

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

REFERENCE TOXICANT

TOXICITY TESTING REPORT

SAMPLE DATE: July 28, 2016

TEST DATE: July 28, 2016

TEST NUMBER: 1607RT2A.C

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

TEST SPECIES: *Ceriodaphnia dubia*

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

TEST TYPE: Chronic

RESULT:

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

EC₅₀ = 70.8 $\mu\text{g/L}$ (Survival)

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

IC₂₅ = 35.9 $\mu\text{g/L}$ (Reproduction)

Rea Mara A Crinklaw
Analyst

Rea Mara A Crinklaw
Signature

Water Biologist II
Title

8/16/16
Date

Kay Yamamoto
Supervisor

Kay Yamamoto
Signature

Water Biologist III
Title

8/31/16
Date

CETIS Summary Report

Report Date: 12 Aug-16 09:20 (p 1 of 2)
 Test Code: 1607RT2A.C | 11-3245-2063

Ceriodaphnia 7-d Survival and Reproduction Test				Hyperion Treatment Plant Laboratory			
Batch ID:	10-7666-3177	Test Type:	Reproduction-Survival (7d)	Analyst:	Rea Mara Crinklaw		
Start Date:	28 Jul-16 15:09	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Hard Synthetic Water		
Ending Date:	04 Aug-16 10:48	Species:	Ceriodaphnia dubia	Brine:			
Duration:	6d 20h	Source:	In-House Culture	Age:	<8h 7/28/16 (0720-1443)		
Sample ID:	10-7302-3428	Code:	Cu RT	Client:	Watershed Protection Division		
Sample Date:	28 Jul-16 08:46	Material:	Copper chloride	Project:	MS4		
Receive Date:	28 Jul-16 08:46	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	29 Jul-16 16:51	29 Jul-16 16:51	29 Jul-16 17:33			
2	Cu RT	30 Jul-16 10:20	30 Jul-16 10:20	30 Jul-16 11:03			
3	Cu RT	31 Jul-16 09:25	31 Jul-16 09:25	31 Jul-16 10:00			
4	Cu RT	01 Aug-16 12:00	01 Aug-16 12:00	01 Aug-16 12:33			
5	Cu RT	02 Aug-16 13:12	02 Aug-16 13:12	02 Aug-16 13:40			
6	Cu RT	03 Aug-16 12:33	03 Aug-16 12:33	03 Aug-16 13:01			
Test Note: Concentration-response relationship is ideal.							
Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
18-5555-0044	7d Survival Rate	50	100	70.71	N/A		Fisher Exact/Bonferroni-Holm Test
03-4117-8399	Reproduction	50	>50	N/A	45.2%		Dunnett Multiple Comparison Test
Point Estimate Summary							
Analysis ID	Endpoint	Level	µg/L	95% LCL	95% UCL	TU	Method
20-4501-7131	7d Survival Rate	EC5	34.21	1.183	52.31		Linear Interpolation (ICPIN)
		EC10	46.68	3.767	54.72		
		EC15	51.77	9.406	57.31		
		EC20	54.14	25	59.98		
		EC25	56.62	33.91	62.77		
		EC40	64.73	45.46	72.42		
		EC50	70.77	52.99	80.26		
13-6804-5542	Reproduction	IC5	25.24	0.4245	30.67		Linear Interpolation (ICPIN)
		IC10	27.58	1.029	37.57		
		IC15	30.12	1.891	45.98		
		IC20	32.89	3.118	51.24		
		IC25	35.91	4.866	53.44		
		IC40	46.68	27.59	60.6		
		IC50	53.9	37.77	65.89		
Test Acceptability							
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision	
18-5555-0044	7d Survival Rate	Control Resp	0.9	0.8 - NL	Yes	Passes Acceptability Criteria	
20-4501-7131	7d Survival Rate	Control Resp	0.9	0.8 - NL	Yes	Passes Acceptability Criteria	
03-4117-8399	Reproduction	Control Resp	15.7	15 - NL	Yes	Passes Acceptability Criteria	
13-6804-5542	Reproduction	Control Resp	15.7	15 - NL	Yes	Passes Acceptability Criteria	
03-4117-8399	Reproduction	PMSD	0.4523	0.13 - 0.47	Yes	Passes Acceptability Criteria	

CETIS Summary Report

Report Date: 12 Aug-16 09:20 (p 2 of 2)

Test Code: 1607RT2A.C | 11-3245-2063

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	0.9	0.7819	1	0	1	0.1	0.3162	35.14%	0.0%
12.5		10	0.9	0.7819	1	0	1	0.1	0.3162	35.14%	0.0%
25		10	0.9	0.7819	1	0	1	0.1	0.3162	35.14%	0.0%
50		10	0.8	0.6426	0.9574	0	1	0.1333	0.4216	52.7%	11.11%
100		10	0.1	0	0.2181	0	1	0.1	0.3162	316.2%	88.89%
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	15.7	13.31	18.09	7	26	2.028	6.413	40.84%	0.0%
12.5		10	14.1	10.77	17.43	2	30	2.822	8.925	63.3%	10.19%
25		10	15.9	13.03	18.77	0	25	2.429	7.68	48.3%	-1.27%
50		10	8.8	6.381	11.22	0	21	2.048	6.477	73.61%	43.95%
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	0	1	1	1	1	1	1	1	1	1
12.5		1	1	1	0	1	1	1	1	1	1
25		0	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	0	0
100		0	0	0	1	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	7	17	7	14	11	19	21	13	26	22
12.5		7	6	7	2	30	25	15	18	18	13
25		0	25	13	7	18	21	16	21	23	15
50		4	8	4	3	21	15	11	8	0	14
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: 12 Aug-16 09:20 (p 1 of 2)
Test Code: 1607RT2A.C | 11-3245-2063

Ceriodaphnia 7-d Survival and Reproduction Test				Hyperion Treatment Plant Laboratory	
Analysis ID: 18-5555-0044	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.8.1			
Analyzed: 04 Aug-16 14:11	Analysis: STP 2x2 Contingency Tables	Official Results: Yes			
Batch ID: 10-7666-3177	Test Type: Reproduction-Survival (7d)	Analyst: Rea Mara Crinklaw			
Start Date: 28 Jul-16 15:09	Protocol: EPA/821/R-02-013 (2002)	Diluent: Hard Synthetic Water			
Ending Date: 04 Aug-16 10:48	Species: Ceriodaphnia dubia	Brine:			
Duration: 6d 20h	Source: In-House Culture	Age: <8h	7/28/16 (0720-1443)		
Sample ID: 10-7302-3428	Code: Cu RT	Client: Watershed Protection Division			
Sample Date: 28 Jul-16 08:46	Material: Copper chloride	Project: MS4			
Receive Date: 28 Jul-16 08:46	Source: Reference Toxicant				
Sample Age: 6h	Station: Reference Toxicant				

Test Note: Concentration-response relationship is ideal.

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU
Untransformed		C > T	Not Run	50	100	70.71	

Fisher Exact/Bonferroni-Holm Test					
Control	vs	Conc-µg/L	Test Stat	P-Value	Decision(0.05)
Dilution Water		12.5	0.7632	1.0000	Non-Significant Effect
		25	0.7632	1.0000	Non-Significant Effect
		50	0.5	1.0000	Non-Significant Effect
		100	0.000547	0.0022	Significant Effect

Test Acceptability Criteria				
Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.9	0.8 - NL	Yes	Passes Acceptability Criteria

Data Summary				
Conc-µg/L	Control Type	No-Resp	Resp	Total
0	Dilution Water	9	1	10
12.5		9	1	10
25		9	1	10
50		8	2	10
100		1	9	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	0	1	1	1	1	1	1	1	1	1
12.5		1	1	1	0	1	1	1	1	1	1
25		0	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	0	0
100		0	0	0	1	0	0	0	0	0	0

CETIS Analytical Report

Report Date: 12 Aug-16 09:20 (p 2 of 2)
Test Code: 1607RT2A.C | 11-3245-2063

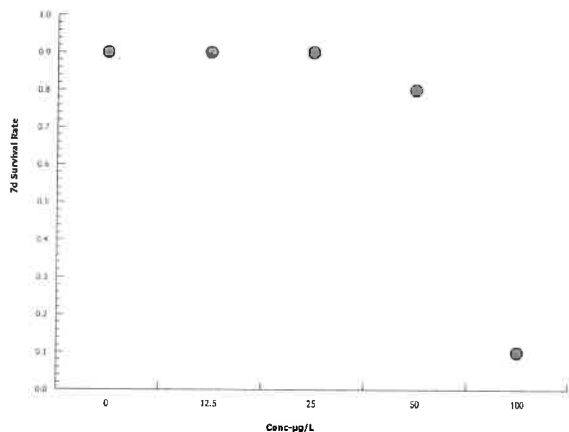
Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 18-5555-0044 Endpoint: 7d Survival Rate
Analyzed: 04 Aug-16 14:11 Analysis: STP 2x2 Contingency Tables

CETIS Version: CETISv1.8.1
Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 12 Aug-16 09:20 (p 1 of 2)
Test Code: 1607RT2A.C | 11-3245-2063

Ceriodaphnia 7-d Survival and Reproduction Test				Hyperion Treatment Plant Laboratory							
Analysis ID: 03-4117-8399	Endpoint: Reproduction	CETIS Version: CETISv1.8.1									
Analyzed: 04 Aug-16 14:12	Analysis: Parametric-Control vs Treatments	Official Results: Yes									
Batch ID: 10-7666-3177	Test Type: Reproduction-Survival (7d)	Analyst: Rea Mara Crinklaw									
Start Date: 28 Jul-16 15:09	Protocol: EPA/821/R-02-013 (2002)	Diluent: Hard Synthetic Water									
Ending Date: 04 Aug-16 10:48	Species: Ceriodaphnia dubia	Brine:									
Duration: 6d 20h	Source: In-House Culture	Age: <8h	7/28/16 (0720-1443)								
Sample ID: 10-7302-3428	Code: Cu RT	Client: Watershed Protection Division									
Sample Date: 28 Jul-16 08:46	Material: Copper chloride	Project: MS4									
Receive Date: 28 Jul-16 08:46	Source: Reference Toxicant										
Sample Age: 6h	Station: Reference Toxicant										
Test Note: Concentration-response relationship is ideal.											
Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD			
Untransformed	0	C > T	Not Run	50	>50	N/A		45.2%			
Dunnett Multiple Comparison Test											
Control	vs	Conc-µg/L	Test Stat	Critical	DF	MSD	P-Value	Decision(α:5%)			
Dilution Water		12.5	0.4805	2.133	18	7.101	0.5516	Non-Significant Effect			
		25	-0.06007	2.133	18	7.101	0.7712	Non-Significant Effect			
		50	2.072	2.133	18	7.101	0.0566	Non-Significant Effect			
Test Acceptability Criteria											
Attribute	Test Stat	TAC Limits	Overlap	Decision							
Control Resp	15.7	15 - NL	Yes	Passes Acceptability Criteria							
PMSD	0.4523	0.13 - 0.47	Yes	Passes Acceptability Criteria							
Auxiliary Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)						
Extreme Value	0	2.223	3.036	0.8927	No Outliers Detected						
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	329.875	109.9583	3	1.984	0.1338	Non-Significant Effect					
Error	1995.5	55.43056	36								
Total	2325.375	165.3889	39								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Bartlett Equality of Variance	1.31	11.34	0.7267	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9895	0.9236	0.9675	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	15.7	13.26	18.14	7	26	2.028	6.413	40.84%	0.0%
12.5		10	14.1	10.71	17.49	2	30	2.822	8.925	63.3%	10.19%
25		10	15.9	12.98	18.82	0	25	2.429	7.68	48.3%	-1.27%
50		10	8.8	6.336	11.26	0	21	2.048	6.477	73.61%	43.95%

CETIS Analytical Report

Report Date: 12 Aug-16 09:20 (p 2 of 2)
 Test Code: 1607RT2A.C | 11-3245-2063

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

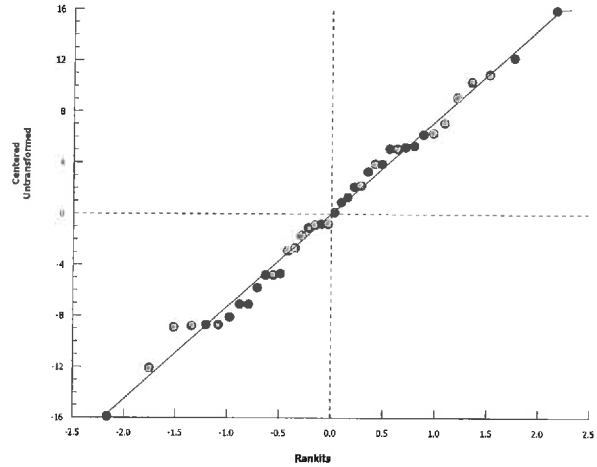
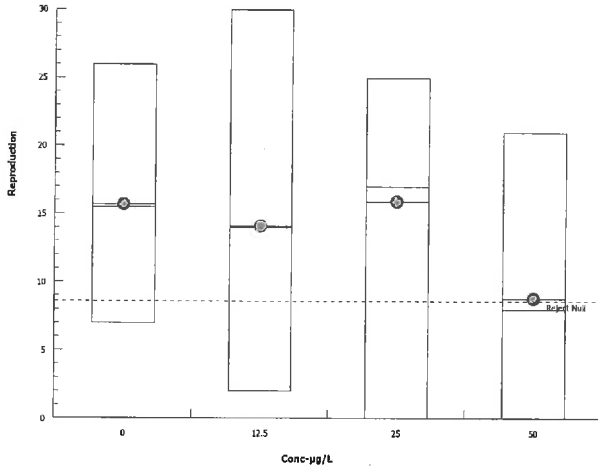
Analysis ID: 03-4117-8399
 Analyzed: 04 Aug-16 14:12
 Endpoint: Reproduction
 Analysis: Parametric-Control vs Treatments

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	7	17	7	14	11	19	21	13	26	22
12.5		7	6	7	2	30	25	15	18	18	13
25		0	25	13	7	18	21	16	21	23	15
50		4	8	4	3	21	15	11	8	0	14

Graphics



CETIS Analytical Report

Report Date: 12 Aug-16 09:20 (p 1 of 4)
Test Code: 1607RT2A.C | 11-3245-2063

Ceriodaphnia 7-d Survival and Reproduction Test				Hyperion Treatment Plant Laboratory	
Analysis ID:	20-4501-7131	Endpoint:	7d Survival Rate	CETIS Version:	CETISv1.8.1
Analyzed:	04 Aug-16 14:13	Analysis:	Linear Interpolation (ICPIN)	Official Results:	Yes
Batch ID:	10-7666-3177	Test Type:	Reproduction-Survival (7d)	Analyst:	Rea Mara Crinklaw
Start Date:	28 Jul-16 15:09	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Hard Synthetic Water
Ending Date:	04 Aug-16 10:48	Species:	Ceriodaphnia dubia	Brine:	
Duration:	6d 20h	Source:	In-House Culture	Age:	<8h 7/28/16 (0720-1443)
Sample ID:	10-7302-3428	Code:	Cu RT	Client:	Watershed Protection Division
Sample Date:	28 Jul-16 08:46	Material:	Copper chloride	Project:	MS4
Receive Date:	28 Jul-16 08:46	Source:	Reference Toxicant		
Sample Age:	6h	Station:	Reference Toxicant		

Test Note: Concentration-response relationship is ideal.

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1.569E+09	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.9	0.8 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	µg/L	95% LCL	95% UCL
EC5	34.21	1.183	52.31
EC10	46.68	3.767	54.72
EC15	51.77	9.406	57.31
EC20	54.14	25	59.98
EC25	56.62	33.91	62.77
EC40	64.73	45.46	72.42
EC50	70.77	52.99	80.26

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	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
12.5		10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
25		10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
50		10	0.8	0	1	0.1333	0.4216	52.7%	11.11%	8	10
100		10	0.1	0	1	0.1	0.3162	316.2%	88.89%	1	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	0	1	1	1	1	1	1	1	1	1
12.5		1	1	1	0	1	1	1	1	1	1
25		0	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	0	0
100		0	0	0	1	0	0	0	0	0	0
200		0	0	0	0	0	0	0	0	0	0

CETIS Analytical Report

Report Date: 12 Aug-16 09:20 (p 2 of 4)
Test Code: 1607RT2A.C | 11-3245-2063

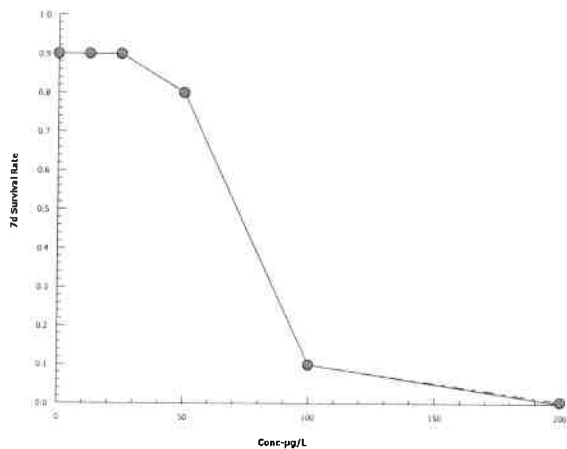
Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Analysis ID: 20-4501-7131 Endpoint: 7d Survival Rate
Analyzed: 04 Aug-16 14:13 Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.1
Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 12 Aug-16 09:20 (p 3 of 4)
Test Code: 1607RT2A.C | 11-3245-2063

Ceriodaphnia 7-d Survival and Reproduction Test				Hyperion Treatment Plant Laboratory							
Analysis ID: 13-6804-5542	Endpoint: Reproduction	CETIS Version: CETISv1.8.1									
Analyzed: 04 Aug-16 14:12	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes									
Batch ID: 10-7666-3177	Test Type: Reproduction-Survival (7d)	Analyst: Rea Mara Crinklaw									
Start Date: 28 Jul-16 15:09	Protocol: EPA/821/R-02-013 (2002)	Diluent: Hard Synthetic Water									
Ending Date: 04 Aug-16 10:48	Species: Ceriodaphnia dubia	Brine:									
Duration: 6d 20h	Source: In-House Culture	Age: <8h	7/28/16 (0720-1443)								
Sample ID: 10-7302-3428	Code: Cu RT	Client: Watershed Protection Division									
Sample Date: 28 Jul-16 08:46	Material: Copper chloride	Project: MS4									
Receive Date: 28 Jul-16 08:46	Source: Reference Toxicant										
Sample Age: 6h	Station: Reference Toxicant										
Test Note: Concentration-response relationship is ideal.											
Linear Interpolation Options											
X Transform	Y Transform	Seed	Resamples								
Log(X+1)	Linear	1.365E+09	200								
		Exp 95% CL	Method								
		Yes	Two-Point Interpolation								
Test Acceptability Criteria											
Attribute	Test Stat	TAC Limits	Overlap								
Control Resp	15.7	15 - NL	Yes								
Decision: Passes Acceptability Criteria											
Residual Analysis											
Attribute	Method	Test Stat	Critical								
Extreme Value	Grubbs Extreme Value	2.734	3.2								
		P-Value	Decision(α:5%)								
		0.2914	No Outliers Detected								
Point Estimates											
Level	μg/L	95% LCL	95% UCL								
IC5	25.24	0.4245	30.67								
IC10	27.58	1.029	37.57								
IC15	30.12	1.891	45.98								
IC20	32.89	3.118	51.24								
IC25	35.91	4.866	53.44								
IC40	46.68	27.59	60.6								
IC50	53.9	37.77	65.89								
Reproduction Summary											
		Calculated Variate									
Conc-μg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect		
0	Dilution Water	10	15.7	7	26	2.028	6.413	40.84%	0.0%		
12.5		10	14.1	2	30	2.822	8.925	63.3%	10.19%		
25		10	15.9	0	25	2.429	7.68	48.3%	-1.27%		
50		10	8.8	0	21	2.048	6.477	73.61%	43.95%		
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	7	17	7	14	11	19	21	13	26	22
12.5		7	6	7	2	30	25	15	18	18	13
25		0	25	13	7	18	21	16	21	23	15
50		4	8	4	3	21	15	11	8	0	14
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: 12 Aug-16 09:20 (p 4 of 4)
Test Code: 1607RT2A.C | 11-3245-2063

Ceriodaphnia 7-d Survival and Reproduction Test

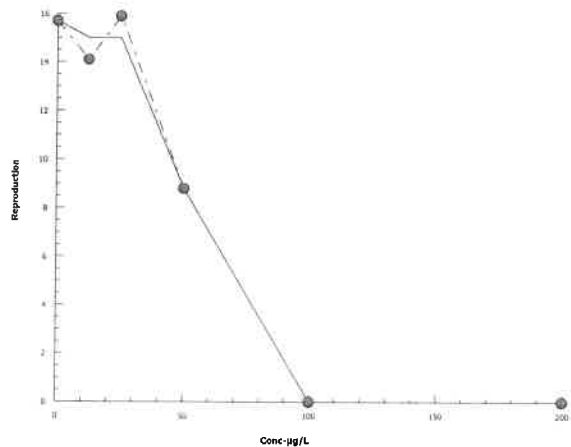
Hyperion Treatment Plant Laboratory

Analysis ID: 13-6804-5542
Analyzed: 04 Aug-16 14:12

Endpoint: Reproduction
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)

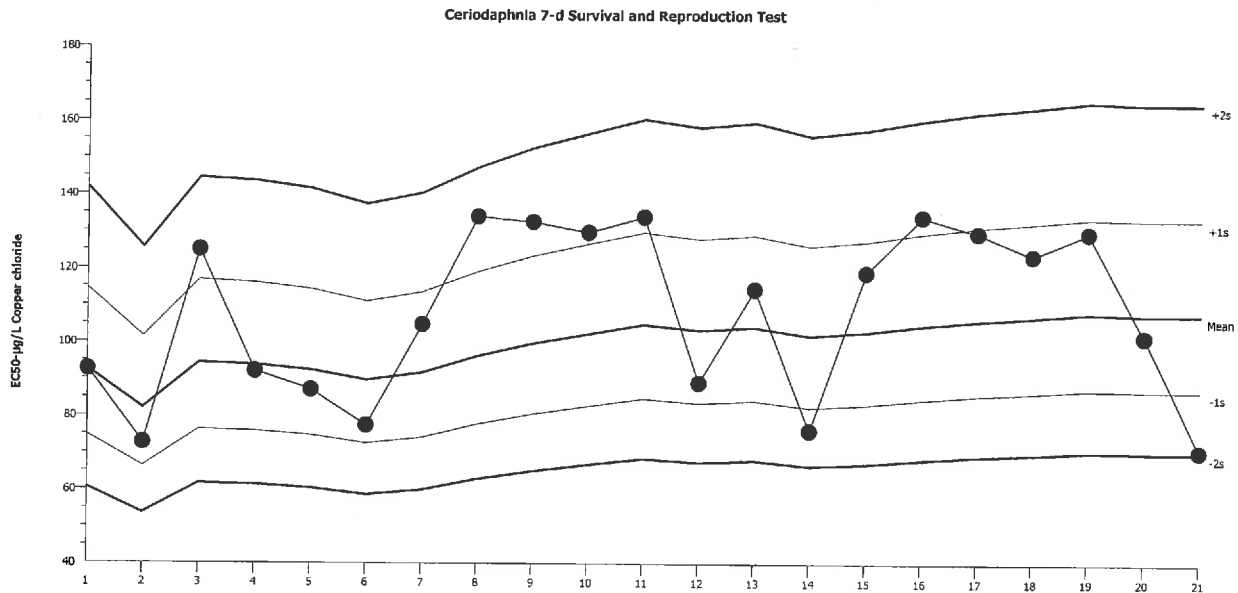
Organism: Ceriodaphnia dubia (Water Flea)

Material: Copper chloride

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

Endpoint: 7d Survival Rate

Source: Reference Toxicant-REF



Mean: 107.8

Count: 20

-1s Warning Limit: 87.08

-2s Action Limit: 70.38

Sigma: N/A

CV: 23.70%

+1s Warning Limit: 133.3

+2s Action Limit: 164.9

Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2014	Jun	26	92.62	-15.15	-0.7118			09-5400-8839	08-3756-7722
2			30	72.68	-35.09	-1.85	(-)		06-0761-4351	18-6783-6461
3		Jul	9	125	17.24	0.6968			16-0469-4842	15-3888-6832
4			30	92.11	-15.66	-0.7375			08-2521-3015	17-5387-7916
5		Aug	6	87.1	-20.67	-1	(-)		20-4489-2324	09-0974-8319
6			20	77.39	-30.38	-1.556	(-)		16-0871-7892	05-0751-2276
7		Sep	10	104.7	-3.028	-0.1339			18-4543-0680	03-4688-9946
8			25	134	26.25	1.024	(+)		06-3219-2673	19-3020-8539
9		Oct	2	132.6	24.81	0.9731			01-8463-4480	11-5042-8629
10			23	129.7	21.97	0.8714			04-7355-7343	15-1897-0561
11		Nov	13	134	26.25	1.024	(+)		13-9213-9561	07-1032-9840
12		Dec	4	89.13	-18.64	-0.8921			11-6677-0498	02-1926-0405
13	2015	Jan	22	114.5	6.691	0.2829			01-5526-0247	07-4843-8959
14		Jun	17	76.22	-31.55	-1.627	(-)		20-9387-7144	01-1636-6576
15		Dec	14	119	11.19	0.464			15-8925-6767	02-2142-4772
16	2016	Jan	21	134.1	26.37	1.028	(+)		18-3843-6965	17-3443-6664
17		Feb	1	129.7	21.97	0.8714			11-0794-9751	09-9142-3700
18			18	123.6	15.87	0.6451			08-3683-2844	13-1421-5523
19		Mar	7	129.7	21.97	0.8714			03-8131-3022	08-3988-9211
20		Apr	4	101.8	-6.017	-0.2699			20-8785-7541	14-5275-7464
21		Jul	28	70.77	-37	-1.975	(-)		11-3245-2063	20-4501-7131

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Test Type: Reproduction-Survival (7d)

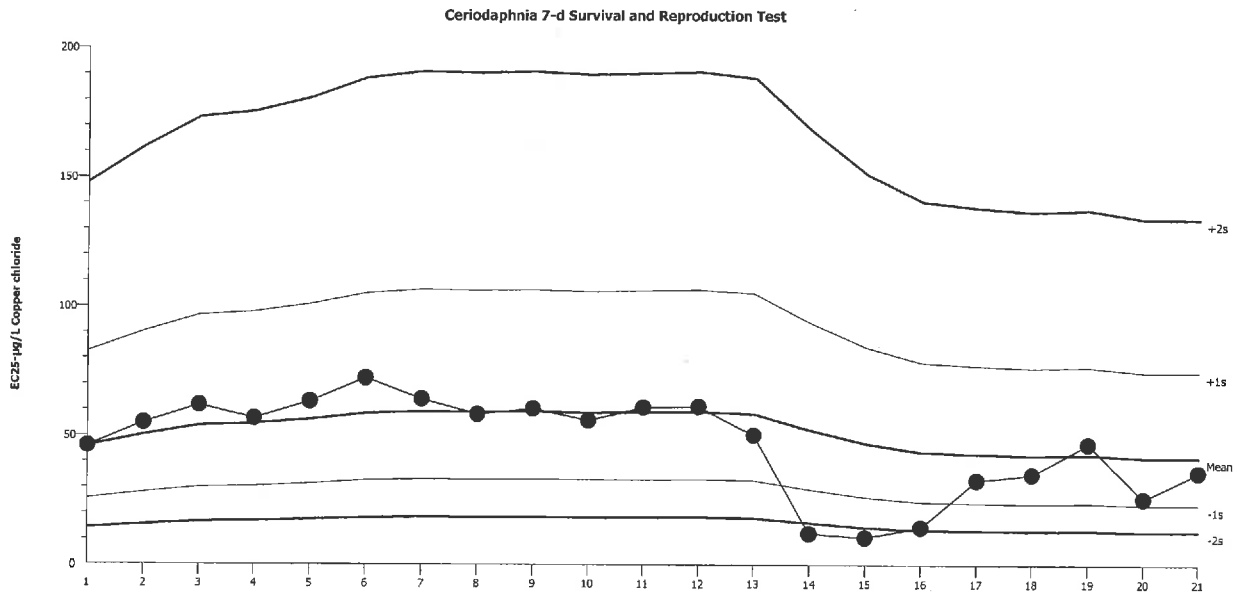
Organism: Ceriodaphnia dubia (Water Flea)

Material: Copper chloride

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

Endpoint: Reproduction

Source: Reference Toxicant-REF



Mean: 41.72

Count: 20

-1s Warning Limit: 23.28

-2s Action Limit: 12.99

Sigma: N/A

CV: 79.30%

+1s Warning Limit: 74.83

+2s Action Limit: 134.1

Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2014	Jun	30	46.07	4.348	0.1699			06-0761-4351	02-3025-4759
2		Jul	9	55.02	13.3	0.4741			16-0469-4842	10-7996-3946
3			30	61.86	20.13	0.6747			08-2521-3015	15-7457-6759
4		Aug	6	56.72	15	0.5263			20-4489-2324	03-9351-7731
5			20	63.25	21.53	0.7129			16-0871-7892	17-0446-0542
6		Sep	10	72.32	30.6	0.9424			18-4543-0680	03-4166-9317
7			25	64.22	22.5	0.739			06-3219-2673	21-1622-8372
8		Oct	2	58.26	16.53	0.5719			01-8463-4480	18-8913-5934
9			15	60.52	18.8	0.6373			12-4387-4309	03-5555-5323
10			23	55.98	14.26	0.5038			04-7355-7343	01-6198-9739
11		Nov	13	61.11	19.39	0.654			13-9213-9561	00-4240-2427
12		Dec	4	61.4	19.68	0.662			11-6677-0498	05-2928-7744
13	2015	Jan	22	50.33	8.604	0.3212			01-5526-0247	05-9407-7070
14		Jun	17	12.13	-29.59	-2.117	(-)	(-)	20-9387-7144	17-7691-6079
15		Dec	14	10.71	-31.01	-2.33	(-)	(-)	15-8925-6767	02-6642-1182
16	2016	Jan	21	14.62	-27.1	-1.797	(-)		18-3843-6965	14-9842-1935
17		Feb	1	32.9	-8.819	-0.4068			11-0794-9751	03-7350-2523
18			18	35.1	-6.625	-0.2962			08-3683-2844	04-0850-8624
19		Mar	7	46.92	5.195	0.201			03-8131-3022	11-6058-4627
20		Apr	4	25.73	-15.99	-0.8282			20-8785-7541	21-2139-2262
21		Jul	28	35.91	-5.809	-0.2568			11-3245-2063	13-6804-5542

CETIS Test Data Worksheet

Report Date:

25 Jul-16 09:13 (p 1 of 2)

Test Code:

11-3245-2063/1607RT2A.C

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 28 Jul-16 ¹⁵⁰⁹
End Date: 04 Aug-16 ¹⁰⁴⁸
Sample Date: 28 Jul-16

Species: Ceriodaphnia dubia
Protocol: EPA/821/R-02-013 (2002)
Material: Copper chloride

Sample Code: 3FF509C4
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	35	1	0	0	0	5	0	2	0X	7	
0	D	2	29	1	0	0	0	6	0	1	10	17	
0	D	3	46	1	0	0	0	3	0	0	1	7	
0	D	4	60	1	0	0	0	6	0	0	4	14	
0	D	5	34	1	0	0	0	8	0	0	3	11	
0	D	6	44	1	0	0	0	6	5	0	8	19	
0	D	7	11	1	0	0	0	6	6	0	9	21	
0	D	8	49	1	0	0	0	7	4	0	2	13	
0	D	9	8	1	0	0	0	6	7	(B) 12	0	28	8/2/16
0	D	10	37	1	0	0	0	6	8	0	8	22	
12.5		1	59	1	0	0	0	2	0	0	5	7	
12.5		2	42	1	0	0	0	6	0	0	0	6	
12.5		3	15	1	0	0	0	3	3	0	1	7	
12.5		4	17	1	0	0	0	2	X			2	
12.5		5	6	1	0	0	0	8	11	0	11	30	
12.5		6	40	1	0	0	0	6	7	0	12	25	
12.5		7	41	1	0	0	0	4	2	0	9	15	
12.5		8	38	1	0	0	0	7	4	0	7	18	
12.5		9	57	1	0	0	0	5	7	6	0	18	
12.5		10	23	1	0	0	0	5	5	0	3	13	
25		1	16	1	0	0	0	6	0	7	12	25	
25		2	27	1	0	0	0	4	2	0	7	13	
25		3	47	1	0	0	0	2	1	0	4	7	
25		4	3	1	0	0	0	4	6	0	8	18	
25		5	28	1	0	0	0	2	0	4	15	21	
25		6	36	1	0	0	0	4	2	10	0	16	
25		7	25	1	0	0	0	5	8	(8) 6	0	(21) 19	8/2/16
25		8	2	1	0	0	0	6	7	(8) 8	10	23	
25		9	10	1	0	0	0	5	2	(8) 8	0	(5) 14	8/2/16
25		10	58	1	0	0	0	1	1	0	2	4	
50		1	48	1	0	0	0	1	0	6	1	8	
50		2	33	1	0	0	0	3	1	0	0	4	
50		3	39	1	0	0	0	3	0	0	0	3	
50		4	12	1	0	0	0	3	0	0	10	21	
50		5	56	1	0	0	0	2	8	0	5	15	
50		6	53	1	0	0	0	2	8	0	1	11	
50		7	52	1	0	0	0	0	0	8	0	8	
50		8	43	1	0	0	0	0	0	0	0	0	
50		9	54	1	0X							0	
50		10	50	1	0	0	0	4	7	3	0X	14	
100		1	22	1	0	0	0X					0	
100		2	1	1	0	0	0	0	0X			0	
100		3	4	1	0X							0	
100		4	7	1	0	0	0	0	0	0	0	0	N
100		5	14	1	0X							0	
100		6	20	1	0X							0	
100		7	51	1	0X							0	

CETIS Test Data Worksheet

Report Date:

25 Jul-16 09:13 (p 2 of 2)

Test Code:

11-3245-2063/1607RT2A.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	9	1	0 X							0	
100		9	55	1	0 X							0	
100		10	31	1	0 X							0	
200		1	5	1	0	0x						0	
200		2	32	1	0	0x						0	
200		3	45	1	0 X							0	
200		4	13	1	0 X							0	
200		5	21	1	0 X							0	
200		6	18	1	0 X							0	
200		7	24	1	0 X							0	
200		8	19	1	0 X							0	
200		9	30	1	0 X							0	
200		10	26	1	0 X							0	

7/28 7/29 7/30 7/31 8/1 8/2 8/3 8/4
Rc Rc

Food Added: 1352 1712 1039 0937 1216 1326 1245 Count
AB Rc a DL Rc Rc Rc 1048
Rc

Transferred: 1509 1733 1103 1000 1233 1340 1301
Rc DL DL Rc Rc Rc

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 28 Jul-16

Species: Ceriodaphnia dubia

Sample Code: 3FF509C4

End Date: 04 Aug-16

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

Sample Source: Reference Toxicant

Sample Date: 28 Jul-16

Material: Copper chloride

Sample Station: Reference Toxicant

Alkalinity (CaCO₃)-mg/L

Conc-µg/L	Code	Reading 1
0	D	116
200		112
Measure Time:		1200
Instrument ID:		Titrate
Analyst:		pc

- see Reconstituted Water Prep Logbook (7/15/16 AS)

8/12/16

Conductivity-µmhos

Conc-µg/L	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	595	618	576	616	594	594	594
12.5		592	588	586	625	595	597	599
25		593	586	595	624	599	597	599
50		590	587	583	624	599	596	600
100		589	584	579	602	599	590	587
200		589	577	565	—	—	—	—
Measure Time:		1349	1651	1020	0925	1200	1312	1233
Instrument ID:		#1	#1	1	1	#1	#1	#1
Analyst:		AG	pc	DL	DL	pc	pc	pc

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	7.41	7.48	7.73	6.99	7.49	7.24	7.67
12.5		7.53	7.68	7.76	7.45	7.71	7.59	7.80
25		7.60	7.70	7.77	7.64	7.86	7.78	7.85
50		7.64	7.72	7.76	7.72	7.85	7.83	7.89
100		7.67	7.77	7.79	7.77	7.91	7.87	7.97
200		7.71	7.81	—	—	—	—	—
Measure Time:		1743	1120	1039	1304	1437	1506	1048
Instrument ID:		#4	4	4	#4	#4	#4	#4
Analyst:		pc	DL	DL	pc	pc	pc	pc

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	8.04	7.01	7.85	7.78	7.58	7.39	7.59
12.5		7.81	7.38	7.82	7.85	7.80	7.72	7.78
25		7.74	7.50	7.88	7.85	7.83	7.84	7.86
50		7.71	7.54	7.89	7.86	7.85	7.89	7.90
100		7.70	7.58	7.90	7.86	7.87	7.94	7.93
200		7.75	7.62	7.90	—	—	—	—
Measure Time:		1349	1651	1020	0925	1200	1312	1233
Instrument ID:		#4	#4	4	4	#4	#4	#4
Analyst:		AG	pc	DL	DL	pc	pc	pc

Hardness (CaCO₃)-mg/L

Conc-µg/L	Code	Reading 1
0	D	172
200		176
Measure Time:		1200
Instrument ID:		Titrate
Analyst:		pc

- see Reconstituted Water Prep Logbook (7/15/16 AS)

8/12/16

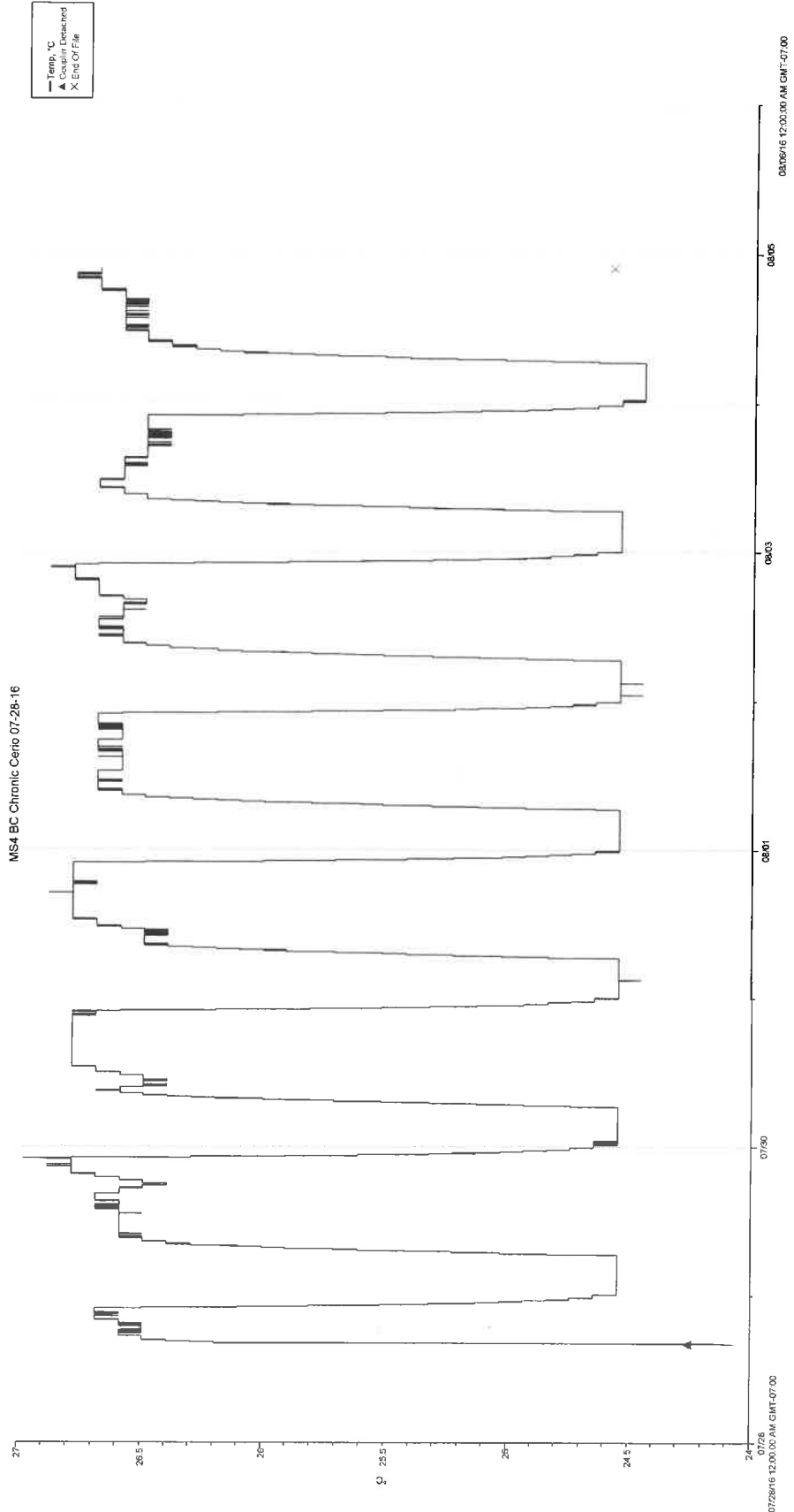
pc

kmy

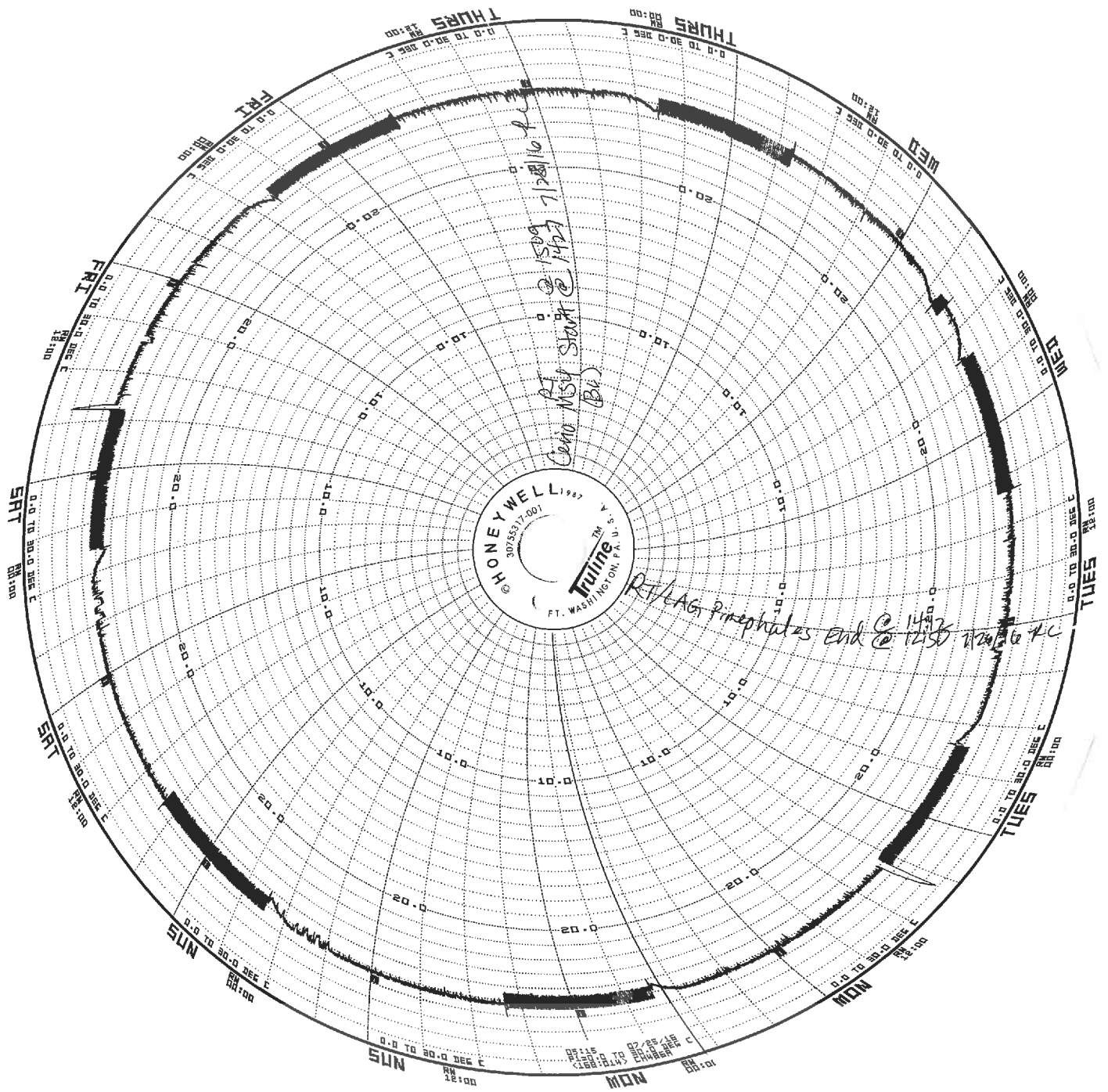
CETIS Measurement Worksheet

Report Date: 25 Jul-16 09:13 (p 2 of 2)
Test Code: 1607RT2A.C | 11-3245-2063

Ceriodaphnia 7-d Survival and Reproduction Test										Hyperion Treatment Plant Laboratory	
Start Date:		28 Jul-16		Species:		Ceriodaphnia dubia		Sample Code:		3FF509C4	
End Date:		04 Aug-16		Protocol:		EPA/821/R-02-013 (2002)		Sample Source:		Reference Toxicant	
Sample Date:		28 Jul-16		Material:		Copper chloride		Sample Station:		Reference Toxicant	
Final pH											
Conc-µg/L		Code		Reading 1		Reading 2		Reading 3		Reading 4	
0		D		8.50		8.41		8.41		8.47	
12.5				8.51		8.40		8.47		8.50	
25				8.52		8.40		8.48		8.51	
50				8.53		8.41		8.48		8.50	
100				8.54		8.43		8.51		8.52	
200				8.55		8.44		—		—	
Measure Time:		1743		1120		1039		1304		1437	
Instrument ID:		#4		4		4		#4		#4	
Analyst:		RC		DL		DL		RC		RC	
Initial pH											
Conc-µg/L		Code		Reading 1		Reading 2		Reading 3		Reading 4	
0		D		8.41		8.45		8.50		8.50	
12.5				8.47		8.53		8.39		8.54	
25				8.47		8.54		8.44		8.54	
50				8.46		8.55		8.45		8.54	
100				8.46		8.54		8.46		8.52	
200				8.47		8.54		8.47		—	
Measure Time:		1349		1651		1020		0925		1200	
Instrument ID:		#4		#4		4		4		#4	
Analyst:		AG		RC		DL		DL		RC	
Final Temperature-°C											
Conc-µg/L		Code		Reading 1		Reading 2		Reading 3		Reading 4	
0		D		25.3		24.5		25.0		25.3	
12.5				25.3		25.0		25.2		25.2	
25				25.2		25.1		25.2		25.0	
50				25.2		25.1		25.1		25.0	
100				25.1		25.1		25.1		24.9	
200				25.2		25.1		—		—	
Measure Time:		1743		1120		1039		1304		1437	
Instrument ID:		#4		4		4		#4		#4	
Analyst:		RC		DL		DL		RC		RC	
Initial Temperature-°C											
Conc-µg/L		Code		Reading 1		Reading 2		Reading 3		Reading 4	
0		D		25.4		25.9		24.0		24.8	
12.5				25.5		25.7		24.3		24.9	
25				25.4		25.5		24.6		24.9	
50				25.1		25.3		24.6		24.9	
100				25.0		25.0		24.6		24.8	
200				24.9		24.8		24.4		—	
Measure Time:		1349		1651		1020		0925		1200	
Instrument ID:		#4		#4		4		4		#4	
Analyst:		AG		RC		DL		DL		RC	

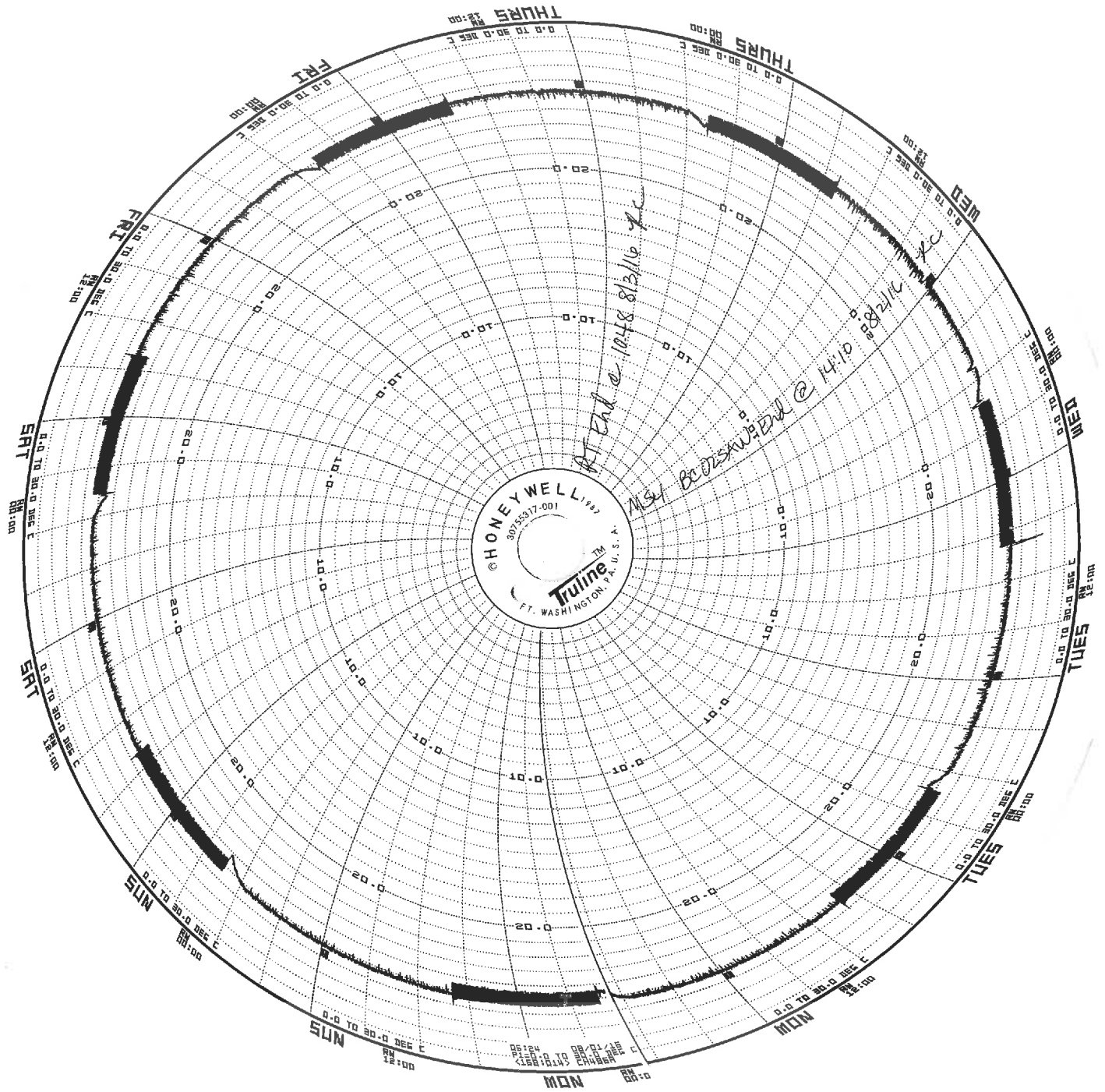


Test: 1607RT2A.C, 1607072A.C
Date: 7/26/16 (12:50) - 8/24/16 (14:10)



Test: 1607 RT2A.C, 1607072A.C

Date: 7/26/16 (12:50) - 8/2/16 (14:10)



Test: 1607RT2A.C, 1607072A.C
Date: 7/26/16 (12:50) - 8/2/16 (14:10)

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

STORMWATER MONITORING PROGRAM

TOXICITY TESTING REPORT

SAMPLE DATE: July 27, 2016

TEST DATE: July 28, 2016

TEST NUMBER: 1607072A.C

TEST MATERIAL: Station BC02SAW

TEST SPECIES: *Ceriodaphnia dubia*

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


TEST TYPE: Chronic

REFERENCE TOXICANT TEST: 1607RT2A.C

RESULT:

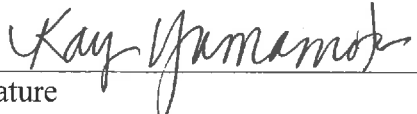
Survival
Reproduction

Pass, 0% effect
Pass, -32.3% effect

Rea Mara A Crinklaw
Analyst

Signature

Water Biologist II
Title

8/16/16
Date

Kay Yamamoto
Supervisor

Signature

Water Biologist III
Title

8/31/16
Date

CETIS Summary Report

Report Date: 11 Aug-16 12:14 (p 1 of 1)
 Test Code: 1607072A.C | 20-6433-6080

Ceriodaphnia 7-d Survival and Reproduction Test						Hyperion Treatment Plant Laboratory					
Batch ID:	14-8812-8481	Test Type:	Reproduction-Survival (7d)	Analyst:	Rea Mara Crinklaw						
Start Date:	28 Jul-16 14:27	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Mod-Hard Synthetic Water						
Ending Date:	03 Aug-16 14:10	Species:	Ceriodaphnia dubia	Brine:							
Duration:	6d	Source:	In-House Culture	Age:	<8h 7/28/16 (0737-1402)						
Sample ID:	17-6030-1964	Code:	456201	Client:	Watershed Protection Division						
Sample Date:	27 Jul-16 10:05	Material:	Stormwater Monitoring Sample	Project:	MS4						
Receive Date:	27 Jul-16 13:10	Source:	Stormwater (STORMWATER)								
Sample Age:	28h (13.9 °C)	Station:	BC02SAW								
Sample Renewals											
Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C						
1	456201	27 Jul-16 10:05	27 Jul-16 13:10	29 Jul-16 17:42	13.9						
2	456201	27 Jul-16 10:05	27 Jul-16 13:10	30 Jul-16 11:16	13.9						
3	456201	27 Jul-16 10:05	27 Jul-16 13:10	31 Jul-16 10:24	13.9						
4	456201	27 Jul-16 10:05	27 Jul-16 13:10	01 Aug-16 12:55	13.9						
5	456201	27 Jul-16 10:05	27 Jul-16 13:10	02 Aug-16 14:11	13.9						
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
06-6317-3206	6d Survival Rate	100	>100	N/A	N/A	1	TST-Welch's t Test				
00-3141-1392	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					
06-6317-3206	6d Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria					
00-3141-1392	Reproduction	Control Resp	15.5	15 - NL	Yes	Passes Acceptability Criteria					
6d 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	15.5	13.16	17.84	5	26	1.979	6.258	40.38%	0.0%
100		10	20.5	17.83	23.17	8	30	2.262	7.153	34.89%	-32.26%
6d 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	16	15	20	19	26	9	5	19	17	9
100		30	25	21	28	18	8	17	16	14	28

CETIS Analytical Report

Report Date: 11 Aug-16 12:14 (p 1 of 4)

Test Code: 1607072A.C | 20-6433-6080

Ceriodaphnia 7-d Survival and Reproduction Test					Hyperion Treatment Plant Laboratory						
Analysis ID: 06-6317-3206	Endpoint: 6d Survival Rate	CETIS Version: CETISv1.8.1		Official Results: Yes							
Analyzed: 11 Aug-16 12:12	Analysis: Parametric Bioequivalence-Two Sample										
Batch ID: 14-8812-8481	Test Type: Reproduction-Survival (7d)	Analyst: Rea Mara Crinklaw		Age: <8h 7/28/16 (0737-1402)							
Start Date: 28 Jul-16 14:27	Protocol: EPA/821/R-02-013 (2002)	Diluent: Mod-Hard Synthetic Water									
Ending Date: 03 Aug-16 14:10	Species: Ceriodaphnia dubia	Brine:									
Duration: 6d	Source: In-House Culture										
Sample ID: 17-6030-1964	Code: 456201	Client: Watershed Protection Division									
Sample Date: 27 Jul-16 10:05	Material: Stormwater Monitoring Sample	Project: MS4									
Receive Date: 27 Jul-16 13:10	Source: Stormwater (STORMWATER)										
Sample Age: 28h (13.9 °C)	Station: BC02SAW										
Data Transform	Zeta	Alt Hyp	MC Trials	TST b	Test Result						
Angular (Corrected)	0	C*b > T	Not Run	0.8	Sample passes 6d survival rate endpoint						
TST-Welch's t Test											
Control	vs	Conc-%	Test Stat	Critical	DF	MSD	P-Value	Decision(α:20%)			
Dilution Water		100*	0.2094				<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						
6d 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%

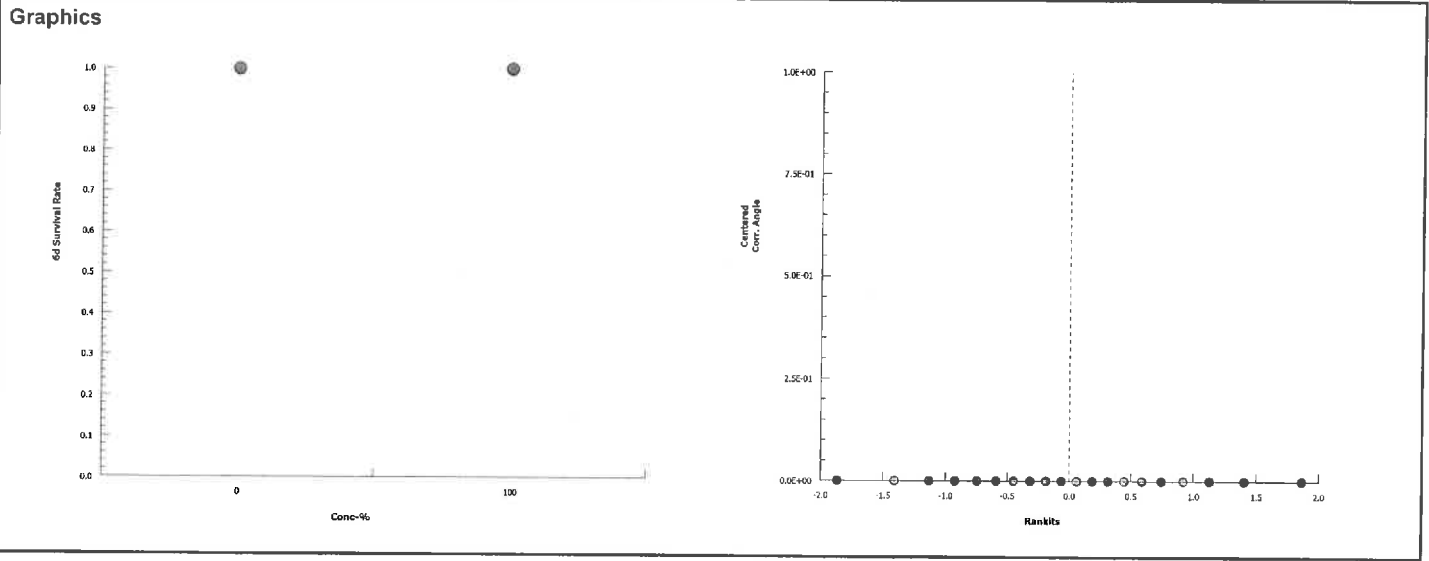
CETIS Analytical Report

Report Date: 11 Aug-16 12:14 (p 2 of 4)
 Test Code: 1607072A.C | 20-6433-6080

Ceriodaphnia 7-d Survival and Reproduction Test Hyperion Treatment Plant Laboratory

Analysis ID: 06-6317-3206	Endpoint: 6d Survival Rate	CETIS Version: CETISv1.8.1
Analyzed: 11 Aug-16 12:12	Analysis: Parametric Bioequivalence-Two Sample	Official Results: Yes

6d 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



CETIS Analytical Report

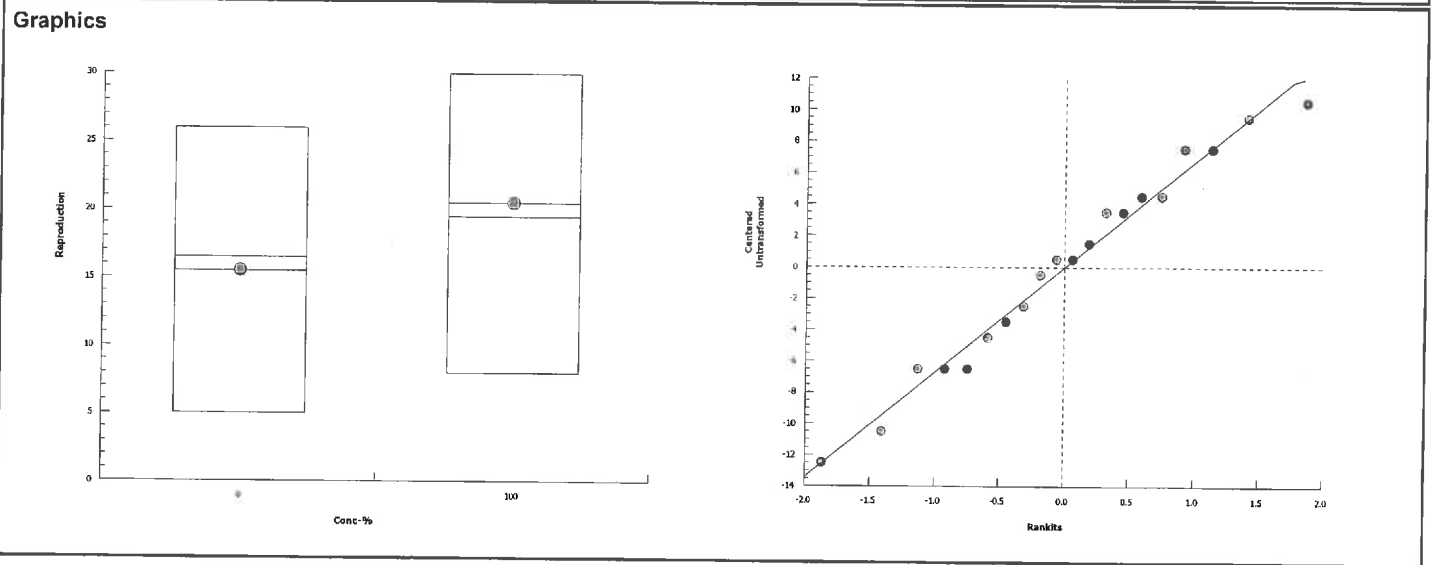
Report Date: 11 Aug-16 12:14 (p 3 of 4)
Test Code: 1607072A.C | 20-6433-6080

Ceriodaphnia 7-d Survival and Reproduction Test				Hyperion Treatment Plant Laboratory							
Analysis ID: 00-3141-1392	Endpoint: Reproduction	CETIS Version: CETISv1.8.1									
Analyzed: 03 Aug-16 15:28	Analysis: Parametric Bioequivalence-Two Sample	Official Results: Yes									
Batch ID: 14-8812-8481	Test Type: Reproduction-Survival (7d)	Analyst: Rea Mara Crinklaw									
Start Date: 28 Jul-16 14:27	Protocol: EPA/821/R-02-013 (2002)	Diluent: Mod-Hard Synthetic Water									
Ending Date: 03 Aug-16 14:10	Species: Ceriodaphnia dubia	Brine:									
Duration: 6d	Source: In-House Culture	Age: <8h	7/28/16 (0737-1402)								
Sample ID: 17-6030-1964	Code: 456201	Client: Watershed Protection Division									
Sample Date: 27 Jul-16 10:05	Material: Stormwater Monitoring Sample	Project: MS4									
Receive Date: 27 Jul-16 13:10	Source: Stormwater (STORMWATER)										
Sample Age: 28h (13.9 °C)	Station: BC02SAW										
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*	3.28	0.8662	15		0.0025	Non-Significant Effect			
Test Acceptability Criteria											
Attribute	Test Stat	TAC Limits	Overlap	Decision							
Control Resp	15.5	15 - NL	Yes	Passes Acceptability Criteria							
Auxiliary Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)						
Extreme Value	0	1.911	2.708	0.9323	No Outliers Detected						
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	125	125	1	2.768	0.1135	Non-Significant Effect					
Error	813	45.16667	18								
Total	938	170.1667	19								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Variance Ratio F	1.306	6.541	0.6970	Equal Variances						
Distribution	Shapiro-Wilk W Normality	0.9711	0.866	0.7774	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	15.5	13.12	17.88	5	26	1.979	6.258	40.38%	0.0%
100		10	20.5	17.78	23.22	8	30	2.262	7.153	34.89%	-32.26%

CETIS Analytical Report

Report Date: 11 Aug-16 12:14 (p 4 of 4)
 Test Code: 1607072A.C | 20-6433-6080

Ceriodaphnia 7-d Survival and Reproduction Test							Hyperion Treatment Plant Laboratory				
Analysis ID:	00-3141-1392		Endpoint:	Reproduction			CETIS Version:	CETISv1.8.1			
Analyzed:	03 Aug-16 15:28		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	16	15	20	19	26	9	5	19	17	9
100		30	25	21	28	18	8	17	16	14	28



CETIS Test Data Worksheet

Report Date: 25 Jul-16 09:14 (p 1 of 1)
Test Code: 20-6433-6080/1607072A.C

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 28 Jul-16 1427 Species: Ceriodaphnia dubia
End Date: 8/3/16 1410 Protocol: EPA/821/R-02-013 (2002)
Sample Date: 27 Jul-16 Material: Stormwater Monitoring Sample

Sample Code: 68EC138C
Sample Source: Stormwater
Sample Station: BC02SAW

Conc-%	Code	Rep	Pos	# Exposed	1d Survival	2d Survival	3d Survival	4d Survival	5d Survival	6d Survival	7d Survival	Neonates	Male
0	D	1	3	1	0	0	0	3	4	9		16	
0	D	2	13	1	0	0	0	4	2	9		15	
0	D	3	15	1	0	0	0	5	2	13		20	
0	D	4	14	1	0	0	0	3	6	10		18	
0	D	5	20	1	0	0	0	7	9	10		26	
0	D	6	18	1	0	0	0	6	2	1		9	
0	D	7	9	1	0	0	0	5	0	0		5	
0	D	8	2	1	0	0	0	7	4	8		19	
0	D	9	12	1	0	0	0	5	4	8		17	
0	D	10	5	1	0	0	0	4	1	4		9	
100		1	6	1	0	0	0	6	11	13		30	
100		2	1	1	0	0	0	6	8	11		25	
100		3	19	1	0	0	0	6	6	9		21	
100		4	17	1	0	0	0	6	9	13		28	
100		5	8	1	0	0	0	4	5	9		18	
100		6	4	1	0	0	0	4	1	3		8	
100		7	11	1	0	0	0	5	6	6		17	
100		8	16	1	0	0	0	6	5	5		16	
100		9	7	1	0	0	0	4	7	3		14	
100		10	10	1	0	0	0	7	8	13		28	

Food Added: 7/28 RC/AG 1352 AG 1712 RC 1040 DL 0937 DL 1216 RC 1326 RC 1245 RC

Transferred: 7/28 RC/AG 1427 RC 1742 RC 1116 DL 1024 DL 1255 RC 1411 RC 1410 RC End

CETIS Measurement Worksheet

Report Date: 25 Jul-16 09:14 (p 1 of 2)
 Test Code: 1607072A.C | 20-6433-6080

Ceriodaphnia 7-d Survival and Reproduction Test

Hyperion Treatment Plant Laboratory

Start Date: 28 Jul-16 Species: Ceriodaphnia dubia Sample Code: 68EC138C
 End Date: 04 Aug-16 Protocol: EPA/821/R-02-013 (2002) Sample Source: Stormwater
 Sample Date: 27 Jul-16 Material: Stormwater Monitoring Sample Sample Station: BC02SAW

Alkalinity (CaCO₃)-mg/L 8/12/16

Conc-%	Code	Reading 1
0	D	60
100		208
Measure Time:		1200
Instrument ID:		Titrate
Analyst:		Rc

Conductivity-µmhos 7/28 7/29 7-30 7-31 8/1 8/2 8/3

Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	346	323	306	346	332	330	333
100		1215	1182	1181	1272	1230	1212	1182
Measure Time:		1341	1657	1027	0930	1200	1312	1233
Instrument ID:		#1	#1	DL	DL	#1	#1	#1
Analyst:		Rc	Rc	DL	DL	Rc	Rc	Rc

Test ended Day 6.
 Day 7 solution not used.

Final Dissolved Oxygen-mg/L 7/28 7/29 7-30 7-31 8/1 8/2 8/3

Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	7.60	7.76	7.75	7.45	7.84	7.87	
100		7.57	7.65	7.71	7.72	7.77	7.82	
Measure Time:		1749	1123	1043	1304	1437	1506	
Instrument ID:		#4	4	4	#4	#4	#4	
Analyst:		Rc	DL	DL	Rc	Rc	Rc	

Initial Dissolved Oxygen-mg/L 7/28 7/29 7-30 7-31 8/1 8/2 8/3

Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	7.56	7.27	7.67	7.52	7.56	7.81	7.81
100		8.85	10.31	10.17	9.17	8.81	8.39	8.70
Measure Time:		1341	1657	1027	0930	1200	1312	1233
Instrument ID:		#4	#4	4	4	#4	#4	#4
Analyst:		Rc	Rc	DL	DL	Rc	Rc	Rc

Test ended Day 6.
 Day 7 solution not used.

Hardness (CaCO₃)-mg/L 8/12/16

Conc-%	Code	Reading 1
0	D	92
100		380
Measure Time:		1200
Instrument ID:		Titrate
Analyst:		Rc

Final pH 7/29 7-30 7-31 8/1 8/2 8/3

Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	8.29	8.19	8.24	8.30	8.34	8.35	
100		8.70	8.64	8.66	8.67	8.69	8.67	
Measure Time:		1749	1123	1043	1304	1437	1506	
Instrument ID:		#4	4	4	#4	#4	#4	
Analyst:		Rc	DL	DL	Rc	Rc	Rc	

CETIS Measurement Worksheet

Report Date: 25 Jul-16 09:14 (p 2 of 2)
 Test Code: 1607072A.C | 20-6433-6080

Ceriodaphnia 7-d Survival and Reproduction Test										Hyperion Treatment Plant Laboratory
Start Date: 28 Jul-16		Species: Ceriodaphnia dubia				Sample Code: 68EC138C				
End Date: 04 Aug-16		Protocol: EPA/821/R-02-013 (2002)				Sample Source: Stormwater				
Sample Date: 27 Jul-16		Material: Stormwater Monitoring Sample				Sample Station: BC02SAW				

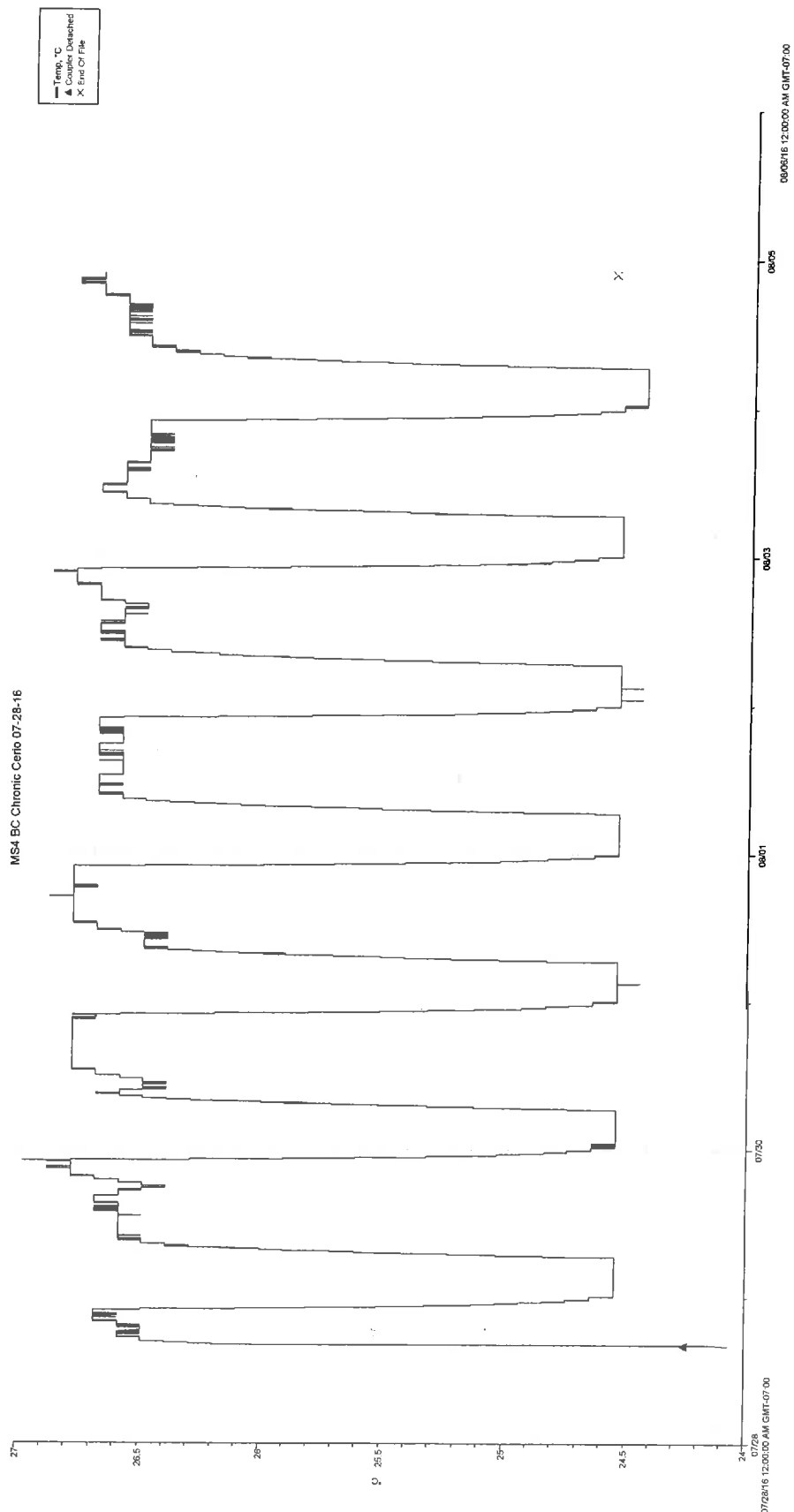
Initial pH		7/28	7/29	7-30	7-31	8/1	8/2	8/3	
Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	
0	D	8.27	8.54	8.41	8.52	8.49	8.46	8.51	
100		8.88	8.87	8.81	8.82	8.77	8.74	8.65	
Measure Time:		1341	1657	1027	0930	1200	1312	1233	
Instrument ID:		#4	#4	4	4	#4	#4	#4	
Analyst:		Rc	Rc	DL	DL	Rc	Rc	Rc	

Test ended Day 6. Day 7 solution not used.

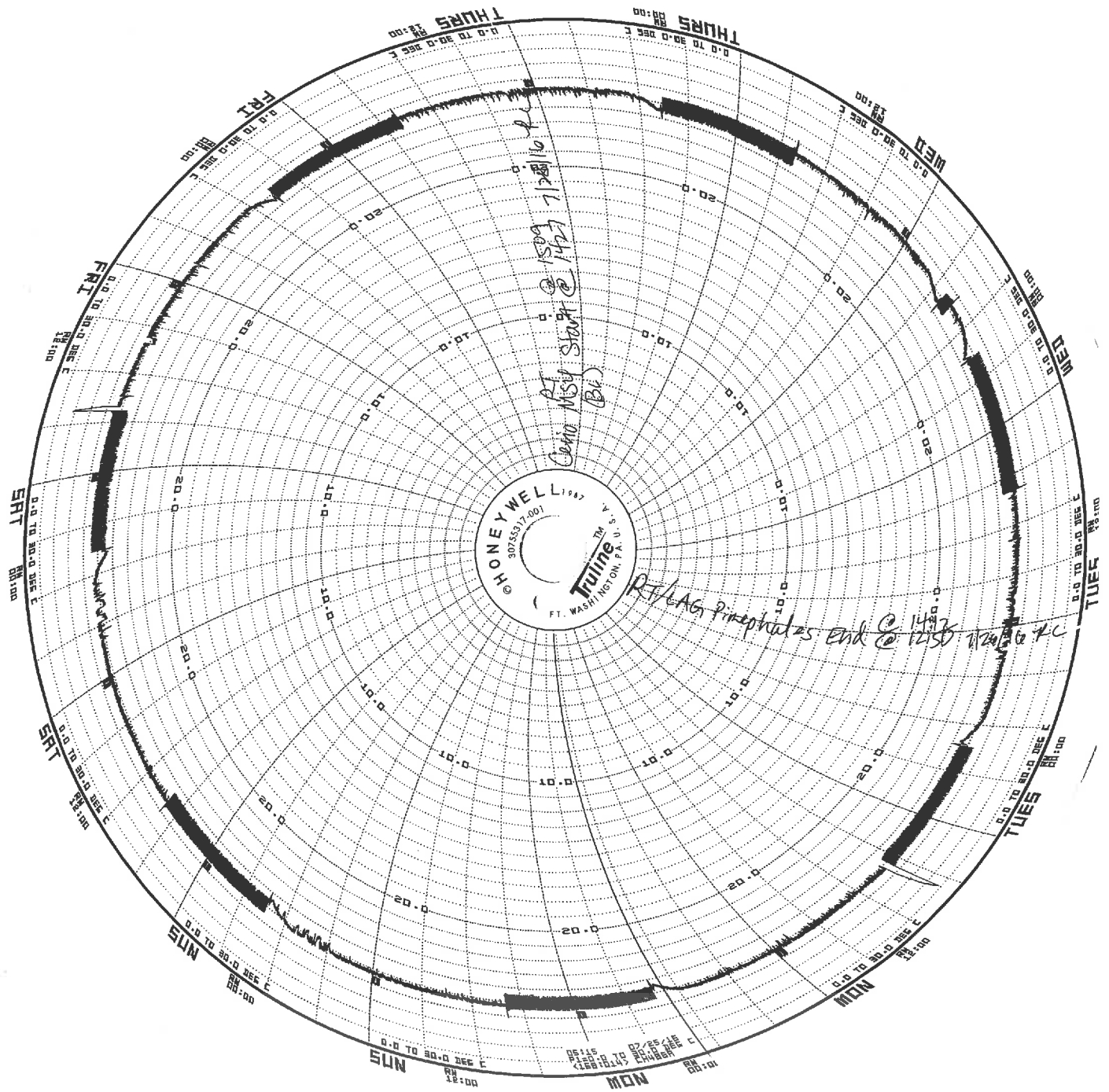
Final Temperature-°C		7/29	7-30	7-31	8/1	8/2	8/3	
Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7
0	D	25.5	25.5	25.3	25.4	25.6	25.1	
100		25.5	25.6	25.3	25.4	25.5	24.9	
Measure Time:		1749	1123	1043	1304	1437	1506	
Instrument ID:		#4	4	4	#4	#4	#4	
Analyst:		Rc	DL	DL	Rc	Rc	Rc	

Initial Temperature-°C		7/28	7/29	7-30	7-31	8/1	8/2	8/3	
Conc-%	Code	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	
0	D	24.1	24.9	24.3	24.7	25.4	25.1	25.3	
100		24.3	25.0	24.4	24.7	25.3	25.0	25.1	
Measure Time:		1341	1657	1027	0930	1043 1200	1312	1233	
Instrument ID:		#4	#4	4	4	4 7-31	#4	#4	
Analyst:		Rc	Rc	DL	DL	DL	Rc	Rc	

Test ended Day 6. Day 7 solution not used.

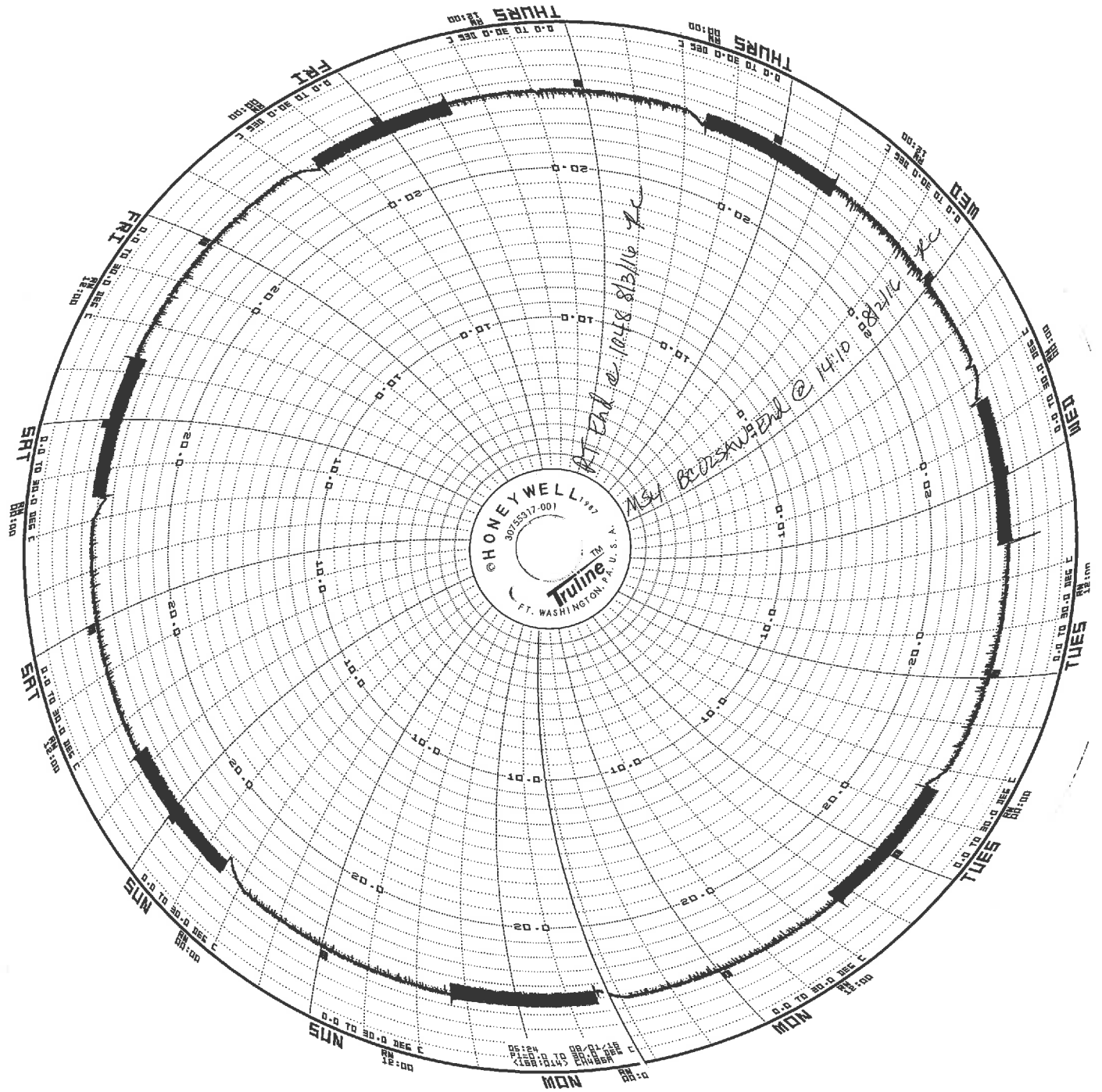


Test: 1607RT 2A.C, 1607072A.C
Date: 7/26/16 (12:50) - 8/2/16 (14:10)



Test: 1607 RT2A.C, 1607072A.C

Date: 7/26/16(12:50) - 8/2/16(14:10)



Test: 1607RT2A.C, 1607072A.C
 Date: 7/26/16 (12:50) - 8/2/16 (14:10)