138-0333	18-3627-7518
17		Aug	22	19.4	-12.48	-1.178	(-)		11-5251-4189	07-5888-1093
18		Sep	12	41.54	9.659	0.6275			10-4359-2259	01-2617-3703
19		Oct	17	27.3	-4.578	-0.3675			09-6713-5129	11-3265-6236
20		Nov	14	24.67	-7.213	-0.6081			16-4205-8005	10-8446-2066
21			23	58.79	26.91	1.451	(+)		07-8581-3240	21-2452-6843

CETIS Test Data Worksheet

Report Date:

22 Nov-18 14:13 (p 1 of 2)

Test Code:

07-8581-3240/1811RT2B.C

Ceriodaphnia 7-d Survival and Reproduction Test MC #29#4 → 11/23/18 Hyperion Treatment Plant Laboratory

Start Date: 23 Nov-18 1435 Species: Ceriodaphnia dubia (9:50-13:35) Sample Code: 2FC2F96
 End Date: 30 Nov-18 1432 Protocol: EPA/821/R-02-013 (2002) Sample Source: Reference Toxicant
 Sample Date: 23 Nov-18 1135 Material: Copper chloride Sample Station:

Conc-µg/L	Code	Rep	Pos	# Exposed	1d Survival	2d Survival	3d Survival	4d Survival	5d Survival	6d Survival	7d Survival	Neonates	Male
0	D	1	1	1	0	0	0	6	0	13	23	42	
0	D	2	12	1	0	0	0	4	10	21	0	35	
0	D	3	15	1	0	0	0	5	0	10	16	31	
0	D	4	8	1	0	0	0	4	10	0	17	31	
0	D	5	5	1	0	0	0	6	0	13	24	43	
0	D	6	25	1	0	0	0	4	9	0	18	31	
0	D	7	16	1	0	0	0	3	9	0	19	31	
0	D	8	42	1	0	0	0	6	0	18	18	39	
0	D	9	32	1	0	0	0	5	0	18	16	31	
0	D	10	22	1	0	0	0	4	7	0	17	28	
12.5		1	21	1	0	0	0	4	0	11	21	38	
12.5		2	55	1	0	0	0	4	0	10	15	30	
12.5		3	41	1	0	0	0	3	0	14	16	33	
12.5		4	44	1	0	0	0	6	0	16	24	46	
12.5		5	33	1	0	0	0	0	6	18	6	30	
12.5		6	18	1	0	0	0	4	0	18	20	34	
12.5		7	24	1	0	0	0	7	0	15	20	42	
12.5		8	37	1	0	0	0	6	0	13	20	39	
12.5		9	20	1	0	0	0	5	0	13	17	35	
12.5		10	10	1	0	0	0	4	9	0	16	29	
25		1	50	1	0	0	0	5	0	14	23	42	
25		2	47	1	0	0	0	5	0	15	20	40	
25		3	30	1	0	0	0	4	0	15	17	31	
25		4	58	1	0	0	0	5	12	0	21	38	
25		5	39	1	0	0	0	5	0	14	19	38	
25		6	46	1	0	0	0	4	0	1	12	17	
25		7	14	1	0	0	0	5	12	0	20	37	
25		8	3	1	0	0	0	5	0	12	24	41	
25		9	27	1	0	0	0	1	0	4	14	19	
25		10	26	1	0	0	0	0	6	4	1	11	
50		1	56	1	0	0	0	4	0	0	19	34	
50		2	9	1	0	0	0	3	9	0	17	29	
50		3	45	1	0	0	0	0	7	15	20	42	
50		4	29	1	0	0	0	5	0	11	15	31	
50		5	60	1	0	0	0	0	4	18	11	23	
50		6	11	1	0	0	0	0	0	12	19	39	
50		7	40	1	0	0	0	6	0	13	20	39	
50		8	17	1	0	0	0	5	0	9	9	23	
50		9	19	1	0	0	0	4	0	0	20	32	
50		10	4	1	0	0	0	6	0	0	8	20	
100		1	52	1	0	0	0	5	0	0	0	13	
100		2	43	1	0	0	0	5	0	0	11	25	
100		3	53	1	0	0	0	0	0	0	0	0	
100		4	6	1	0	0	0	2	0	0	0	2	
100		5	31	1	0	0	0	4	0	0	0	10	
100		6	2	1	0	0	0	5	2	0	0	9	
100		7	23	1	0	0	0	6	2	0	0	14	

CETIS Test Data Worksheet

Report Date:

22 Nov-18 14:13 (p 2 of 2)

Test Code:

07-8581-3240/1811RT2B.C

Conc-µg/L	Code	Rep	Pos	# Exposed	1d Survival	2d Survival	3d Survival	4d Survival	5d Survival	6d Survival	7d Survival	Neonates	Male
100		8	13	1	0	0	0	0	0	0	0	0	
100		9	38	1	0	0	0	3	0	4	3	10	
100		10	48	1	0	0	0	3	10	0	0	13	
200		1	59	1	0	0X	X	X	X	X	X	0	
200		2	35	1	0	0X	0	0X	X	X	X	0	
200		3	57	1	0	0	0X	X	X	X	X	0	
200		4	36	1	0	0X	X	X	X	X	X	0	
200		5	28	1	0	0	0X	X	X	X	X	0	
200		6	49	1	0	0	0	0	1	0X	X	1	
200		7	54	1	0	0	0	0X	X	X	X	0	
200		8	34	1	0	0	0	0	1	0X	X	1	
200		9	7	1	0	0	0	0	0	1X	X	1	
200		10	51	1	0	0	0	0	0	0X	X	0	

11/23 11/24 11/25 11/26 11/27 11/28 11/29 11/30

Food Added: 1358 1109 1210 1241 1018 0842 1127
 Fe Fe Fe Fe Fe Fe Fe

Transferred: 1435 1124 1300 1323 1125 0927 1215
 Fe Fe Fe Fe Fe Fe Fe

11/27 11/28 11/29 11/30
 1430 1432 11/30/18

Re

Re

CETIS Measurement Worksheet

Report Date: 22 Nov-18 14:13 (p 1 of 2)
Test Code: 1811RT2B.C | 07-8581-3240

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 23 Nov-18 Species: Ceriodaphnia dubia Sample Code: 2FC2F96
End Date: 30 Nov-18 Protocol: EPA/821/R-02-013 (2002) Sample Source: Reference Toxicant
Sample Date: 23 Nov-18 Material: Copper chloride Sample Station:

Alkalinity (CaCO₃)-mg/L

Conc-µg/L	Code	Reading 1
0	D	120
200		124
Measure Time:		
Instrument ID:		
Analyst:		

see Reconstituted Water Prep. Logbook (11/21/18 AS)
see attached worksheet

Conductivity-µmhos

Conc-µg/L	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	579	556	557	543	579	579	580
12.5		589	564	563	560	565	593	589
25		591	563	564	560	561	536	519
50		590	562	563	561	540	589	477
100		591	561	563	560	534	575	548
200		582	553	545	553	491	378	575
Measure Time:		1218	1100	1140	1130	1024	0847	1130
Instrument ID:		#3	#3	#3	#3	2	2	2
Analyst:		RC	RC	RC	RC	RL	RL	RL

11-28-18 102
565

Final Dissolved Oxygen-mg/L

Conc-µg/L	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	7.43	7.57	7.66	7.48	7.99	7.42	7.64
12.5		7.52	7.66	7.74	7.59	7.93	7.46	7.61
25		7.59	7.62	7.85	7.63	7.86	7.51	7.59
50		7.58	7.45	7.79	7.70	7.83	7.49	7.61
100		7.54	7.85	7.85	7.73	7.75	7.51	7.69
200		7.42	7.49	8.03	7.80	7.78	7.52	—
Measure Time:		1232	1330	1343	1432	1034	1540	1725
Instrument ID:		#4	#4	#4	4	4	#4	#4
Analyst:		RC	RC	RC	RL	RL	RC	RC

Initial Dissolved Oxygen-mg/L

Conc-µg/L	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	7.57	7.61	7.78	7.75	8.01	7.99	7.88
12.5		7.66	7.66	7.71	7.89	8.05	7.99	7.92
25		7.62	7.62	7.70	7.88	8.00	8.03	7.94
50		7.65	7.59	7.71	7.91	8.02	8.00	7.93
100		7.55	7.57	7.74	7.94	8.00	8.04	7.94
200		7.49	7.53	7.81	7.91	7.98	8.02	7.97
Measure Time:		1218	1100	1140	1130	1024	0847	1130
Instrument ID:		#4	#4	#4	#4	4	4	4
Analyst:		RC	RC	RC	RC	RL	RL	RL

Hardness (CaCO₃)-mg/L

Conc-µg/L	Code	Reading 1
0	D	172
200		180
Measure Time:		
Instrument ID:		
Analyst:		

see Reconstituted Water Prep. Logbook (11/21/18 AS)
see attached worksheet

CETIS Measurement Worksheet

Report Date: 22 Nov-18 14:13 (p 2 of 2)
Test Code: 1811RT2B.C | 07-8581-3240

Ceriodaphnia 7-d Survival and Reproduction Test								Hyperion Treatment Plant Laboratory
Start Date: 23 Nov-18		Species: Ceriodaphnia dubia		Sample Code: 2FC2F96				
End Date: 30 Nov-18		Protocol: EPA/821/R-02-013 (2002)		Sample Source: Reference Toxicant				
Sample Date: 23 Nov-18		Material: Copper chloride		Sample Station:				

Final pH								
Conc-µg/L	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	8.13	7.81	8.15	8.27	8.18	8.08	8.37
12.5		8.22	7.89	8.19	8.26	8.16	8.08	8.32
25		8.21	7.90	8.16	8.25	8.12	8.09	8.28
50		8.18	7.88	8.13	8.24	8.15	8.08	8.28
100		8.19	7.92	8.17	8.22	8.11	8.09	8.31
200		8.14	7.94	8.19	8.27	8.13	8.09	8.31
Measure Time:		1232	1330	1343	1432	1034	1540	1725
Instrument ID:		#3	#3	#3	3	3	#3	#3
Analyst:		RC	RC	RC	RC	RC	RC	RC

Initial pH								
Conc-µg/L	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	8.05	7.84	8.00	8.03	8.13	8.07	8.12
12.5		8.10	7.87	8.04	8.11	8.13	8.08	8.12
25		8.11	7.90	8.07	8.13	8.13	8.07	8.13
50		8.13	7.92	8.06	8.15	8.14	8.08	8.13
100		8.14	7.93	8.07	8.15	8.13	8.08	8.14
200		8.14	7.94	8.06	8.14	8.13	8.07	8.13
Measure Time:		1218	1100	1140	1130	1024	0847	1130
Instrument ID:		#3	#3	#3	#3	3	3	3
Analyst:		RC	RC	RC	RC	RC	RC	RC

Final Temperature-°C								
Conc-µg/L	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	25.5	25.7	25.4	25.1	24.3	25.3	25.2
12.5		25.4	25.7	25.2	25.0	24.7	25.1	25.0
25		25.3	25.5	25.1	25.0	24.7	25.0	24.9
50		25.3	25.5	25.1	24.9	24.9	24.9	24.9
100		25.2	25.5	25.1	25.1	24.9	24.8	24.7
200		25.1	25.6	25.0	25.0	24.9	24.5	24.5
Measure Time:		1232	1330	1343	1432	1034	1540	1725
Instrument ID:		#3	#3	#3	3	3	#3	#3
Analyst:		RC	RC	RC	RC	RC	RC	RC

Initial Temperature-°C								
Conc-µg/L	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	25.2	25.1	25.2	24.9	24.3	25.1	25.4
12.5		25.7	25.9	24.9	24.8	24.5	24.9	25.2
25		25.8	25.9	24.8	24.5	24.4	24.9	25.1
50		25.7	25.8	24.7	24.5	24.5	24.8	25.1
100		25.6	25.5	24.6	24.8	24.4	24.7	25.0
200		25.5	25.3	24.7	24.5	24.3	24.6	24.8
Measure Time:		1218	1100	1140	1130	1024	0847	1130
Instrument ID:		#3	#3	#3	#3	3	3	3
Analyst:		RC	RC	RC	RC	RC	RC	RC

Alkalinity

Date/Time: 2/4/10, 1300Project: MS4 1st Flush CelioAnalyst: 102Titrant: H₂SO₄Factor: 20 @ 50 mL

Sample	Sample (mL) Amount	Titrant Amount (mL)	Titrant Amount x Factor (mg CaCO ₃ /L)
MTHSPW	25	1.5	60
[200] Cu		3.1	124
THJ		1.2	48
WAS		2.4	96
R#5 LA		0.6	24
DOM		0.5	20
SMB		2.6	104
NAT		0.9	36
SAW	25	1.0	40

Hardness

Date/Time: 12/4/18, 1300

Project: M54 1st Flush

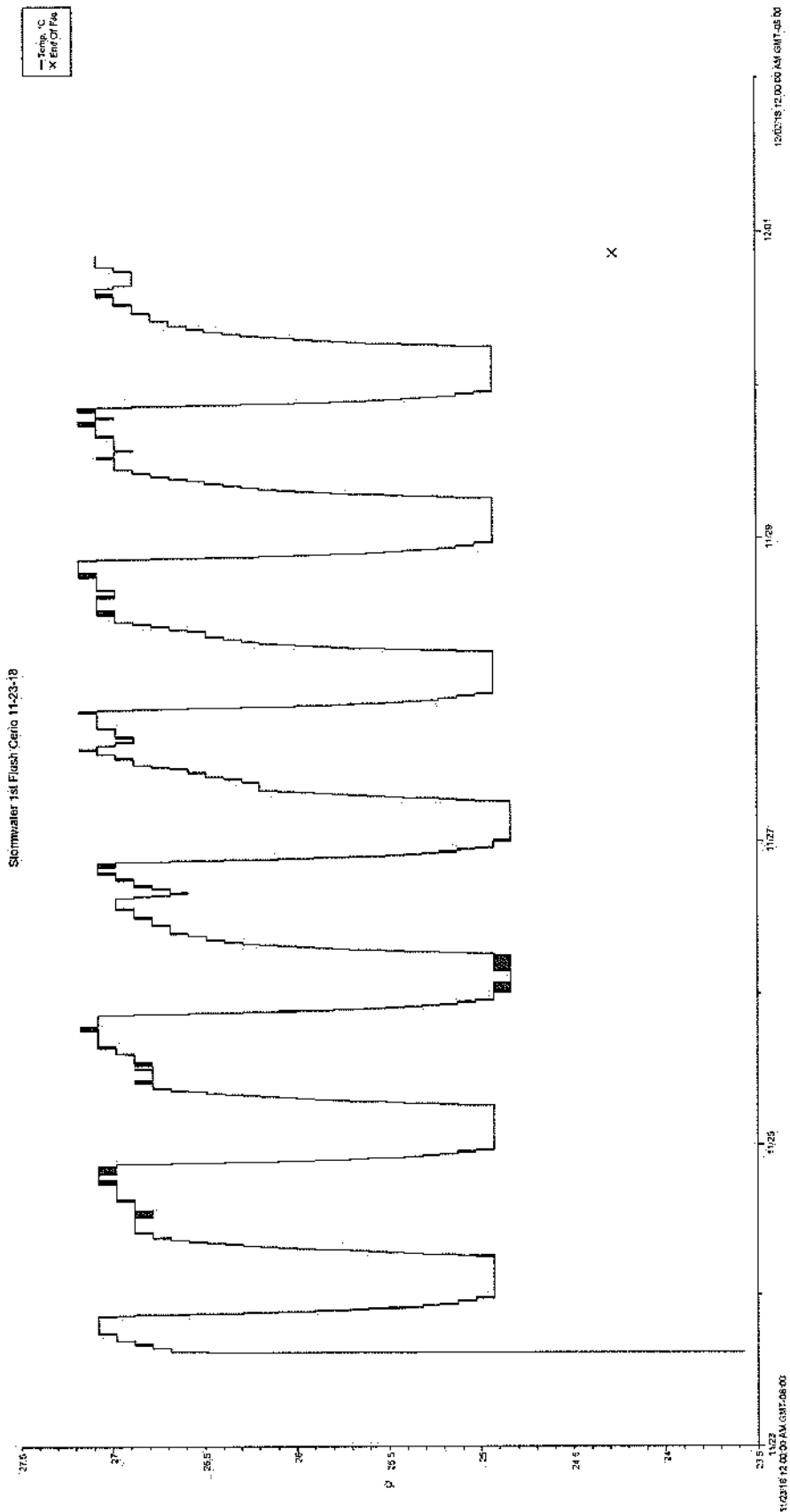
Analyst: 102

Cert

Titrant: EDTA

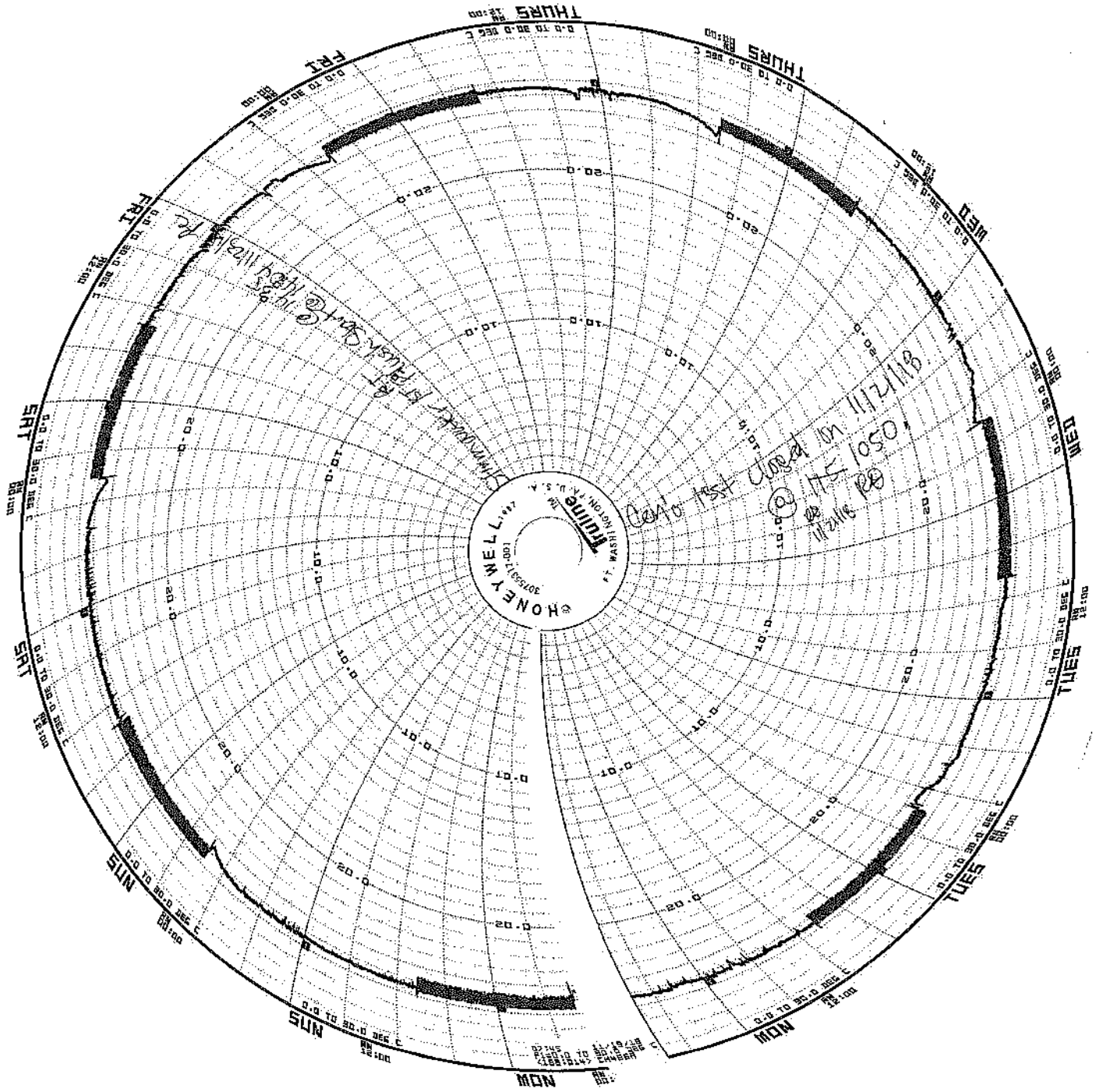
Factor: 20050 mL

Sample	Sample Amount (mL)	Titrant Amount (mL)	Titrant Amount x Factor (mg CaCO ₃ /L)
M5FW	25	2.2	48 ^{102 12/4/18} (88)
[200] CH	1	4.5	180
TWJ		1.7	60
WAS		3.6	144
PHSA		0.7	20
DOM		0.6	24
SMB		5.6	224
NAT	▽	1.2	48
SAW	25	1.2	48

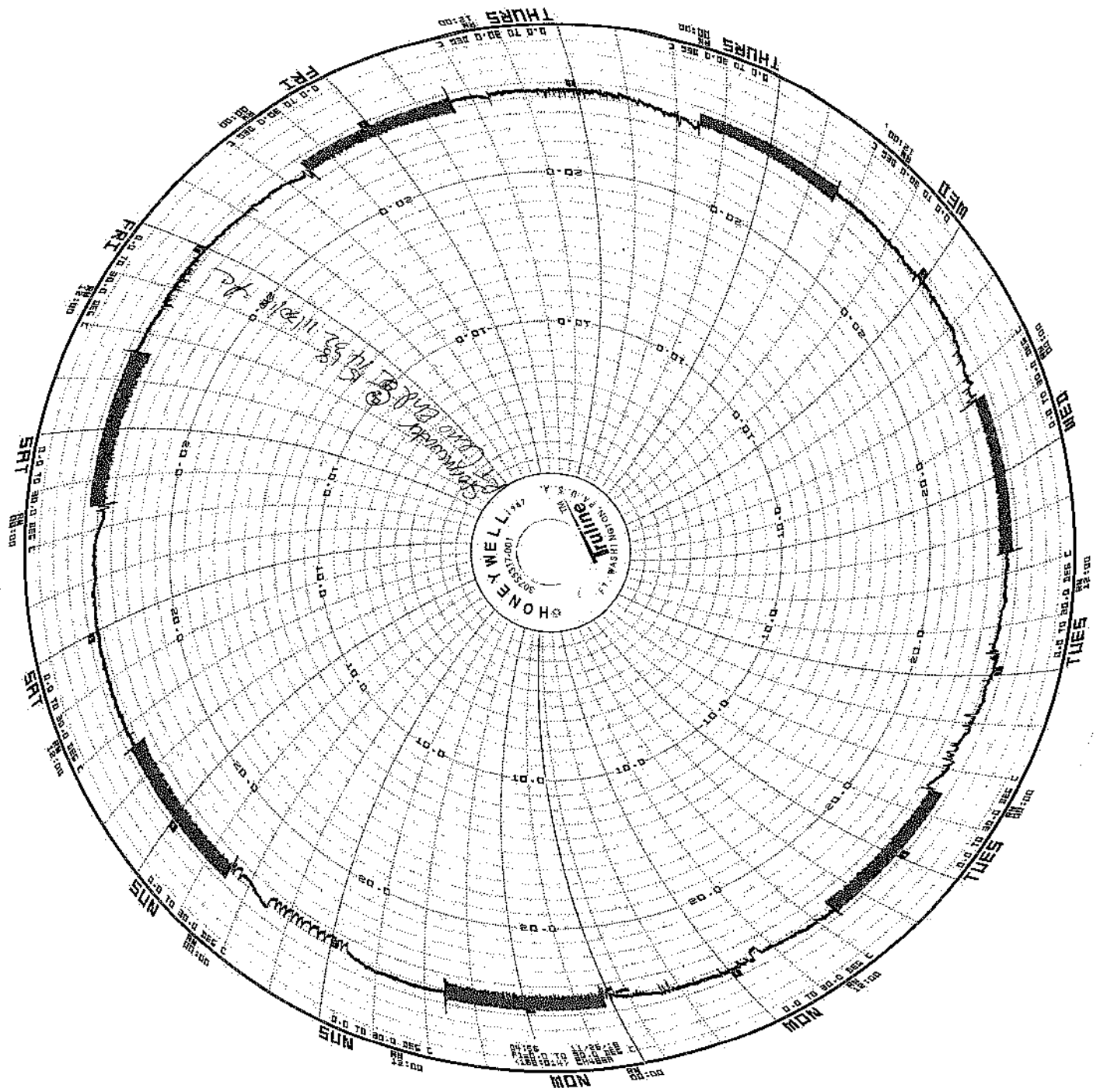


Test: 1811RT28.C, 1811072A.C - G.C

Date: 11/23/18(14:04) - 11/30/18(15:18)



Test: 1811RT2B.C, 1811072A-G.C
 Date: 11/23/18(14:04) - 11/30/18(15:18)



Test: 1811RTZB.C, 1811072A-G.C

Date: 11/23/18 (14:04) - 11/30/18 (15:18)

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

REFERENCE TOXICANT
TOXICITY TESTING REPORT

SAMPLE DATE: November 27, 2018

TEST DATE: November 27, 2018

TEST NUMBER: 1811RT2A.H

TEST MATERIAL: Zinc Sulfate

TEST SPECIES: *Haliotis rufescens*

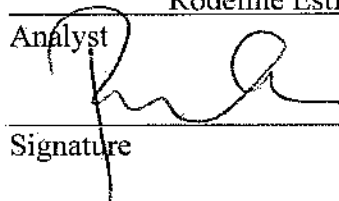
PROTOCOL: EPA/600/R-95/136

TEST TYPE: Chronic

RESULT: Invalid*

*The abalone failed to spawn enough gametes to start the test.

Rodeline Estiva

Analyst


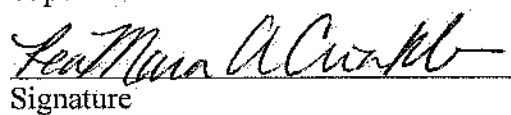
Signature

Water Biologist II

Title
JANUARY 28, 2019

Date

Rea Crinklaw

Supervisor


Signature

Water Biologist III

Title
2/25/19

Date

CETIS Test Data Worksheet



Report Date: 26 Nov-18 09:20 (p 1 of 1)
Test Code: 10-3138-5125/1811RT2A.H

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Start Date: 27 Nov-18 Species: *Haliotis rufescens* Sample Code: 3A1B51E8
End Date: 29 Nov-18 Protocol: EPA/600/R-95/136 (1995) Sample Source: Reference Toxicant
Sample Date: 27 Nov-18 Material: Zinc sulfate Sample Station:

Conc-µg/L	Code	Rep	Pos	# Counted	# Normal	Notes
0	D	1	24			
0	D	2	17			
0	D	3	9			
0	D	4	27			
0	D	5	10			
10		1	26			
10		2	13			
10		3	2			
10		4	23			
10		5	8			
18		1	1			
18		2	30			
18		3	15			
18		4	14			
18		5	25			
32		1	20			
32		2	22			
32		3	4			
32		4	12			
32		5	29			
56		1	16			
56		2	5			
56		3	3			
56		4	6			
56		5	28			
100		1	18			
100		2	7			
100		3	19			
100		4	21			
100		5	11			

Test aborted.

set up @ 10:00 RE 11/27/2018

CETIS Measurement Worksheet

RT

Report Date: 26 Nov-18 09:20 (p 1 of 1)
Test Code: 1811RT2A.H | 10-3138-5125

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Start Date: 27 Nov-18 Species: Haliotis rufescens Sample Code: 3A1B51E8
End Date: 29 Nov-18 Protocol: EPA/600/R-95/136 (1995) Sample Source: Reference Toxicant
Sample Date: 27 Nov-18 Material: Zinc sulfate Sample Station:

Dissolved Oxygen-mg/L 11/27

Conc-µg/L	Code	Reading 1	Reading 2
0	D	7.45	
10		7.54	
18		7.64	
32		7.66	
56		7.65	
100		7.67	
Measure Time:		12:46	
Instrument ID:		#3	
Analyst:		RA	

pH 11/27

Conc-µg/L	Code	Reading 1	Reading 2
0	D	8.40	
10		8.39	
18		8.42	
32		8.40	
56		8.42	
100		8.41	
Measure Time:		11:03	
Instrument ID:		#1	
Analyst:		RA	

Salinity-ppt 11/27

Conc-µg/L	Code	Reading 1	Reading 2
0	D	34	
10		34	
18		34	
32		34	
56		34	
100		34	
Measure Time:		11:03	
Instrument ID:		#4	
Analyst:		RA	

Temperature-°C 11/27

Conc-µg/L	Code	Reading 1	Reading 2	Reading 3
0	D	14.8		
10		15.1		
18		15.2		
32		15.2		
56		15.2		
100		15.2		
Measure Time:		11:03		
Instrument ID:		#1		
Analyst:		RA		

ABALONE SPAWNING WORKSHEET

TYPE OF EFFLUENT: Stormwater

TEST START DATE: November 27, 2018
 TEST ID: 1811RT2A.H, 1811072A.H, 1811072B.H
 TIME SPAWNING START: 900

Batch #: 181004

Number of abalone	Gonad index	Temperature		
Males <u>2</u> <u>2</u> <u>1</u> <u>1</u>	<u>1.5</u>	<u>15°</u> C		
Females <u>2</u> <u>2</u> <u>2</u> <u>1</u> <u>1</u>	<u>1.6</u>	<u>15°</u> C		
	Time	Male	Female	
Beginning of spawning treatment:	Male <u>1032</u> Female <u>936</u>	<u>15°</u> C	<u>15°</u> C	
Taken out of H2O2:	<u>1303</u> <u>1212</u>			
First male abalone spawn:	<u>1332</u>	<u>15°</u> C	<u>15°</u> C	
First female abalone spawn:	<u>1308*</u>	<u>15°</u> C	<u>15°</u> C	
Fertilization start:	—	<u>15°</u> C	<u>15°</u> C	
Fertilization completed:	—	<u>15°</u> C	<u>15°</u> C	

Fertilized eggs density count:

Mean _____/0.5 ml

Add 1000 embryos/test container divided by the number of embryos/ml
 _____ = _____ ml/test per beaker

Temperature of embryos: _____° C
 Temperature of test containers: _____° C
 Time embryos added to test chambers (TEST START): _____

*Very little amount of eggs
 Test will be aborted. Not enough egg and sperm for
 fertilization to start test. RE 11/27/2018

TEST CLOSING

DATE: _____ TIME: _____

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

STORMWATER MONITORING PROGRAM

TOXICITY TESTING REPORT

SAMPLE DATE: November 26, 2018

TEST DATE: November 27, 2018

TEST NUMBER: 1811072B.H

TEST MATERIAL: Station RW-SMB-3

TEST SPECIES: *Haliotis rufescens*

PROTOCOL: EPA/600/R-95/136

TEST TYPE: Chronic

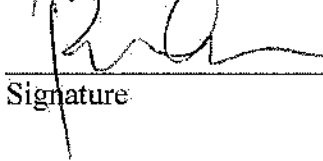
REFERENCE TOXICANT TEST: 1811RT2A.H

RESULT: Invalid*

*The abalone failed to spawn enough gametes to start the test.

Rodeline Estiva

Analyst



Signature

Water Biologist II

Title

JANUARY 28, 2019

Date

Rea Crinklaw

Supervisor



Signature

Water Biologist III

Title

2/25/19

Date

CETIS Test Data Worksheet

SMB 3Report Date: 26 Nov-18 09:17 (p 1 of 1)
Test Code: 18-6502-9091/1811072B.H

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Start Date: 27 Nov-18 Species: *Haliotis rufescens*
End Date: 29 Nov-18 Protocol: EPA/600/R-95/136 (1995)
Sample Date: 26 Nov-18 Material: Stormwater Monitoring SampleSample Code: 2C4C6F6
Sample Source: WPD
Sample Station: RW-SMB-3

Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
0	D	1	8			
0	D	2	15			
0	D	3	5			
0	D	4	9			
0	D	5	14			
100		1	13			
100		2	12			
100		3	2			
100		4	11			
100		5	6			

sampled 11/26/2018 @ 10:24, 3283902

Test aborted

Set-up @ 11:20, 11/27/18 ~~RA~~

CETIS Measurement Worksheet

SMB 3Report Date: 26 Nov-18 09:17 (p 1 of 1)
Test Code: 1811072B.H | 18-6502-9091

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Start Date: 27 Nov-18 Species: Haliotis rufescens
End Date: 29 Nov-18 Protocol: EPA/600/R-95/136 (1995)
Sample Date: 26 Nov-18 Material: Stormwater Monitoring SampleSample Code: 2C4C6F6
Sample Source: WPD
Sample Station: RW-SMB-3

Dissolved Oxygen-mg/L 11/27

Conc-%	Code	Reading 1	Reading 2
0	D	7.44	
100		8.52	
Measure Time:		1220	
Instrument ID:		#3	
Analyst:		RB	

pH 11/27

Conc-%	Code	Reading 1	Reading 2
0	D	8.42	
100		8.54	
Measure Time:		1120	
Instrument ID:		#1	
Analyst:		RB	

Salinity-ppt 11/27

Conc-%	Code	Reading 1	Reading 2
0	D	34	
100		34	
Measure Time:		1120	
Instrument ID:		#4	
Analyst:		RB	

Temperature-°C 11/27

Conc-%	Code	Reading 1	Reading 2	Reading 3
0	D	15.1		
100		14.0		
Measure Time:		1120		
Instrument ID:		#1		
Analyst:		RB		

ABALONE SPAWNING WORKSHEET

TYPE OF EFFLUENT: Stormwater

TEST START DATE: November 27, 2018
 TEST ID: 1811RT2A.H, 1811072A.H, 1811072B.H
 TIME SPAWNING START: 900

Batch #: 181004

Number of abalone		Gonad index	Temperature	
Males	<u>2</u> <u>2</u> <u>1</u> <u>1</u>	<u>1.5</u>	<u>15°</u> C	
Females	<u>2</u> <u>2</u> <u>2</u> <u>1</u> <u>1</u>	<u>1.6</u>	<u>15°</u> C	
		Time	Male	Female
		Male Female	Temperature	Temperature
Beginning of spawning treatment:		<u>1032</u> <u>936</u>	<u>15°</u> C	<u>15°</u> C
Taken out of H2O2:		<u>1303</u> <u>1212</u>		
First male abalone spawn:		<u>1332</u>	<u>15°</u> C	<u>15°</u> C
First female abalone spawn:		<u>1308*</u>	<u>15°</u> C	<u>15°</u> C
Fertilization start:		—	<u>15°</u> C	<u>15°</u> C
Fertilization completed:		—	<u>15°</u> C	<u>15°</u> C

Fertilized eggs density count:

Mean _____/0.5 ml

Add 1000 embryos/test container divided by the number of embryos/ml
 _____ = _____ ml/test per beaker

Temperature of embryos: _____ ° C
 Temperature of test containers: _____ ° C
 Time embryos added to test chambers (TEST START): _____

*Very little amount of eggs

Test will be aborted. Not enough egg and sperm for fertilization to start test. RE 11/27/2018

TEST CLOSING

DATE: _____ TIME: _____

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

STORMWATER MONITORING PROGRAM

TOXICITY TESTING REPORT

SAMPLE DATE: November 26, 2018

TEST DATE: November 27, 2018

TEST NUMBER: 1811072A.H

TEST MATERIAL: Station RW-SMB-1

TEST SPECIES: *Haliotis rufescens*

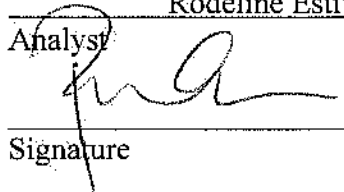
PROTOCOL: EPA/600/R-95/136

TEST TYPE: Chronic


REFERENCE TOXICANT TEST: 1811RT2A.H

RESULT: Invalid*

*The abalone failed to spawn enough gametes to start the test.

Rodeline Estiva
Analyst

Signature

Water Biologist II
Title
JANUARY 28, 2019
Date

Rea Crinklaw
Supervisor

Signature

Water Biologist III
Title
2/25/19
Date

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Start Date: 27 Nov-18

Species: Haliotis rufescens

Sample Code: 1C1BCD9D

End Date: 29 Nov-18

Protocol: EPA/600/R-95/136 (1995)

Sample Source: WPD

Sample Date: 26 Nov-18

Material: Stormwater Monitoring Sample

Sample Station: RW-SMB-1

Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
0	D	1	8			
0	D	2	15			
0	D	3	5			
0	D	4	9			
0	D	5	14			
100		1	7			
100		2	1			
100		3	4			
100		4	3			
100		5	10			

Sampled 11/26/2018 @ 9:56, 3283901

Batch 1112 HBN 69866

Test aborted.

Set-up @ 11:15 on 11/27/2018, RE

CETIS Measurement Worksheet

SMB 1

Report Date: 26 Nov-18 09:17 (p 1 of 1)

Test Code: 1811072A.H | 16-5703-7707

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Start Date: 27 Nov-18 Species: Haliotis rufescens
End Date: 29 Nov-18 Protocol: EPA/600/R-95/136 (1995)
Sample Date: 26 Nov-18 Material: Stormwater Monitoring Sample

Sample Code: 1C1BCD9D
Sample Source: WPD
Sample Station: RW-SMB-1

Dissolved Oxygen-mg/L 11/27

Conc-%	Code	Reading 1	Reading 2
0	D	7.44	
100		8.30	
Measure Time:		1227	
Instrument ID:		#3	
Analyst:		RO	

pH 11/27

Conc-%	Code	Reading 1	Reading 2
0	D	8.42	
100		8.52	
Measure Time:		1115	
Instrument ID:		#1	
Analyst:		RO	

Salinity-ppt 11/27

Conc-%	Code	Reading 1	Reading 2
0	D	34	
100		34	
Measure Time:		1115	
Instrument ID:		#4	
Analyst:		RO	

Temperature-°C 11/27

Conc-%	Code	Reading 1	Reading 2	Reading 3
0	D	15.1		
100		14.4		
Measure Time:		1115		
Instrument ID:		#1		
Analyst:		RO		

ABALONE SPAWNING WORKSHEET

TYPE OF EFFLUENT: Stormwater

TEST START DATE: November 27, 2018
 TEST ID: 1811RT2A.H, 1811072A.H, 1811072B.H
 TIME SPAWNING START: 900

Batch #: 181004

Number of abalone	Gonad index	Temperature		
Males <u>2</u> <u>2</u> <u>1</u> <u>1</u>	<u>1.5</u>	<u>15°</u> C		
Females <u>2</u> <u>2</u> <u>2</u> <u>1</u> <u>1</u>	<u>1.6</u>	<u>15°</u> C		
	Time	Male	Female	
Beginning of spawning treatment:	Male <u>1032</u> Female <u>936</u>	<u>15°</u> C	<u>15°</u> C	
Taken out of H2O2:	<u>1303</u> <u>1212</u>			
First male abalone spawn:	<u>1332</u>	<u>15°</u> C	<u>15°</u> C	
First female abalone spawn:	<u>1308*</u>	<u>15°</u> C	<u>15°</u> C	
Fertilization start:	—	<u>15°</u> C	<u>15°</u> C	
Fertilization completed:	—	<u>15°</u> C	<u>15°</u> C	

Fertilized eggs density count:

Mean _____/0.5 ml

Add 1000 embryos/test container divided by the number of embryos/ml
 _____=_____ml/test per beaker

Temperature of embryos: _____° C
 Temperature of test containers: _____° C
 Time embryos added to test chambers (TEST START): _____

*Very little amount of eggs
 Test will be aborted. Not enough egg and sperm for
 fertilization to start test. RE 11/27/2018

TEST CLOSING

DATE: _____ TIME: _____

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

REFERENCE TOXICANT
TOXICITY TESTING REPORT

SAMPLE DATE: November 27, 2018

TEST DATE: November 27, 2018


TEST NUMBER: 1811RT2A.U

TEST MATERIAL: Copper Chloride

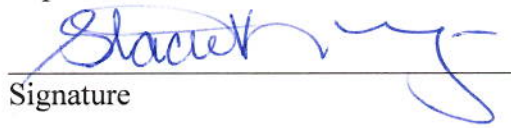
TEST SPECIES: *Strongylocentrotus purpuratus* PROTOCOL: EPA/600/R-95/136

TEST TYPE: Chronic

RESULT: NOEC = 20.4 µg/L
IC₂₅ = 29.7 µg/L

Rea Mara A Crinklaw
Analyst

Signature

Water Biologist III
Title
1/28/19
Date

Stacey Karnya
Supervisor

Signature

Acting Laboratory Manager I
Title
2-21-19
Date

CETIS Summary Report

Report Date: 28 Jan-19 11:10 (p 1 of 1)
Test Code: 1811RT2A.U | 10-7298-1075

Echinoid Fertilization Test						Hyperion Treatment Plant Laboratory					
Batch ID:	00-4258-3346		Test Type:		Fertilization		Analyst:	Rea Mara Crinklaw			
Start Date:	27 Nov-18 15:20		Protocol:		EPA/600/R-95/136 (1995)		Diluent:	Laboratory Seawater			
Ending Date:	27 Nov-18 16:00		Species:		Strongylocentrotus purpuratus		Brine:	Frozen Seawater			
Duration:	40m		Source:		David Guttoff		Age:				
Sample ID:	18-8248-8533		Code:		Cu RT		Client:	Watershed Protection Division			
Sample Date:	27 Nov-18 09:20		Material:		Copper chloride		Project:	MS4			
Receive Date:	27 Nov-18 09:20		Source:		Reference Toxicant						
Sample Age:	6h		Station:								
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
12-2120-5265	Fertilization Rate	20.4	30	24.74	14.2%		Dunnett Multiple Comparison Test				
Point Estimate Summary											
Analysis ID	Endpoint	Level	µg/L	95% LCL	95% UCL	TU	Method				
08-1175-5721	Fertilization Rate	EC5	18.16	6.764	24.49		Linear Interpolation (ICPIN)				
		EC10	22.22	12.17	25.38						
		EC15	24.49	16.97	28.34						
		EC20	26.98	21.63	N/A						
		EC25	29.71	25.23	N/A						
		EC40	>30	N/A	N/A						
		EC50	>30	N/A	N/A						
Test Acceptability											
Analysis ID	Endpoint	Attribute		Test Stat	TAC Limits		Overlap	Decision			
08-1175-5721	Fertilization Rate	Control Resp		0.72	0.7 - NL		Yes	Passes Acceptability Criteria			
12-2120-5265	Fertilization Rate	Control Resp		0.72	0.7 - NL		Yes	Passes Acceptability Criteria			
12-2120-5265	Fertilization Rate	PMSD		0.1422	NL - 0.25		No	Passes Acceptability Criteria			
Fertilization Rate Summary											
Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.72	0.701	0.739	0.67	0.79	0.0255	0.05099	7.08%	0.0%
6.5		4	0.745	0.7235	0.7665	0.66	0.78	0.02872	0.05745	7.71%	-3.47%
9.5		4	0.76	0.7358	0.7842	0.7	0.83	0.0324	0.06481	8.53%	-5.56%
13.9		4	0.715	0.6996	0.7304	0.66	0.76	0.02062	0.04123	5.77%	0.69%
20.4		4	0.7	0.6695	0.7305	0.6	0.8	0.04082	0.08165	11.66%	2.78%
30		4	0.5525	0.5374	0.5676	0.51	0.6	0.02016	0.04031	7.3%	23.26%
Fertilization Rate Detail											
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Dilution Water	0.67	0.72	0.79	0.7						
6.5		0.66	0.76	0.78	0.78						
9.5		0.8	0.83	0.7	0.71						
13.9		0.76	0.72	0.66	0.72						
20.4		0.7	0.7	0.6	0.8						
30		0.6	0.57	0.53	0.51						

CETIS Analytical Report

 Report Date: 28 Jan-19 11:10 (p.1 of 2)
 Test Code: 1811RT2A.U | 10-7298-1075

Echinoid Fertilization Test				Hyperion Treatment Plant Laboratory				
Analysis ID:	12-2120-5265	Endpoint:	Fertilization Rate	CETIS Version:	CETISv1.8.1			
Analyzed:	27 Dec-18 9:29	Analysis:	Parametric-Control vs Treatments	Official Results:	Yes			
Batch ID:	00-4258-3346	Test Type:	Fertilization	Analyst:	Rea Mara Crinklaw			
Start Date:	27 Nov-18 15:20	Protocol:	EPA/600/R-95/136 (1995)	Diluent:	Laboratory Seawater			
Ending Date:	27 Nov-18 16:00	Species:	Strongylocentrotus purpuratus	Brine:	Frozen Seawater			
Duration:	40m	Source:	David Guloff	Age:				
Sample ID:	18-8248-8533	Code:	Cu RT	Client:	Watershed Protection Division			
Sample Date:	27 Nov-18 09:20	Material:	Copper chloride	Project:	MS4			
Receive Date:	27 Nov-18 09:20	Source:	Reference Toxicant					
Sample Age:	6h	Station:						
Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	
Angular (Corrected)	0	C > T	Not Run	20.4	30	24.74	14.2%	
Dunnett Multiple Comparison Test								
Control	vs	Conc-µg/L	Test Stat	Critical	DF	MSD	P-Value	Decision(α:5%)
Dilution Water		6.5	-0.623	2.407	6	0.1104	0.9547	Non-Significant Effect
		9.5	-1.026	2.407	6	0.1104	0.9839	Non-Significant Effect
		13.9	0.1335	2.407	6	0.1104	0.7910	Non-Significant Effect
		20.4	0.4493	2.407	6	0.1104	0.6693	Non-Significant Effect
		30*	3.845	2.407	6	0.1104	0.0026	Significant Effect
Test Acceptability Criteria								
Attribute	Test Stat	TAC Limits	Overlap	Decision				
Control Resp	0.72	0.7 - NL	Yes	Passes Acceptability Criteria				
PMSD	0.1422	NL - 0.25	No	Passes Acceptability Criteria				
Auxiliary Tests								
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)			
Extreme Value	0	1.974	2.802	0.9789	No Outliers Detected			
ANOVA Table								
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)		
Between	0.1275609	0.02551219	5	6.064	0.0018	Significant Effect		
Error	0.07572903	0.004207169	18					
Total	0.20329	0.02971936	23					
Distributional Tests								
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)			
Variances	Bartlett Equality of Variance	2.374	15.09	0.7954	Equal Variances			
Distribution	Shapiro-Wilk W Normality	0.9818	0.884	0.9267	Normal Distribution			

Kc

RE

CETIS Analytical Report

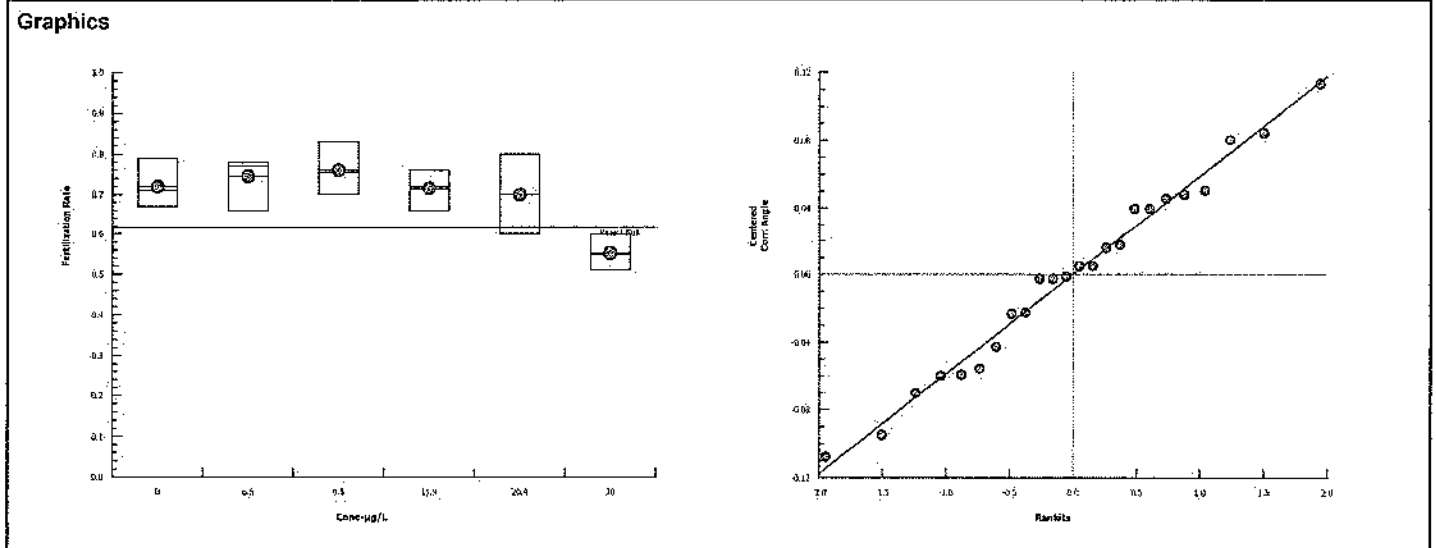
Report Date: 28-Jan-19 11:10 (p 2 of 2)
Test Code: 1811RT2A.U | 10-7298-1075

Echinoid Fertilization Test				Hyperion Treatment Plant Laboratory			
Analysis ID:	12-2120-5265	Endpoint:	Fertilization Rate	CETIS Version:	CETISv1.8.1		
Analyzed:	27 Dec-18 9:29	Analysis:	Parametric-Control vs Treatments	Official Results:	Yes		

Fertilization Rate Summary											
Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.72	0.7006	0.7394	0.67	0.79	0.0255	0.05099	7.08%	0.0%
6.5		4	0.745	0.7231	0.7669	0.66	0.78	0.02872	0.05745	7.71%	-3.47%
9.5		4	0.76	0.7353	0.7847	0.7	0.83	0.0324	0.06481	8.53%	-5.56%
13.9		4	0.715	0.6993	0.7307	0.66	0.76	0.02062	0.04123	5.77%	0.69%
20.4		4	0.7	0.6689	0.7311	0.6	0.8	0.04082	0.08165	11.66%	2.78%
30		4	0.5525	0.5372	0.5678	0.51	0.6	0.02016	0.04031	7.3%	23.26%

Angular (Corrected) Transformed Summary											
Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1.014	0.9924	1.037	0.9589	1.095	0.02899	0.05798	5.72%	0.0%
6.5		4	1.043	1.019	1.067	0.9483	1.083	0.03209	0.06419	6.15%	-2.82%
9.5		4	1.062	1.032	1.091	0.9912	1.146	0.03837	0.07674	7.23%	-4.64%
13.9		4	1.008	0.9911	1.026	0.9483	1.059	0.02274	0.04548	4.51%	0.6%
20.4		4	0.9939	0.9595	1.028	0.8861	1.107	0.04515	0.09031	9.09%	2.03%
30		4	0.8381	0.8227	0.8536	0.7954	0.8861	0.0203	0.04061	4.85%	17.38%

Fertilization Rate Detail					
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.67	0.72	0.79	0.7
6.5		0.66	0.76	0.78	0.78
9.5		0.8	0.83	0.7	0.71
13.9		0.76	0.72	0.66	0.72
20.4		0.7	0.7	0.6	0.8
30		0.6	0.57	0.53	0.51



Concentration-response relationship shows significant effect only at highest concentration. 1/28/19 RC

CETIS Analytical Report

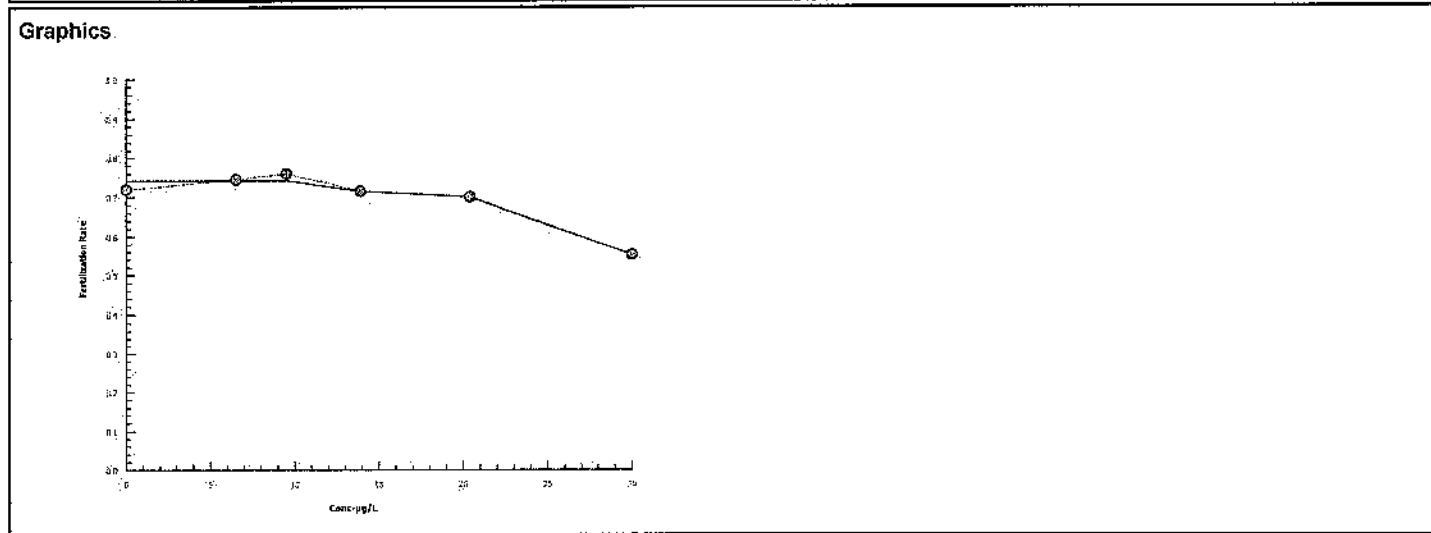
Report Date: 28 Jan-19 11:10 (p 1 of 2)
Test Code: 1811RT2A.U | 10-7298-1075

Echinoid Fertilization Test				Hyperion Treatment Plant Laboratory							
Analysis ID: 08-1175-5721		Endpoint: Fertilization Rate		CETIS Version: CETISv1.8.1							
Analyzed: 27 Dec-18 9:29		Analysis: Linear Interpolation (ICPIN)		Official Results: Yes							
Batch ID: 00-4258-3346		Test Type: Fertilization		Analyst: Rea Mara Crinklaw							
Start Date: 27 Nov-18 15:20		Protocol: EPA/600/R-95/136 (1995)		Diluent: Laboratory Seawater							
Ending Date: 27 Nov-18 16:00		Species: Strongylocentrotus purpuratus		Brine: Frozen Seawater							
Duration: 40m		Source: David Gutoff		Age:							
Sample ID: 18-8248-8533		Code: Cu RT		Client: Watershed Protection Division							
Sample Date: 27 Nov-18 09:20		Material: Copper chloride		Project: MS4							
Receive Date: 27 Nov-18 09:20		Source: Reference Toxicant									
Sample Age: 6h		Station:									
Linear Interpolation Options											
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method						
Log(X+1)	Linear	710258201	200	Yes	Two-Point Interpolation						
Test Acceptability Criteria											
Attribute	Test Stat	TAC Limits	Overlap	Decision							
Control Resp	0.72	0.7 - NL	Yes	Passes Acceptability Criteria							
Residual Analysis											
Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)						
Extreme Value	Grubbs Extreme Value	1.974	2.802	0.9789	No Outliers Detected						
Point Estimates											
Level	µg/L	95% LCL	95% UCL								
EC5	18.16	6.764	24.49								
EC10	22.22	12.17	25.38								
EC15	24.49	16.97	28.34								
EC20	26.98	21.63	N/A								
EC25	29.71	25.23	N/A								
EC40	>30	N/A	N/A								
EC50	>30	N/A	N/A								
Fertilization Rate Summary											
			Calculated Variate(A/B)								
Conc-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	4	0.72	0.67	0.79	0.0255	0.05099	7.08%	0.0%	288	400
6.5		4	0.745	0.66	0.78	0.02872	0.05745	7.71%	-3.47%	298	400
9.5		4	0.76	0.7	0.83	0.0324	0.06481	8.53%	-5.56%	304	400
13.9		4	0.715	0.66	0.76	0.02062	0.04123	5.77%	0.69%	286	400
20.4		4	0.7	0.6	0.8	0.04082	0.08165	11.66%	2.78%	280	400
30		4	0.5525	0.51	0.6	0.02016	0.04031	7.3%	23.26%	221	400
Fertilization Rate Detail											
Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Dilution Water	0.67	0.72	0.79	0.7						
6.5		0.66	0.76	0.78	0.78						
9.5		0.8	0.83	0.7	0.71						
13.9		0.76	0.72	0.66	0.72						
20.4		0.7	0.7	0.6	0.8						
30		0.6	0.57	0.53	0.51						

CETIS Analytical Report

Report Date: 28 Jan-19 11:10 (p 2 of 2)
Test Code: 1811RT2A.U | 10-7298-1075

Echinoid Fertilization Test		Hyperion Treatment Plant Laboratory	
Analysis ID: 08-1175-5721	Endpoint: Fertilization Rate	CETIS Version: CETISv1.8.1	
Analyzed: 27 Dec-18 9:29	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes	



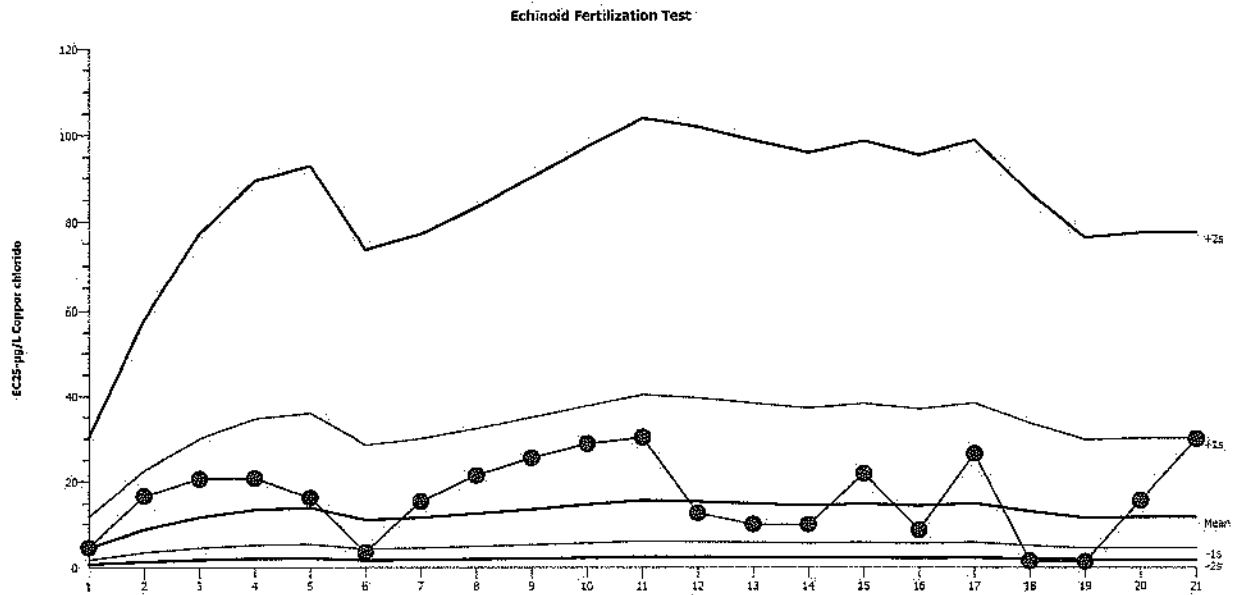
Echinoid Fertilization Test

Hyperion Treatment Plant Laboratory

Test Type: Fertilization
Protocol: EPA/600/R-95/136 (1995)

Organism: Strongylocentrotus purpuratus (Purpl
Endpoint: Fertilization Rate

Material: Copper chloride
Source: Reference Toxicant-REF



Mean: 11.62

Count: 20

-1s Warning Limit: 4.504

-2s Action Limit: 1.746

Sigma: N/A

CV: 158.00%

+1s Warning Limit: 29.97

+2s Action Limit: 77.31

Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2004	Feb	28	4.569	-7.054	-0.9852			10-2773-6804	07-4530-8211
2			28	16.64	5.021	0.3789			05-3112-2731	08-9498-1472
3			29	20.56	8.939	0.602			03-1212-4136	13-5407-3332
4			29	20.72	9.095	0.61			11-7058-6495	01-8633-7201
5		Mar	2	16.21	4.587	0.351			09-2137-0269	13-7772-0800
6		Apr	18	3.474	-8.149	-1.275	(-)		11-9278-6264	13-4799-4359
7	2005	Jan	5	15.34	3.721	0.2931			11-9712-5110	08-2196-4872
8			19	21.36	9.736	0.6421			12-4585-7379	08-8243-3392
9		Mar	7	25.41	13.79	0.8253			08-1939-8776	00-2976-8574
10			25	28.71	17.09	0.9543			09-9632-4874	00-6080-0300
11			25	30.16	18.53	1.006	(+)		18-5497-6485	04-1608-0162
12	2008	Jun	26	12.56	0.9359	0.08173			10-0944-2397	11-0169-5017
13	2010	Aug	25	9.899	-1.724	-0.1695			02-9945-6715	00-8068-9638
14	2011	Dec	1	9.867	-1.756	-0.1728			15-6477-9589	14-4147-3826
15	2012	Sep	13	21.75	10.13	0.6614			08-7937-2326	08-7756-3235
16		Oct	23	8.58	-3.043	-0.3203			08-2188-1692	07-5914-6938
17	2013	Sep	6	26.33	14.71	0.8631			16-8889-8873	07-2568-7151
18	2015	Jul	1	1.345	-10.28	-2.276	(-)	(-)	03-4008-6194	06-8546-4015
19	2016	Jan	11	1.215	-10.41	-2.383	(-)	(-)	17-5839-4263	07-4356-3957
20		Nov	22	15.49	3.866	0.303			16-5802-5664	02-1527-6888
21	2018		27	29.71	18.09	0.9904			10-7298-1075	08-1175-5721

CETIS Test Data Worksheet

Report Date: 26 Nov-18 09:34 (p 1 of 1)
 Test Code: 10-7298-1075/1811RT2A.U

Echinoid Fertilization Test

Hyperion Treatment Plant Laboratory

Start Date: 27 Nov-18 15:20 Species: Strongylocentrotus purpuratus
 End Date: 27 Nov-18 16:00 Protocol: EPA/600/R-95/136 (1995)
 Sample Date: 27 Nov-18 Material: Copper chloride

Sample Code: 70347ED5
 Sample Source: Reference Toxicant
 Sample Station:

Conc-µg/L	Code	Rep	Pos	# Counted	# Fertilized	Notes
0	D	1	2	100	67	
0	D	2	5	100	72	
0	D	3	15	100	79	
0	D	4	14	100	70	
6.5		1	17	100	66	
6.5		2	22	100	76	
6.5		3	7	100	78	
6.5		4	16	100	78	
9.5		1	23	100	80	
9.5		2	11	100	83	
9.5		3	20	100	70	
9.5		4	19	100	71	
13.9		1	13	100	76	
13.9		2	3	100	72	
13.9		3	9	100	66	
13.9		4	8	100	72	
20.4		1	10	100	70	
20.4		2	4	100	70	
20.4		3	6	100	60	
20.4		4	12	100	80	
30		1	21	100	60	
30		2	1	100	57	
30		3	18	100	53	
30		4	24	100	51	

CETIS Measurement Worksheet

Report Date: 26 Nov-18 09:34 (p 1 of 1)
Test Code: 1811RT2A.U | 10-7298-1075

Echinoid Fertilization Test

Hyperion Treatment Plant Laboratory

Start Date: 27 Nov-18 Species: Strongylocentrotus purpuratus
End Date: 27 Nov-18 Protocol: EPA/600/R-95/136 (1995)
Sample Date: 27 Nov-18 Material: Copper chloride

Sample Code: 70347ED5
Sample Source: Reference Toxicant
Sample Station:

Dissolved Oxygen-mg/L 11-27-18

Conc-µg/L	Code	Reading 1
0	D	7.23
6.5		7.44
9.5		7.56
13.9		7.59
20.4		7.60
30		7.55
Measure Time:		920
Instrument ID:		#3
Analyst:		Ang

pH 11-27-18

Conc-µg/L	Code	Reading 1
0	D	8.16
6.5		8.17
9.5		8.17
13.9		8.16
20.4		8.17
30		8.18
Measure Time:		920
Instrument ID:		#4
Analyst:		Ang

Salinity-ppt 11-27-18

Conc-µg/L	Code	Reading 1
0	D	34
6.5		34
9.5		34
13.9		34
20.4		34
30		34
Measure Time:		920
Instrument ID:		#3
Analyst:		Ang

Temperature-°C 11-27-18

Conc-µg/L	Code	Reading 1
0	D	13.2
6.5		13.0
9.5		12.9
13.9		12.9
20.4		12.9
30		13.0
Measure Time:		920
Instrument ID:		#4
Analyst:		Ang

*Continuous temperature recording not available. 11/28/19 Rc

11/27/18 Rc

Figure 1. Sample data sheet for spawning record.

Animal No.	Sex	Time		2nd Injection	Comments
		Injected	Spawn		
1	M	10:50	11:19	11:03	
2	F	10:55	10:57	11:05	good quality motile
3	M	10:57 ^{11:01}	11:05	11:06	
4	M	10:59	11:13	11:12	
5	F	10:59	11:13	11:13	good quality
6		11:00		11:19	
7	M	11:01	11:21	11:20	
8	M	11:02	11:30	11:21	
9					
10					
11					
12					

Pooled eggs from female nos. #2 #5.Pooled (_____ mL) of sperm each from male nos. #3.

sperm

<2000>

<1000>

<500>

<250>

Trial Fertilization
X59%, 58% \Rightarrow 58.5%32%, 45% \Rightarrow 38.5%³⁹⁶26%, 35% \Rightarrow 30.5%

sperm @ 13:28

eggs @ 13:58

Formular @ 14:18

11/27/18 Ac

Figure 2. Sample data sheet for egg and sperm counts.

EGG COUNTS -

Sample	Dilution	Count	Eggs/mL	\bar{x}
A	1:10	244 \Rightarrow	2440 *	} 2520* eggs/mL
B	1:100	26 \Rightarrow	2600 *	
Confirmatory C	1:10	222 \Rightarrow	2220 *	

For 100 mL egg suspension at 2,240 eggs/mL use:

100 mL x 2,240 eggs/mL / (counted eggs/mL) = mL of egg stock

224,000 eggs / 2,520* eggs/mL = 88.9 mL

* Analyst error in calculation. Forgot to account for dilution factor using Sedgwick Rafter. Values should be multiplied by 10.

If required stock >100 mL, concentrate egg stock by settling the eggs and decanting off sufficient overlying water to retain:

$$(\text{_____ eggs/mL} / 2,240 \text{ eggs/mL}) \times 100 = \text{_____} \% \text{ volume}$$

SPERM COUNTS - Coulter Counter Multisizer used

Sample	Dilution	Count	Squares	Sperm/mL
Confirmatory <2000>				26.07 x 10 ⁶

$$\text{SPERM/mL} = \frac{(\text{DIL. FACT.}) (\text{COUNT}) (4000) (1000)}{(\text{NO. SQUARES COUNTED})}$$

Final

Sperm 15:20

eggs 15:40

formalin 16:00

$$\text{Final Ratio} = \frac{(0.100 \text{ mL}) (26.07 \times 10^6 \text{ sperm/mL})}{(0.500 \text{ mL}) (22200 \text{ eggs/mL})} = \frac{235 \text{ sperm}}{1 \text{ egg}}$$

12/27/18 RL

		Non-Fert	Fertilized	Total
RT	1	43	57	100
	2	33	67	100
	3	28	72	100
	4	30	70	100
	5	18	72	100
	6	40	60	100
	7	22	78	100
	8	28	72	100
	9	34	66	100
	10	30	70	100
	11	17	83	100
	12	20	80	100
	13	24	76	100
	14	30	70	100
	15	21	79	100
	16	22	78	100
	17	34	66	100
	18	47	53	100
	19	29	71	100
	20	30	70	100
	21	40	60	100
	22	24	76	100
	23	20	80	100
	24	49	51	100
	25			
	26			
	27			
	28			
	29			
	30			
	31			
	32			
	33			
	34			
	35			
	36			
	37			
	38			
	39			
	40			
	41			
	42			
	43			
	44			
	45			

		Non-Fert	Fertilized	Total
	46			
	47			
	48			
	49			
	50			
1	SMB 1	27	73	100
2	51	21	79	100
3	52	30	70	100
4	53	32	68	100
5	54	17	83	100
6	55	24	76	100
7	56	17	83	100
8	57	15.4	85	100
9	12/27/18 58	22.20	80	100
10	59	27	73	100
11	60	25	75	100
12	61	23	77	100
13	62			
14	63			
15	64			
	65			
	66			
	67			
	68			
	69			
SMB 1	EE 1 70	100	0	100
	EE 2 71	100	0	100
SMB 3	EE 1 72	100	0	100
	EE 2 73	100	0	100
DW	ED 1 74	100	0	100
	ED 2 75	100	0	100
	76			
	77			
	78			
	79			
	80			
	81			
	82			
	83			
	84			
	85			
	86			
	87			
	88			
	89			
	90			

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

STORMWATER MONITORING PROGRAM
TOXICITY TESTING REPORT

SAMPLE DATE: November 26, 2018

TEST DATE: November 27, 2018

TEST NUMBER: 1811072A.U


TEST MATERIAL: Station RW-SMB-1

TEST SPECIES: *Strongylocentrotus purpuratus* PROTOCOL: EPA/600/R-95/136


TEST TYPE: Chronic

REFERENCE TOXICANT TEST: 1811RT2A.U

RESULT: Pass, 0.65% Effect

Rea Mara A Crinklaw
Analyst

Signature

Water Biologist III
Title
1/28/19
Date

Stacey Karnya
Supervisor

Signature

Acting Laboratory Manager I
Title
2-21-19
Date

CETIS Summary Report

Report Date: 28 Jan-19 12:30 (p 1 of 1)
Test Code: 1811072A.U | 11-4086-3198

Echinoid Fertilization Test						Hyperion Treatment Plant Laboratory					
Batch ID:	00-4258-3346	Test Type:	Fertilization	Analyst:	Rea Mara Crinklaw						
Start Date:	27 Nov-18 15:20	Protocol:	EPA/600/R-95/136 (1995)	Diluent:	Laboratory Seawater						
Ending Date:	27 Nov-18 16:00	Species:	Strongylocentrotus purpuratus	Brine:	Frozen Seawater						
Duration:	40m	Source:	David Gutoff	Age:							
Sample ID:	07-1846-0962	Code:	3283901	Client:	Watershed Protection Division						
Sample Date:	26 Nov-18 09:56	Material:	Stormwater Monitoring Sample	Project:	MS4						
Receive Date:	26 Nov-18 13:00	Source:	WPD (WATERSHED)								
Sample Age:	29h (11.1 °C)	Station:	RW-SMB-1								
Batch: 1121, HBN: 71555											
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
12-6533-6146	Fertilization Rate	100	>100	N/A	N/A	1	TST-Welch's t Test				
Test Acceptability											
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision					
12-6533-6146	Fertilization Rate	Control Resp	0.765	0.7 - NL	Yes	Passes Acceptability Criteria					
Fertilization Rate Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.765	0.7405	0.7895	0.68	0.83	0.03279	0.06557	8.57%	0.0%
0	Egg/Dilution Wa	2	0	0	0	0	0	0	0		100.0%
0	Egg/Effluent	2	0	0	0	0	0	0	0		100.0%
100		4	0.76	0.7358	0.7842	0.7	0.85	0.0324	0.06481	8.53%	0.65%
Fertilization Rate Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Dilution Water	0.75	0.68	0.83	0.8						
0	Egg/Dilution Wa	0	0								
0	Egg/Effluent	0	0								
100		0.73	0.85	0.76	0.7						

CETIS Analytical Report

 Report Date: 28 Jan-19 12:30 (p 1 of 2)
 Test Code: 1811072A.U | 11-4086-3198

Echinoid Fertilization Test						Hyperion Treatment Plant Laboratory					
Analysis ID:	12-6533-6146		Endpoint:	Fertilization Rate		CETIS Version:	CETISv1.8.1				
Analyzed:	28-Jan-19 11:42		Analysis:	Parametric Bioequivalence-Two Sample		Official Results:	Yes				
Batch ID:	00-4258-3346		Test Type:	Fertilization		Analyst:	Rea Mara Crinklaw				
Start Date:	27 Nov-18 15:20		Protocol:	EPA/600/R-95/136 (1995)		Diluent:	Laboratory Seawater				
Ending Date:	27 Nov-18 16:00		Species:	Strongylocentrotus purpuratus		Brine:	Frozen Seawater				
Duration:	40m		Source:	David Guttoff		Age:					
Sample ID:	07-1846-0962		Code:	3283901		Client:	Watershed Protection Division				
Sample Date:	26 Nov-18 09:56		Material:	Stormwater Monitoring Sample		Project:	MS4				
Receive Date:	26 Nov-18 13:00		Source:	WPD (WATERSHED)							
Sample Age:	29h (11.1 °C)		Station:	RW-SMB-1							
Data Transform	Zeta	Alt. Hyp	MC Trials	TST b	Test Result						
Angular (Corrected)	0	C*b > T	Not Run	0.75	Sample passes fertilization rate endpoint						
TST-Welch's t Test											
Control	vs	Conc-%	Test Stat	Critical	DF	MSD	P-Value	Decision(α:5%)			
Dilution Water		100*	5.338	2.015	5		0.0015	Non-Significant Effect			
Test Acceptability Criteria											
Attribute	Test Stat	TAC Limits	Overlap	Decision							
Control Resp	0.765	0.7 - NL	Yes	Passes Acceptability Criteria							
Auxiliary Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)						
Extreme Value	0	1.54	2.127	0.7949	No Outliers Detected						
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	6.167714E-05	6.167714E-05	1	0.01014	0.9231	Non-Significant Effect					
Error	0.03649938	0.00608323	6								
Total	0.03656106	0.006144907	7								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.06	47.47	0.9626	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9702	0.6451	0.8994	Normal Distribution						
Fertilization Rate Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.765	0.7401	0.7899	0.68	0.83	0.03279	0.06557	8.57%	0.0%
100		4	0.76	0.7353	0.7847	0.7	0.85	0.0324	0.06481	8.53%	0.65%
Angular (Corrected) Transformed Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1.067	1.038	1.097	0.9695	1.146	0.03842	0.07684	7.2%	0.0%
100		4	1.062	1.032	1.092	0.9912	1.173	0.03957	0.07913	7.45%	0.52%

CETIS Analytical Report

Report Date: 28 Jan-19 12:30 (p 2 of 2)
 Test Code: 1811072A.U | 11-4086-3198

Echinoid Fertilization Test

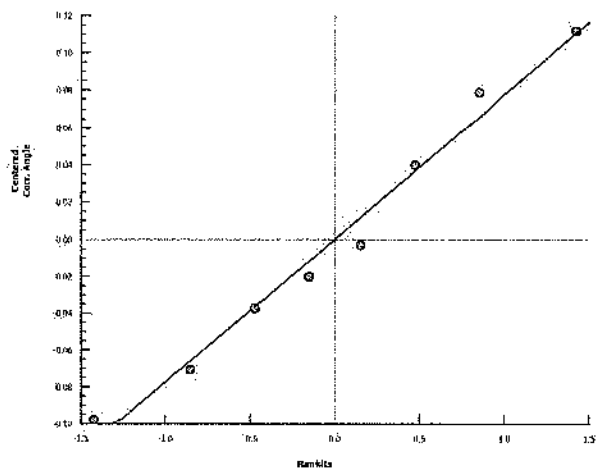
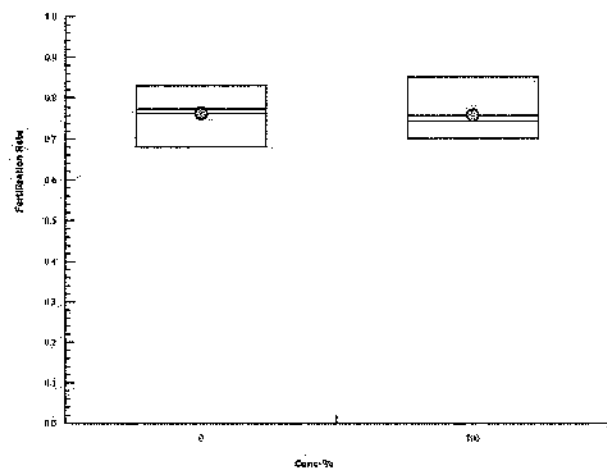
Hyperion Treatment Plant Laboratory

Analysis ID: 12-6533-6146 Endpoint: Fertilization Rate CETIS Version: CETISv1.8.1
 Analyzed: 28-Jan-19 11:42 Analysis: Parametric Bioequivalence-Two Sample Official Results: Yes

Fertilization Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.75	0.68	0.83	0.8
100		0.73	0.85	0.76	0.7

Graphics



CETIS Test Data Worksheet

Report Date: 26 Nov-18 09:54 (p. 1 of 1)
 Test Code: 11-4086-3198/1811072A.U

Echinoid Fertilization Test

Hyperion Treatment Plant Laboratory

Start Date: 27 Nov-18 1520 Species: Strongylocentrotus purpuratus
 End Date: 27 Nov-18 1600 Protocol: EPA/600/R-95/136 (1995)
 Sample Date: 26 Nov-18 Material: Stormwater Monitoring Sample

Sample Code: 2AD2D822
 Sample Source: WPD
 Sample Station: RW-SMB-1

Conc-%	Code	Rep	Pos	# Counted	# Fertilized	Notes
0	D	1	11	100	83	
0	D	2	4	100	70	
0	D	3	5	100	72	
0	D	4	9	100	66	
0	ED	1		100	0	
0	ED	2		100	0	
0	EE	1		100	0	
0	EE	2		100	0	
100		1	1	100	73	
100		2	8	100	85	
100		3	6	100	76	
100		4	3	100	70	

CETIS Measurement Worksheet

Report Date: 26 Nov-18 09:54 (p 1 of 1)
Test Code: 1811072A.U | 11-4086-3198

Echinoid Fertilization Test

Hyperion Treatment Plant Laboratory

Start Date: 27 Nov-18 Species: Strongylocentrotus purpuratus
End Date: 27 Nov-18 Protocol: EPA/600/R-95/136 (1995)
Sample Date: 26 Nov-18 Material: Stormwater Monitoring Sample

Sample Code: 2AD2D822
Sample Source: WPD
Sample Station: RW-SMB-1

Dissolved Oxygen-mg/L 11-27-18

Conc-%	Code	Reading 1
0	D	7.94
100		8.41
Measure Time:		940
Instrument ID:		#3
Analyst:		Ang

pH 11-27-18

Conc-%	Code	Reading 1
0	D	8.18
100		8.27
Measure Time:		940
Instrument ID:		#4
Analyst:		Ang

Salinity-ppt 11-27-18

Conc-%	Code	Reading 1
0	D	34
100		34
Measure Time:		940
Instrument ID:		#3
Analyst:		Ang

Temperature-°C 11-27-18

Conc-%	Code	Reading 1
0	D	12.8
100		11.6
Measure Time:		940
Instrument ID:		#4
Analyst:		Ang

*Continuous temperature recording not available. 1/28/19 Ac.

11/27/18 Rc

Figure 1. Sample data sheet for spawning record.

Animal No.	Sex	Time		2nd Injection	Comments
		Injected	Spawn		
1	M	10:50	11:19	11:03	
2	F	10:55	10:57	11:05	good quality
3	M	10:57 ^{11:20}	11:05	11:06	motile
4	M	10:59	11:13	11:12	
5	F	10:59	11:13	11:13	good quality
6		11:00		11:19	
7	M	11:01	11:21	11:20	
8	M	11:02	11:30	11:21	
9					
10					
11					
12					

Pooled eggs from female nos. #2 #5

Pooled (_____ mL) of sperm each from male nos. #3

sperm
<2000>

Trial Fertilization
X

sperm @ 13:38
eggs @ 13:58
Fertilizer @ 14:18

<1000>

59%, 58% \Rightarrow 58.5%

<500>

32%, 45% \Rightarrow 38.5%
396

<250>

26%, 35% \Rightarrow 30.5%

11/27/18 A

Figure 2. Sample data sheet for egg and sperm counts.

EGG COUNTS -

Sample	Dilution	Count	Eggs/mL
A	1:10	244	2440 *
B	1:100	26	2600 *
Confirmatory C	1:10	222	2220 *

X

2520*
eggs/mL

For 100 mL egg suspension at 2,240 eggs/mL use:

$$100 \text{ mL} \times 2,240 \text{ eggs/mL} / (\text{counted eggs/mL}) = \text{mL of egg stock}$$

$$224,000 \text{ eggs} / 2,520^* \text{ eggs/mL} = 88.9 \text{ mL}$$

* Analyst error in calculation
Forgot to account for
dilution factor using
Sedgewick Rafter. Value
should be multiplied by

If required stock >100 mL, concentrate egg stock by settling the eggs and decanting off sufficient overlying water to retain:

$$(\text{_____ eggs/mL} / 2,240 \text{ eggs/mL}) \times 100 = \text{_____ \% volume}$$

SPERM COUNTS - Coulter Counter Multisizer used

Sample	Dilution	Count	Squares	Sperm/mL
Confirmatory <2000>				26.07 x 10 ⁶

$$\text{SPERM/mL} = \frac{(\text{DIL. FACT.}) (\text{COUNT}) (4000) (1000)}{(\text{NO. SQUARES COUNTED})}$$

Final

Sperm 15:20

eggs 15:40

formalin 16:00

$$\text{Final Ratio} = \frac{(0.100 \text{ mL}) (26.07 \times 10^6 \text{ sperm/mL})}{(0.500 \text{ mL}) (22200 \text{ eggs/mL})} = \frac{235 \text{ sperm}}{1 \text{ egg}}$$

12/27/18 KL

	Non-Fert	Fertilized	Total
RT 1	43	57	100
2	33	67	100
3	28	72	100
4	30	70	100
5	68	72	100
6	40	60	100
7	22	78	100
8	28	72	100
9	34	66	100
10	30	70	100
11	17	83	100
12	20	80	100
13	24	76	100
14	30	70	100
15	21	79	100
16	22	78	100
17	34	66	100
18	47	53	100
19	29	71	100
20	30	70	100
21	40	60	100
22	24	76	100
23	20	80	100
24	49	51	100
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
41			
42			
43			
44			
45			

	Non-Fert	Fertilized	Total
	46		
	47		
	48		
	49		
	50		
1 SMB	51 27	73	100
2	52 21	79	100
3	53 30	70	100
4	54 32	68	100
5	55 17	83	100
6	56 24	76	100
7	57 17	83	100
8	58 15	85	100
9 12/27/18	59 22	80	100
10	60 27	73	100
11	61 25	75	100
12	62 23	77	100
13	63		
14	64		
15	65		
	66		
	67		
	68		
	69		
SMB 1	EE1 70	100 0	100
	EE2 71	100 0	100
SMB 3	EE1 72	100 0	100
	EE2 73	100 0	100
DW	ED1 74	100 0	100
	ED2 75	100 0	100
	76		
	77		
	78		
	79		
	80		
	81		
	82		
	83		
	84		
	85		
	86		
	87		
	88		
	89		
	90		

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

STORMWATER MONITORING PROGRAM
TOXICITY TESTING REPORT

SAMPLE DATE: November 26, 2018

TEST DATE: November 27, 2018

TEST NUMBER: 1811072B.U

TEST MATERIAL: Station RW-SMB-3


TEST SPECIES: *Strongylocentrotus purpuratus* PROTOCOL: EPA/600/R-95/136

TEST TYPE: Chronic

REFERENCE TOXICANT TEST: 1811RT2A.U

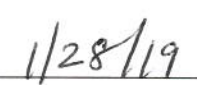
RESULT: Pass, -1.96% Effect

Rea Mara A Crinklaw

Analyst



Signature

Water Biologist III

Title


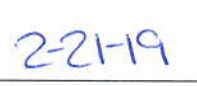
Date

Stacey Karnya

Supervisor


Signature

Acting Laboratory Manager I

Title


Date

CETIS Summary Report

Report Date: 28 Jan-19 13:40 (p 1 of 1)
 Test Code: 1811072B.U | 08-5312-8248

Echinoid Fertilization Test						Hyperion Treatment Plant Laboratory					
Batch ID:	00-4258-3346	Test Type:	Fertilization	Analyst:	Rea Mara Crinklaw						
Start Date:	27 Nov-18 15:20	Protocol:	EPA/600/R-95/136 (1995)	Diluent:	Laboratory Seawater						
Ending Date:	27 Nov-18 16:00	Species:	Strongylocentrotus purpuratus	Brine:	Frozen Seawater						
Duration:	40m	Source:	David Gutoff	Age:							
Sample ID:	06-0146-9380	Code:	3283902	Client:	Watershed Protection Division						
Sample Date:	26 Nov-18 10:24	Material:	Stormwater Monitoring Sample	Project:	MS4						
Receive Date:	26 Nov-18 13:00	Source:	WPD (WATERSHED)	Batch: 1121; HBN: 7155							
Sample Age:	29h (10.1 °C)	Station:	RW-SMB-3								
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
12-6858-4027	Fertilization Rate	100	>100	N/A	N/A	1	TST-Weich's t Test				
Test Acceptability											
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision					
12-6858-4027	Fertilization Rate	Control Resp	0.765	0.7 - NL	Yes	Passes Acceptability Criteria					
Fertilization Rate Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.765	0.7405	0.7895	0.68	0.83	0.03279	0.06557	8.57%	0.0%
0	Egg/Dilution Wa	2	0	0	0	0	0	0	0		100.0%
0	Egg/Effluent	2	0	0	0	0	0	0	0		100.0%
100		4	0.78	0.7645	0.7955	0.73	0.83	0.02082	0.04163	5.34%	-1.96%
Fertilization Rate Detail											
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Dilution Water	0.75	0.68	0.83	0.8						
0	Egg/Dilution Wa	0	0								
0	Egg/Effluent	0	0								
100		0.77	0.83	0.73	0.79						

CETIS Analytical Report

 Report Date: 28 Jan-19 13:40 (p 1 of 2)
 Test Code: 1811072B.U | 08-5312-8248

Echinoid Fertilization Test						Hyperion Treatment Plant Laboratory					
Analysis ID: 12-6858-4027		Endpoint: Fertilization Rate				CETIS Version: CETISv1.8.1					
Analyzed: 28 Jan-19 13:38		Analysis: Parametric Bioequivalence-Two Sample				Official Results: Yes					
Batch ID: 00-4258-3346		Test Type: Fertilization				Analyst: Rea Mara Crinklaw					
Start Date: 27 Nov-18 15:20		Protocol: EPA/600/R-95/136 (1995)				Diluent: Laboratory Seawater					
Ending Date: 27 Nov-18 16:00		Species: Strongylocentrotus purpuratus				Brine: Frozen Seawater					
Duration: 40m		Source: David Gutoff				Age:					
Sample ID: 06-0146-9380		Code: 3283902				Client: Watershed Protection Division					
Sample Date: 26 Nov-18 10:24		Material: Stormwater Monitoring Sample				Project: MS4					
Receive Date: 26 Nov-18 13:00		Source: WPD (WATERSHED)									
Sample Age: 29h (10.1 °C)		Station: RW-SMB-3									
Data Transform		Zeta	Alt Hyp	MC Trials	TST b	Test Result					
Angular (Corrected)		0	C*b > T	Not Run	0.75	Sample passes fertilization rate endpoint					
TST-Welch's t Test											
Control	vs	Conc-%	Test Stat	Critical	DF	MSD	P-Value	Decision(α:5%)			
Dilution Water		100*	7.392	2.015	5		0.0004	Non-Significant Effect			
Test Acceptability Criteria											
Attribute	Test Stat	TAC Limits	Overlap	Decision							
Control Resp.	0.765	0.7 - NL	Yes	Passes Acceptability Criteria							
Auxiliary Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)						
Extreme Value	0	1.626	2.127	0.6144	No Outliers Detected						
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	0.0005427955	0.0005427955	1	0.1283	0.7325	Non-Significant Effect					
Error	0.02538169	0.004230282	6								
Total	0.02592449	0.004773078	7								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	2.31	47.47	0.5095	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9702	0.6451	0.8993	Normal Distribution						
Fertilization Rate Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.765	0.7401	0.7899	0.68	0.83	0.03279	0.06557	8.57%	0.0%
100		4	0.78	0.7642	0.7958	0.73	0.83	0.02082	0.04163	5.34%	-1.96%
Angular (Corrected) Transformed Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1.067	1.038	1.097	0.9695	1.146	0.03842	0.07684	7.2%	0.0%
100		4	1.084	1.065	1.103	1.024	1.146	0.02528	0.05056	4.66%	-1.54%




CETIS Analytical Report

Report Date: 28 Jan-19 13:40 (p 2 of 2)
Test Code: 1811072B.U | 08-5312-8248

Echinoid Fertilization Test

Hyperion Treatment Plant Laboratory

Analysis ID: 12-6858-4027
Analyzed: 28 Jan-19 13:38

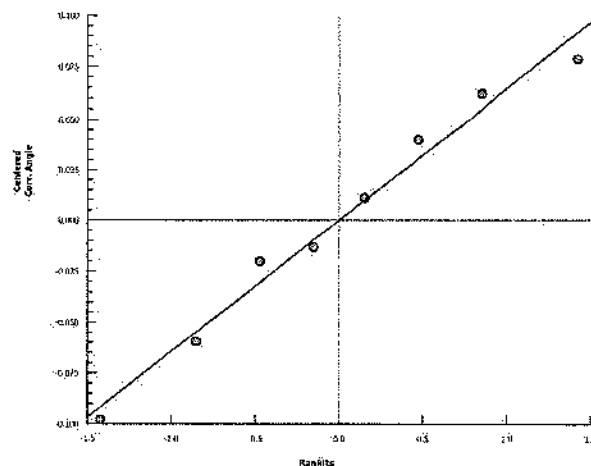
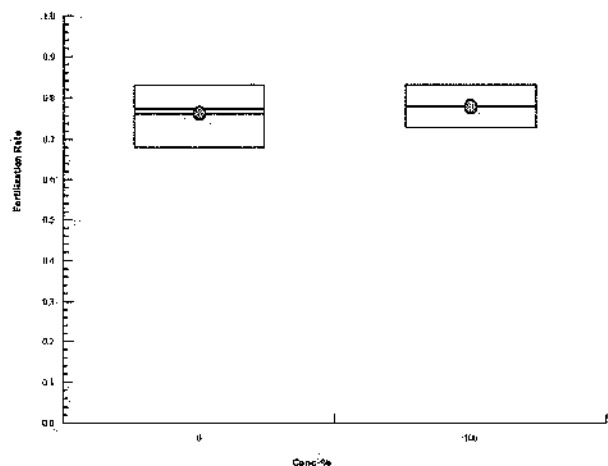
Endpoint: Fertilization Rate
Analysis: Parametric Bioequivalence-Two Sample

CETIS Version: CETISv1.8.1
Official Results: Yes

Fertilization Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.75	0.68	0.83	0.8
100		0.77	0.83	0.73	0.79

Graphics



CETIS Test Data Worksheet

Report Date: 26 Nov-18 09:55 (p 1 of 1)
 Test Code: 08-5312-8248/1811072B.U

Echinoid Fertilization Test

Hyperion Treatment Plant Laboratory

Start Date: 27 Nov-18 ¹⁵²⁰
 End Date: 27 Nov-18 ¹⁴⁰⁰
 Sample Date: 26 Nov-18

Species: Strongylocentrotus purpuratus
 Protocol: EPA/600/R-95/136 (1995)
 Material: Stormwater Monitoring Sample

Sample Code: 23D9B1C4
 Sample Source: WPD
 Sample Station: RW-SMB-3

Conc-%	Code	Rep	Pos	# Counted	# Fertilized	Notes
0	D	1	11	100	83	
0	D	2	4	100	70	
0	D	3	5	100	72	
0	D	4	9	100	66	
0	ED	1		100	0	
0	ED	2		100	0	
0	EE	1		100	0	
0	EE	2		100	0	
100		1	12	100	77	
100		2	7	100	83	
100		3	10	100	73	
100		4	2	100	79	

*Ke**20*

CETIS Measurement Worksheet

Report Date: 26 Nov-18 09:55 (p 1 of 1)
Test Code: 1811072B.U | 08-5312-8248

Echinoid Fertilization Test

Hyperion Treatment Plant Laboratory

Start Date: 27 Nov-18 Species: Strongylocentrotus purpuratus
End Date: 27 Nov-18 Protocol: EPA/600/R-95/136 (1995)
Sample Date: 26 Nov-18 Material: Stormwater Monitoring Sample

Sample Code: 23D9B1C4
Sample Source: WPD
Sample Station: RW-SMB-3

Dissolved Oxygen-mg/L 11-27-18

Conc-%	Code	Reading 1
0	D	7.94
100		8.73
Measure Time:		940
Instrument ID:		#3
Analyst:		Ang

pH 11-27-18

Conc-%	Code	Reading 1
0	D	8.18
100		8.26
Measure Time:		940
Instrument ID:		#4
Analyst:		Ang

Salinity-ppt 11-27-18

Conc-%	Code	Reading 1
0	D	34
100		34
Measure Time:		940
Instrument ID:		#3
Analyst:		Ang

Temperature-°C 11-27-18

Conc-%	Code	Reading 1
0	D	12.8
100		11.1
Measure Time:		940
Instrument ID:		#4
Analyst:		Ang

* Continuous temperature recording not available. 11/28/18 Rc

11/27/18 Rc

Figure 1. Sample data sheet for spawning record.

Animal No.	Sex	Time		2nd Injection	Comments
		Injected	Spawn		
1	M	10:50	11:19	11:03	
2	F	10:55	10:57	11:05	good quality
3	M	10:57 ^{11:01}	11:05	11:06	motile
4	M	10:59	11:13	11:12	
5	F	10:59	11:13	11:13	good quality
6		11:00		11:19	
7	M	11:01	11:21	11:20	
8	M	11:02	11:30	11:21	
9					
10					
11					
12					

Pooled eggs from female nos. #2 & #5

Pooled (mL) of sperm each from male nos. #3

sperm

<2000>

<1000>

<500>

<250>

Trial Fertilization
X

59%, 58% \Rightarrow 58.5%

32%, 45% \Rightarrow 38.5% ³⁹⁶

26%, 35% \Rightarrow 30.5%

sperm @ 13:38

eggs @ 13:58

Fertilizer @ 14:18

11/27/18 Ac

Figure 2. Sample data sheet for egg and sperm counts.

EGG COUNTS -

Sample	Dilution	Count	Eggs/mL
A	1:10	244 \Rightarrow	2440 *
B	1:100	26 \Rightarrow	2600 *
Confirmatory C	1:10	222 \Rightarrow	2220 *

 \bar{x} > 2520*
eggs/mL

For 100 mL egg suspension at 2,240 eggs/mL use:

* Analyst error in calculation.
 Forgot to account for
 dilution factor using
 Sedgewick-Rafter. Values
 should be multiplied by 10

$$100 \text{ mL} \times 2,240 \text{ eggs/mL} / (\text{counted eggs/mL}) = \text{mL of egg stock}$$

$$224,000 \text{ eggs} / \underline{2,520^*} \text{ eggs/mL} = \underline{88.9} \text{ mL}$$

If required stock >100 mL, concentrate egg stock by settling the eggs and decanting off sufficient overlying water to retain:

$$(\text{_____ eggs/mL} / 2,240 \text{ eggs/mL}) \times 100 = \text{_____} \% \text{ volume}$$

SPERM COUNTS - Coulter Counter Multisizer used

Sample	Dilution	Count	Squares	Sperm/mL
Confirmatory <2000>				26.07×10^6

$$\text{SPERM/mL} = \frac{(\text{DIL. FACT.}) (\text{COUNT}) (4000) (1000)}{(\text{NO. SQUARES COUNTED})}$$

Final

Sperm 15:20

eggs 15:40

formalin 16:00

$$\text{Final Ratio} = \frac{(0.100 \text{ mL}) (26.07 \times 10^6 \text{ sperm/mL})}{(0.500 \text{ mL}) (22200 \text{ eggs/mL})} = \frac{235 \text{ sperm}}{1 \text{ egg}}$$

12/27/18 RL

	Non-Fert	Fertilized	Total
RT 1	43	57	100
2	33	67	100
3	28	72	100
4	30	70	100
5	68	72	100
6	40	60	100
7	22	78	100
8	28	72	100
9	34	66	100
10	30	70	100
11	17	83	100
12	30	80	100
13	24	76	100
14	30	70	100
15	21	79	100
16	22	78	100
17	34	66	100
18	47	53	100
19	29	71	100
20	30	70	100
21	40	60	100
22	24	76	100
23	20	80	100
24	49	51	100
25			
26			
27			
28			
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31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
41			
42			
43			
44			
45			

	Non-Fert	Fertilized	Total
46			
47			
48			
49			
50			
1 SMB 51	27	73	100
2 52	21	79	100
3 53	30	70	100
4 54	32	68	100
5 55	17	83	100
6 56	24	76	100
7 57	17	83	100
8 58	15 AC	85	100
9 12/27/18 59	22 20	80	100
10 60	27	73	100
11 61	25	75	100
12 62	23	77	100
13 63			
14 64			
15 65			
	66		
	67		
	68		
	69		
SMB1 EE1 70	100	0	100
EE2 71	100	0	100
94B3 EE1 72	100	0	100
EE2 73	100	0	100
DW ED1 74	100	0	100
ED2 75	100	0	100
	76		
	77		
	78		
	79		
	80		
	81		
	82		
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	87		
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	90		