

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

REFERENCE TOXICANT
TOXICITY TESTING REPORT

SAMPLE DATE: November 22, 2016

TEST DATE: November 22, 2016

TEST NUMBER: 1611RT2B.H

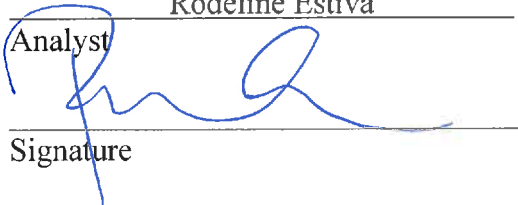
TEST MATERIAL: Zinc Sulfate

TEST SPECIES: *Haliotis rufescens*

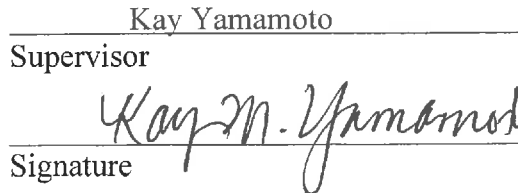
PROTOCOL: EPA/600/R-95/136

TEST TYPE: Chronic

RESULT NOEC: 32 µg/L
IC25: 53.4 µg/L

Rodeline Estiva
Analyst

Signature

Water Biologist II
Title
November 30, 2016
Date

Kay Yamamoto
Supervisor

Signature

Water Biologist III
Title
11/30/16
Date

CETIS Summary Report

Report Date: 30 Nov-16 13:03 (p 1 of 1)
Test Code: 1611RT2B.H | 08-9314-9192

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Batch ID: 07-0008-8704
Start Date: 22 Nov-16 14:02
Ending Date: 24 Nov-16 14:52
Duration: 49h
Test Type: Development
Protocol: EPA/600/R-95/136 (1995)
Species: Haliotis rufescens
Source: American Abalone

Analyst: Rodeline Estiva
Diluent: Laboratory Seawater
Brine: Frozen Seawater
Age:

Sample ID: 04-0279-6411
Sample Date: 22 Nov-16 07:15
Receive Date: 22 Nov-16 07:15
Sample Age: 7h
Code: 18022F7B
Material: Zinc sulfate
Source: Reference Toxicant
Station: Reference Toxicant

Client:
Project:

Sample Note: Ideal concentration-response relationship. The sample was set-up at 9:05am on 11/22/2016. The sample age is 2 hours. RE 11/29/2016

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
11-9430-4297	Development Rate	32	56	42.33	2.99%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	µg/L	95% LCL	95% UCL	TU	Method
01-4922-1660	Development Rate	EC5	33.95	30.87	36.02		Linear Interpolation (ICPIN)
		EC10	38.03	34.88	40.25		
		EC15	42.6	39.26	45.67		
		EC20	47.69	43.82	51.56		
		EC25	53.38	48.47	57.67		
		EC40	62.08	59.91	63.71		
		EC50	67.25	65.29	68.77		

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
01-4922-1660	Development Rate	Control Resp	0.9358	0.8 - NL	Yes	Passes Acceptability Criteria
11-9430-4297	Development Rate	Control Resp	0.9358	0.8 - NL	Yes	Passes Acceptability Criteria
11-9430-4297	Development Rate	NOEL	32	NL - 56	No	Passes Acceptability Criteria
11-9430-4297	Development Rate	PMSD	0.02992	0.038 - 0.16	No	Below Acceptability Criteria

*OK, min
PMSD is
3.8%

Development Rate Summary

Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	5	0.9358	0.926	0.9457	0.9	0.964	0.01177	0.02632	2.81%	0.0%
10		5	0.9201	0.9111	0.929	0.8932	0.9434	0.0107	0.02392	2.6%	1.69%
18		5	0.9345	0.9286	0.9404	0.9126	0.9515	0.007081	0.01583	1.69%	0.14%
32		5	0.9143	0.9078	0.9209	0.8919	0.9412	0.007873	0.0176	1.93%	2.3%
56		5	0.6835	0.671	0.6959	0.6429	0.7212	0.01492	0.03336	4.88%	26.97%
100		5	0.001905	0.000314	0.003495	0	0.009524	0.001905	0.004259	223.6%	99.8%

Development Rate Detail

Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	0.964	0.9429	0.9	0.9182	0.9541
10		0.9434	0.8952	0.9327	0.9358	0.8932
18		0.9515	0.9429	0.9126	0.9417	0.9238
32		0.9126	0.9412	0.8919	0.9151	0.9109
56		0.7059	0.6429	0.6923	0.7212	0.6552
100		0	0	0.009524	0	0

CETIS Analytical Report

Report Date: 29 Nov-16 13:23 (p 1 of 2)
 Test Code: 1611RT2B.H | 08-9314-9192

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Analysis ID: 11-9430-4297 Endpoint: Development Rate
 Analyzed: 29 Nov-16 9:49 Analysis: Parametric-Control vs Treatments

CETIS Version: CETISv1.8.1
 Official Results: Yes

Batch ID: 07-0008-8704 Test Type: Development
 Start Date: 22 Nov-16 14:02 Protocol: EPA/600/R-95/136 (1995)
 Ending Date: 24 Nov-16 14:52 Species: Haliotis rufescens
 Duration: 49h Source: American Abalone

Analyst: Rodeline Estiva
 Diluent: Laboratory Seawater
 Brine: Frozen Seawater
 Age:

Sample ID: 04-0279-6411 Code: 18022F7B
 Sample Date: 22 Nov-16 07:15 Material: Zinc sulfate
 Receive Date: 22 Nov-16 07:15 Source: Reference Toxicant
 Sample Age: 7h Station: Reference Toxicant

Client:
 Project:

Sample Note: The sample was set-up at 9:05am on 11/22/2016. The sample age is 2 hours. RE 11/29/2016

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run	32	56	42.33		2.99%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	Test Stat	Critical	DF	MSD	P-Value	Decision(α:5%)
Dilution Water		10	1.35	2.362	8	0.05646	0.2762	Non-Significant Effect
		18	0.2256	2.362	8	0.05646	0.7582	Non-Significant Effect
		32	1.831	2.362	8	0.05646	0.1333	Non-Significant Effect
		56*	14.44	2.362	8	0.05646	<0.0001	Significant Effect
		100*	52.7	2.362	8	0.05646	<0.0001	Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.9358	0.8 - NL	Yes	Passes Acceptability Criteria
NOEL	32	NL - 56	No	Passes Acceptability Criteria
PMSD	0.02992	0.038 - 0.16	No	Below Acceptability Criteria

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	0	2.028	2.908	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.176125	1.235225	5	864.5	<0.0001	Significant Effect
Error	0.03429326	0.001428886	24			
Total	6.210418	1.236654	29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.287	15.09	0.6558	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9688	0.9031	0.5068	Normal Distribution

CETIS Analytical Report

Report Date: 29 Nov-16 13:23 (p 2 of 2)
Test Code: 1611RT2B.H | 08-9314-9192

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Analysis ID: 11-9430-4297
Analyzed: 29 Nov-16 9:49
Endpoint: Development Rate
Analysis: Parametric-Control vs Treatments

CETIS Version: CETISv1.8.1
Official Results: Yes

Development Rate Summary

Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	5	0.9358	0.9258	0.9458	0.9	0.964	0.01177	0.02632	2.81%	0.0%
10		5	0.9201	0.911	0.9292	0.8932	0.9434	0.0107	0.02392	2.6%	1.69%
18		5	0.9345	0.9285	0.9405	0.9126	0.9515	0.007081	0.01583	1.69%	0.14%
32		5	0.9143	0.9076	0.921	0.8919	0.9412	0.007873	0.0176	1.93%	2.3%
56		5	0.6835	0.6708	0.6962	0.6429	0.7212	0.01492	0.03336	4.88%	26.97%
100		5	0.001905	0.000285	0.003525	0	0.009524	0.001905	0.004259	223.6%	99.8%

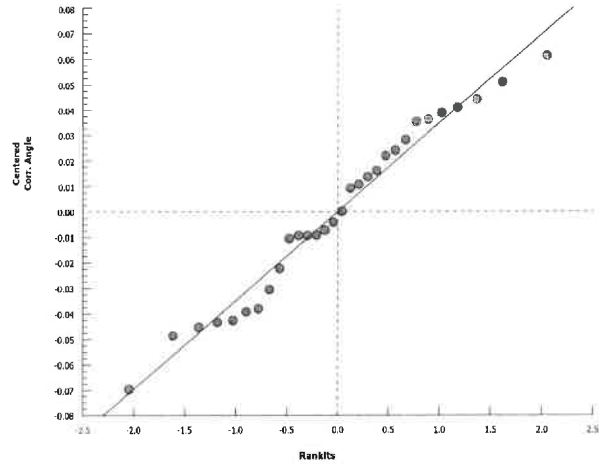
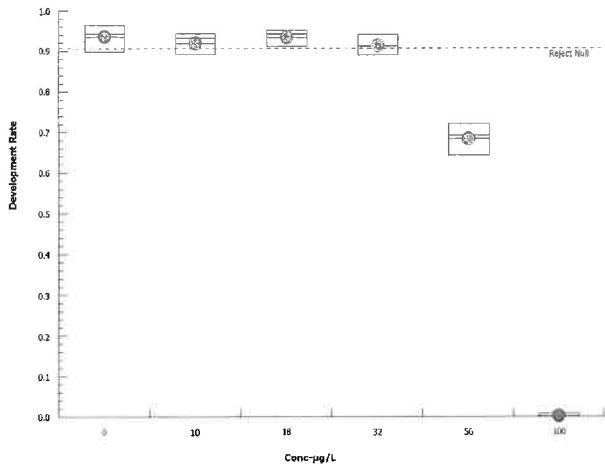
Angular (Corrected) Transformed Summary

Conc-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	5	1.319	1.298	1.339	1.249	1.38	0.02394	0.05352	4.06%	0.0%
10		5	1.287	1.27	1.303	1.238	1.331	0.01953	0.04366	3.39%	2.45%
18		5	1.313	1.301	1.325	1.271	1.349	0.01415	0.03163	2.41%	0.41%
32		5	1.275	1.263	1.287	1.236	1.326	0.01448	0.03238	2.54%	3.32%
56		5	0.9737	0.96	0.9873	0.9303	1.014	0.01602	0.03583	3.68%	26.17%
100		5	0.05899	0.05074	0.06723	0.04836	0.09775	0.009693	0.02167	36.75%	95.53%

Development Rate Detail

Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	0.964	0.9429	0.9	0.9182	0.9541
10		0.9434	0.8952	0.9327	0.9358	0.8932
18		0.9515	0.9429	0.9126	0.9417	0.9238
32		0.9126	0.9412	0.8919	0.9151	0.9109
56		0.7059	0.6429	0.6923	0.7212	0.6552
100		0	0	0.009524	0	0

Graphics



Ideal concentration -
response relationship.
R# 11/30/2016

CETIS Analytical Report

Report Date: 29 Nov-16 13:23 (p 1 of 2)
 Test Code: 1611RT2B.H | 08-9314-9192

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Analysis ID: 01-4922-1660	Endpoint: Development Rate	CETIS Version: CETISv1.8.1
Analyzed: 29 Nov-16 9:49	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes
Batch ID: 07-0008-8704	Test Type: Development	Analyst: Rodeline Estiva
Start Date: 22 Nov-16 14:02	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 24 Nov-16 14:52	Species: Haliotis rufescens	Brine: Frozen Seawater
Duration: 49h	Source: American Abalone	Age:
Sample ID: 04-0279-6411	Code: 18022F7B	Client:
Sample Date: 22 Nov-16 07:15	Material: Zinc sulfate	Project:
Receive Date: 22 Nov-16 07:15	Source: Reference Toxicant	
Sample Age: 7h	Station: Reference Toxicant	

Sample Note: The sample was set-up at 9:05am on 11/22/2016. The sample age is 2 hours. RE 11/29/2016

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1.136E+09	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.9358	0.8 - NL	Yes	Passes Acceptability Criteria

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value	2.028	2.908	1.0000	No Outliers Detected

Point Estimates

Level	µg/L	95% LCL	95% UCL
EC5	33.95	30.87	36.02
EC10	38.03	34.88	40.25
EC15	42.6	39.26	45.67
EC20	47.69	43.82	51.56
EC25	53.38	48.47	57.67
EC40	62.08	59.91	63.71
EC50	67.25	65.29	68.77

Development 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	5	0.9358	0.9	0.964	0.01177	0.02632	2.81%	0.0%	501	535
10		5	0.9201	0.8932	0.9434	0.0107	0.02392	2.6%	1.69%	485	527
18		5	0.9345	0.9126	0.9515	0.007081	0.01583	1.69%	0.14%	485	519
32		5	0.9143	0.8919	0.9412	0.007873	0.0176	1.93%	2.3%	478	523
56		5	0.6835	0.6429	0.7212	0.01492	0.03336	4.88%	26.97%	376	551
100		5	0.001905	0	0.009524	0.001905	0.004259	223.6%	99.8%	1	517

Development Rate Detail

Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	0.964	0.9429	0.9	0.9182	0.9541
10		0.9434	0.8952	0.9327	0.9358	0.8932
18		0.9515	0.9429	0.9126	0.9417	0.9238
32		0.9126	0.9412	0.8919	0.9151	0.9109
56		0.7059	0.6429	0.6923	0.7212	0.6552
100		0	0	0.009524	0	0

RES

Kmy

CETIS Analytical Report

Report Date: 29 Nov-16 13:23 (p 2 of 2)
Test Code: 1611RT2B.H | 08-9314-9192

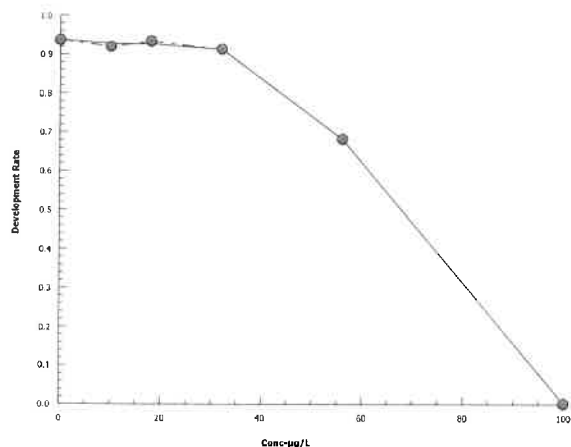
Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Analysis ID: 01-4922-1660 Endpoint: Development Rate
Analyzed: 29 Nov-16 9:49 Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.1
Official Results: Yes

Graphics



Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Test Type: Development

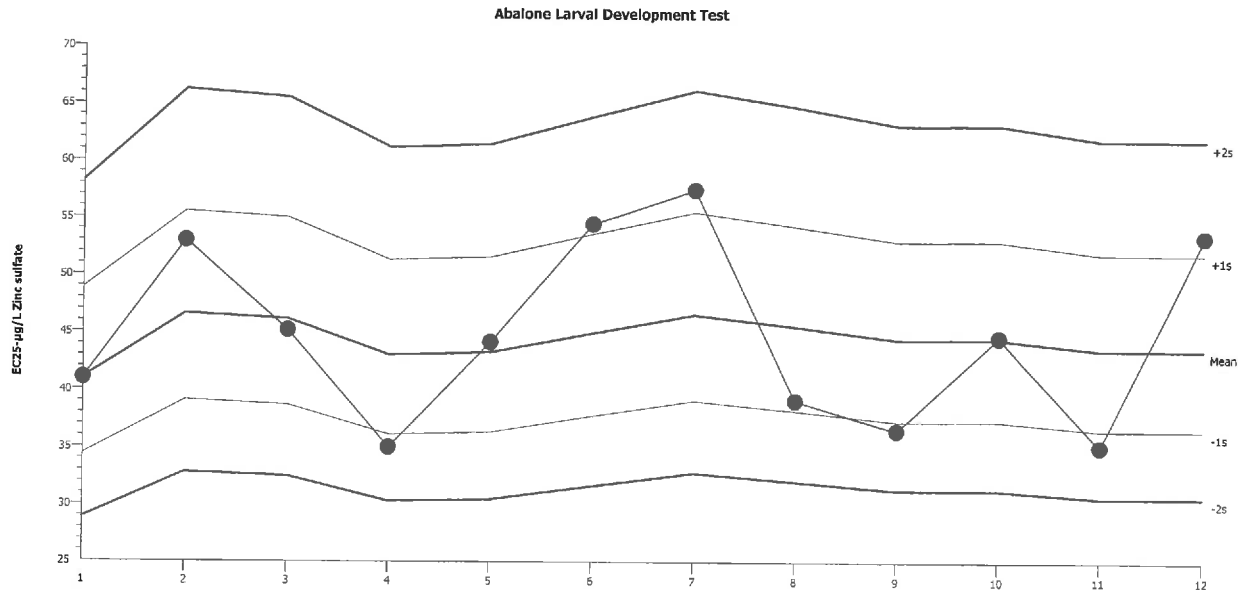
Organism: Haliotis rufescens (Red Abalone)

Material: Zinc sulfate

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

Endpoint: Development Rate

Source: Reference Toxicant-REF



Mean: 43.51

Count: 11

-1s Warning Limit: 36.51

-2s Action Limit: 30.63

Sigma: N/A

CV: 19.20%

+1s Warning Limit: 51.87

+2s Action Limit: 61.83

Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2015	Dec	15	41.01	-2.504	-0.3376			15-3714-2091	14-6669-8620
2	2016	Feb	9	53	9.486	1.123	(+)		06-7880-7546	02-0581-1379
3		Mar	23	45.17	1.663	0.2136			11-2760-5170	19-5054-9005
4		Apr	5	34.99	-8.524	-1.242	(-)		11-1215-1162	19-2219-9156
5		May	10	44.15	0.6437	0.08363			12-0215-4193	05-1895-1744
6		Jun	7	54.44	10.93	1.277	(+)		14-4930-2277	18-7876-8418
7		Jul	12	57.45	13.94	1.583	(+)		12-3983-3660	00-3100-6703
8		Aug	9	39.08	-4.426	-0.611			07-0065-4337	08-5146-6340
9		Sep	6	36.49	-7.017	-1.001	(-)		05-8092-4057	09-1753-9978
10		Oct	4	44.63	1.12	0.1447			15-2271-0521	06-3374-6293
11		Nov	8	35.1	-8.415	-1.224	(-)		09-7023-1451	03-4792-9290
12			22	53.38	9.869	1.164	(+)		08-9314-9192	01-4922-1660

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Test Type: Development

Organism: Haliotis rufescens (Red Abalone)

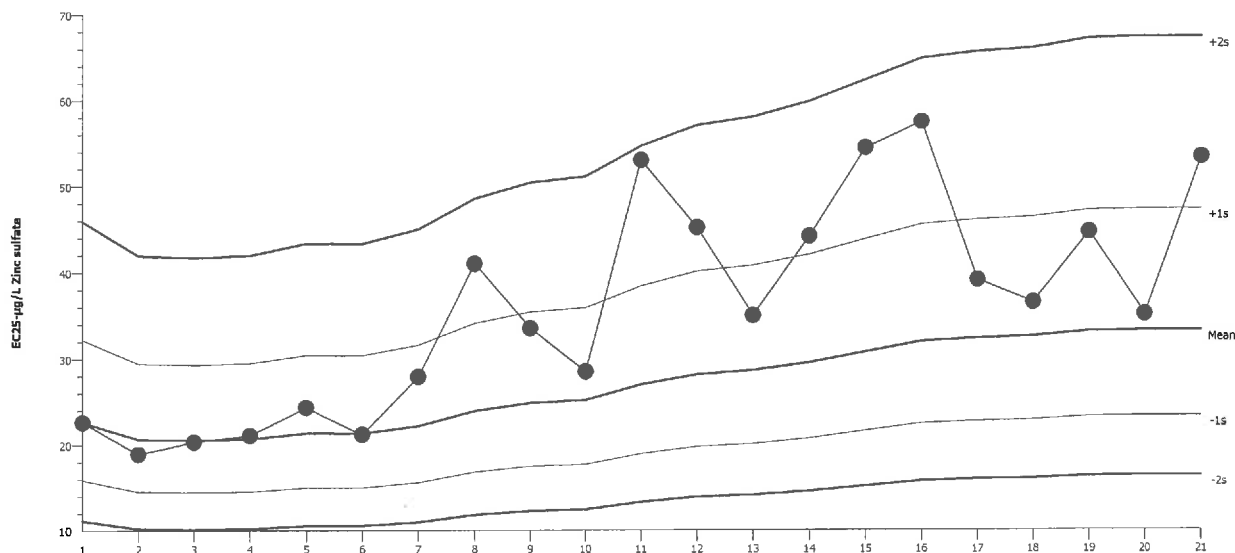
Material: Zinc sulfate

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

Endpoint: Development Rate

Source: Reference Toxicant-REF

Abalone Larval Development Test



Mean: 33.21

Count: 20

-1s Warning Limit: 23.33

-2s Action Limit: 16.38

Sigma: N/A

CV: 42.40%

+1s Warning Limit: 47.31

+2s Action Limit: 67.37

Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2015	Sep	25	22.63	-10.59	-1.086	(-)		17-8870-5001	08-1142-0385
2		Oct	5	18.93	-14.29	-1.591	(-)		13-8662-1699	21-2962-0986
3			19	20.35	-12.87	-1.386	(-)		04-9180-2968	03-7749-4684
4			27	21.09	-12.13	-1.285	(-)		06-2414-8015	15-4754-9198
5		Nov	2	24.34	-8.872	-0.879			09-8080-7122	10-4747-2102
6			17	21.19	-12.03	-1.272	(-)		18-9052-4373	19-6909-4504
7		Dec	15	27.89	-5.321	-0.4939			11-1568-0872	17-8948-7802
8			15	41.01	7.791	0.5961			15-3714-2091	14-6669-8620
9	2016	Jan	12	33.52	0.3032	0.0257			16-7039-0949	04-6589-8411
10		Feb	9	28.51	-4.708	-0.4324			20-6911-7173	20-5659-8179
11			9	53	19.78	1.322	(+)		06-7880-7546	02-0581-1379
12		Mar	23	45.17	11.96	0.8699			11-2760-5170	19-5054-9005
13		Apr	5	34.99	1.772	0.147			11-1215-1162	19-2219-9156
14		May	10	44.15	10.94	0.8053			12-0215-4193	05-1895-1744
15		Jun	7	54.44	21.23	1.398	(+)		14-4930-2277	18-7876-8418
16		Jul	12	57.45	24.24	1.55	(+)		12-3983-3660	00-3100-6703
17		Aug	9	39.08	5.869	0.4603			07-0065-4337	08-5146-6340
18		Sep	6	36.49	3.279	0.2663			05-8092-4057	09-1753-9978
19		Oct	4	44.63	11.42	0.8357			15-2271-0521	06-3374-6293
20		Nov	8	35.1	1.881	0.1558			09-7023-1451	03-4792-9290
21			22	53.38	20.16	1.342	(+)		08-9314-9192	01-4922-1660

CETIS Test Data Worksheet

RT

Report Date: 21 Nov-16 07:57 (p 1 of 1)
Test Code: 08-9314-9192/1611RT2B.H

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Start Date: 22 Nov-16 Species: *Haliotis rufescens*
End Date: 24 Nov-16 Protocol: EPA/600/R-95/136 (1995)
Sample Date: 31 Oct-16 Material: Zinc sulfate

Sample Code: 18022F7B
Sample Source: Reference Toxicant
Sample Station: Reference Toxicant

Conc-µg/L	Code	Rep	Pos	# Counted	# Normal	Notes
0	D	1	26	111	107	
0	D	2	9	105	99	
0	D	3	15	100	90	
0	D	4	20	116	101	
0	D	5	22	109	104	
10		1	13	106	100	
10		2	6	105	94	
10		3	7	104	97	
10		4	28	109	102	
10		5	1	103	92	
18		1	17	103	98	
18		2	24	105	99	
18		3	5	103	94	
18		4	30	103	97	
18		5	21	105	97	
32		1	12	103	94	
32		2	2	102	96	
32		3	23	111	99	
32		4	4	106	97	
32		5	16	101	92	
56		1	3	102	72	
56		2	27	112	72	
56		3	19	117	81	
56		4	29	104	75	
56		5	8	116	76	
100		1	14	102	0	
100		2	10	101	0	
100		3	18	105	1	
100		4	11	102	0	
100		5	25	107	0	

set-up @ 9:05 AM. 11/22/16 RE

CETIS Measurement Worksheet

RT

Report Date: 21 Nov-16 07:57 (p 1 of 1)
Test Code: 1611RT2B.H | 08-9314-9192

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Start Date: 22 Nov-16 Species: *Haliotis rufescens*
End Date: 24 Nov-16 Protocol: EPA/600/R-95/136 (1995)
Sample Date: 31 Oct-16 Material: Zinc sulfate

Sample Code: 18022F7B
Sample Source: Reference Toxicant
Sample Station: Reference Toxicant

Dissolved Oxygen-mg/L 11/22 11/24				
Conc-µg/L	Code	Reading 1	Reading 2	
0	D	7.86	7.05	
10		7.81	7.14	
18		7.78	7.30	
32		7.76	7.37	
56		7.76	7.38	
100		7.77	7.37	
Measure Time:		1830	1403	
Instrument ID:		#2	#2	
Analyst:		RE	RE	

pH 11/22 11/24				
Conc-µg/L	Code	Reading 1	Reading 2	
0	D	8.11	7.97	
10		8.10	7.96	
18		8.11	7.96	
32		8.11	7.97	
56		8.11	7.97	
100		8.11	7.98	
Measure Time:		1608	1403	
Instrument ID:		#4	#4	
Analyst:		RE	RE	

Salinity-ppt 11/22 11/24				
Conc-µg/L	Code	Reading 1	Reading 2	
0	D	33	33	
10		33	33	
18		33	33	
32		33	33	
56		33	33	
100		33	33	
Measure Time:		1600	1403	
Instrument ID:		#4 Cond	#4 Cond	
Analyst:		RE	RE	

Temperature-°C 11/22 11/23 11/24					
Conc-µg/L	Code	Reading 1	Reading 2	Reading 3	
0	D	14.8	15.0	15.0	
10		14.9	14.8	14.9	
18		14.7	14.8	14.9	
32		15.0	14.8	14.9	
56		15.0	14.8	15.0	
100		15.0	14.8	14.9	
Measure Time:		1600	754	1403	
Instrument ID:		#4	#2	#4	
Analyst:		RE	AN	RE	

ABALONE SPAWNING WORKSHEET

TYPE OF EFFLUENT: Stormwater

TEST START DATE: Nov 22, 2016 Batch #: 161103
 TEST ID: 1611RT2B.H, 1611072A.H, 1611072B.H
 TIME SPAWNING START: 9:00 9:15

Number of abalone ^{11/22} Gonad index Temperature
 3 Males 3 3 3 - 3.0 15° C
 3 Females 3 3 3 - 3.0 15° C

	Time	Male Temperature	Female Temperature
Beginning of spawning treatment:	Male <u>1028</u> Female <u>931</u>	<u>15° C</u>	<u>15° C</u>
Taken out of H2O2:	Male <u>1230</u> Female <u>1201</u>		
First male abalone spawn:	<u>1240</u>	<u>15° C</u>	<u>15° C</u>
First female abalone spawn:	<u>1257</u>	<u>15° C</u>	<u>15° C</u>
Fertilization start:	<u>1306</u>	<u>15° C</u>	<u>15° C</u>
Fertilization completed:	<u>11/24/10 4:32</u>	<u>15° C</u>	<u>15° C</u>

Fertilized eggs density count:

Mean 145 eggs 0.5 ml

Add 1000 embryos/test container divided by the number of embryos/ml
~~580 eggs/0.5ml/beaker~~ ml/test per beaker

Temperature of embryos: 15.2° C
 Temperature of test containers: 14.8° C
 Time embryos added to test chambers (TEST START): 1402

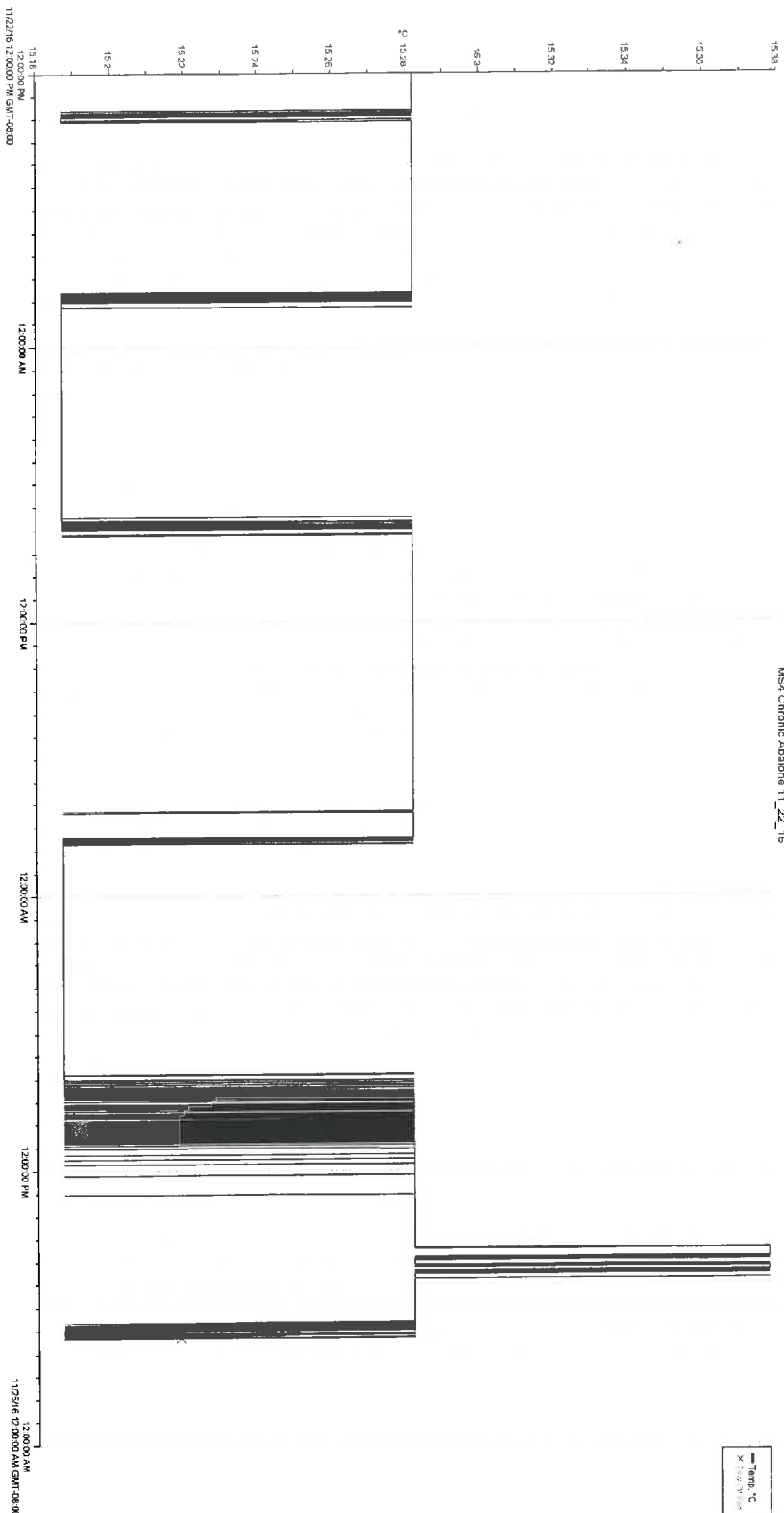
① 73 eggs/0.3ml
 ② 113 eggs/0.3ml
 ③ 93 eggs/0.3ml
 ④ 90 eggs/0.3ml
 ⑤ 66 eggs/0.3ml

Ave = $87 \text{ eggs} / 0.3 \text{ ml} = X / 0.5 \text{ ml}$
 $X = 145 \text{ eggs}$

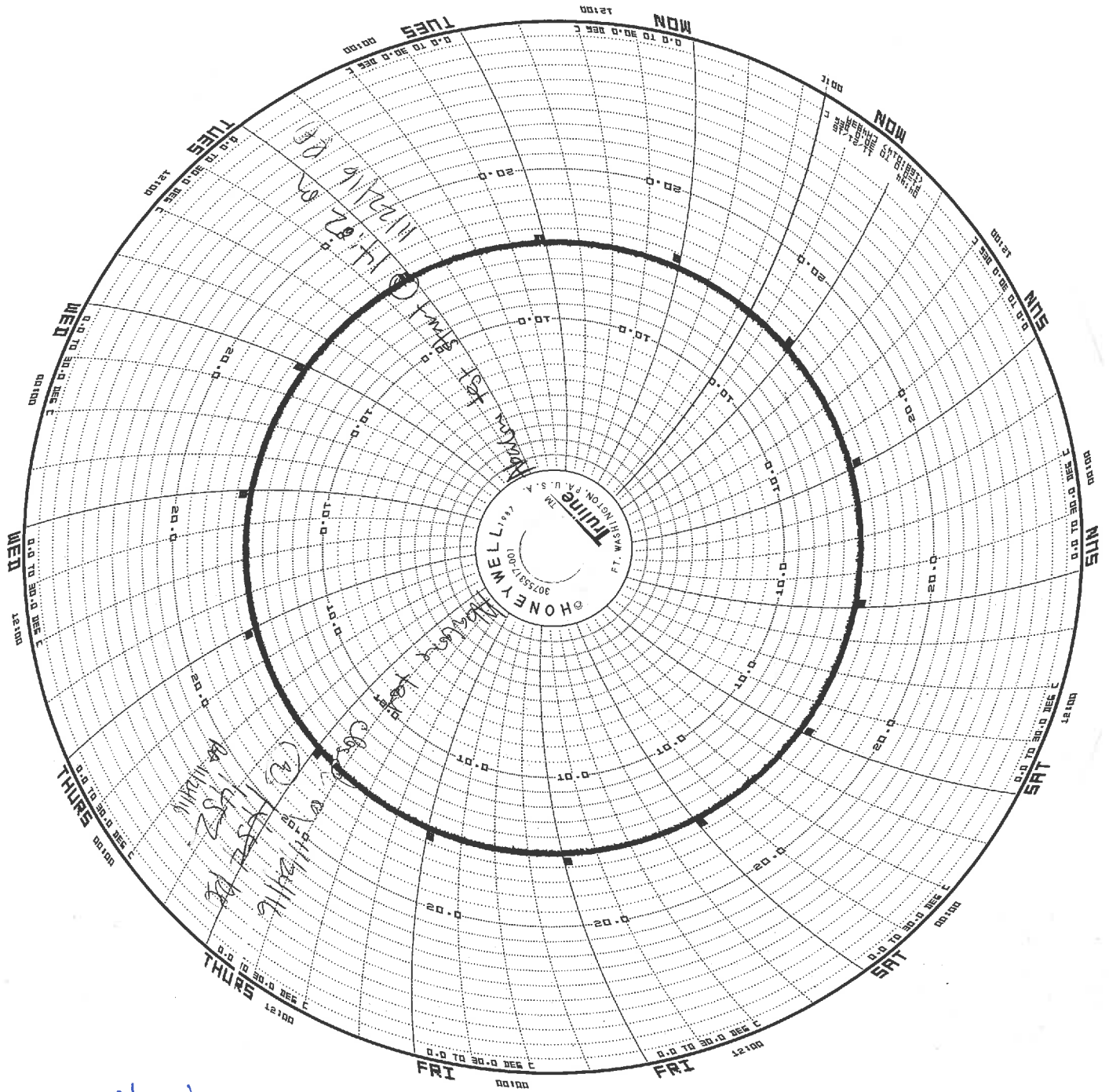
TEST CLOSING
 DATE: 11/24/2016

TIME: 14:52 RF

—Temp, °C
X Time, min



Abalone Chronic
Test start: Tuesday, November 22, 2016
Test end: Thursday, November 24, 2016



Abalone Chronic

Test Start: Tuesday, November 22, 2016

Test End: Thursday, November 24, 2016

RT - 1611RT2B.H

SMB-1 - 1611072A.H

SMB-3 - 1611072B.H

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

STORMWATER MONITORING PROGRAM

TOXICITY TESTING REPORT

SAMPLE DATE: November 21, 2016

TEST DATE: November 22, 2016

TEST NUMBER: 1611072A.H

TEST MATERIAL: Station RW-SMB-1

TEST SPECIES: *Haliotis rufescens*

PROTOCOL: EPA/600/R-95/136

TEST TYPE: Chronic

REFERENCE TOXICANT TEST: 1611RT2B.H

RESULT: PASS

% Effect = -0.22 %

Rodeline Estiva

Analyst

Signature

Water Biologist II

Title

November 30, 2016

Date

Kay Yamamoto

Supervisor

Signature

Water Biologist III

Title

11/30/16

Date

CETIS Summary Report

Report Date: 29 Nov-16 13:58 (p 1 of 1)
Test Code: 1611072A.H | 11-3245-5173

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Batch ID: 07-0008-8704	Test Type: Development	Analyst: Rodeline Estiva
Start Date: 22 Nov-16 14:02	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 24 Nov-16 14:52	Species: Haliotis rufescens	Brine: Frozen Seawater
Duration: 49h	Source: American Abalone	Age:

Sample ID: 12-9891-7884	Code: HT530508	Client: Watershed Protection Division
Sample Date: 21 Nov-16 12:02	Material: Stormwater Monitoring Sample	Project: MS4
Receive Date: 21 Nov-16 14:45	Source: WPD (WATERSHED)	
Sample Age: 26h (13.4 °C)	Station: RW-SMB-1	

Sample Note: The sample was set-up at 8:30am on 11/22/2016. The sample age is 20 hours. RE 11/29/2016

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
18-2692-6993	Development 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
18-2692-6993	Development Rate	Control Resp	0.9375	0.8 - NL	Yes	Passes Acceptability Criteria

Development Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	5	0.9375	0.9321	0.943	0.9159	0.9528	0.006539	0.01462	1.56%	0.0%
100		5	0.9396	0.9303	0.9489	0.8974	0.963	0.01118	0.02499	2.66%	-0.22%

Development Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	0.9159	0.9528	0.9439	0.93	0.945
100		0.963	0.9519	0.9417	0.8974	0.9439

CETIS Analytical Report

Report Date: 29 Nov-16 13:58 (p 1 of 2)
Test Code: 1611072A.H | 11-3245-5173

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Analysis ID: 18-2692-6993	Endpoint: Development Rate	CETIS Version: CETISv1.8.1
Analyzed: 29 Nov-16 9:57	Analysis: Parametric Bioequivalence-Two Sample	Official Results: Yes
Batch ID: 07-0008-8704	Test Type: Development	Analyst: Rodeline Estiva
Start Date: 22 Nov-16 14:02	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 24 Nov-16 14:52	Species: Haliotis rufescens	Brine: Frozen Seawater
Duration: 49h	Source: American Abalone	Age:
Sample ID: 12-9891-7884	Code: HT530508	Client: Watershed Protection Division
Sample Date: 21 Nov-16 12:02	Material: Stormwater Monitoring Sample	Project: MS4
Receive Date: 21 Nov-16 14:45	Source: WPD (WATERSHED)	
Sample Age: 26h (13.4 °C)	Station: RW-SMB-1	

Sample Note: The sample was set-up at 8:30am on 11/22/2016. The sample age is 20 hours. RE 11/29/2016

Data Transform	Zeta	Alt Hyp	MC Trials	TST b	Test Result
Angular (Corrected)	0	C*b > T	Not Run	0.75	Sample passes development rate endpoint

TST-Welch's t Test

Control	vs	Conc-%	Test Stat	Critical	DF	MSD	P-Value	Decision(α:5%)
Dilution Water		100*	13.86	2.015	5		<0.0001	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.9375	0.8 - NL	Yes	Passes Acceptability Criteria

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	0	2.112	2.29	0.1397	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001108083	0.0001108083	1	0.06651	0.8030	Non-Significant Effect
Error	0.01332872	0.001666089	8			
Total	0.01343952	0.001776898	9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.784	23.15	0.3452	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9281	0.7411	0.4297	Normal Distribution

Development Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	5	0.9375	0.932	0.9431	0.9159	0.9528	0.006539	0.01462	1.56%	0.0%
100		5	0.9396	0.9301	0.9491	0.8974	0.963	0.01118	0.02499	2.66%	-0.22%

Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	5	1.319	1.308	1.331	1.277	1.352	0.01327	0.02968	2.25%	0.0%
100		5	1.326	1.307	1.345	1.245	1.377	0.02214	0.04951	3.73%	-0.5%

CETIS Analytical Report

Report Date: 29 Nov-16 13:58 (p 2 of 2)
Test Code: 1611072A.H | 11-3245-5173

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

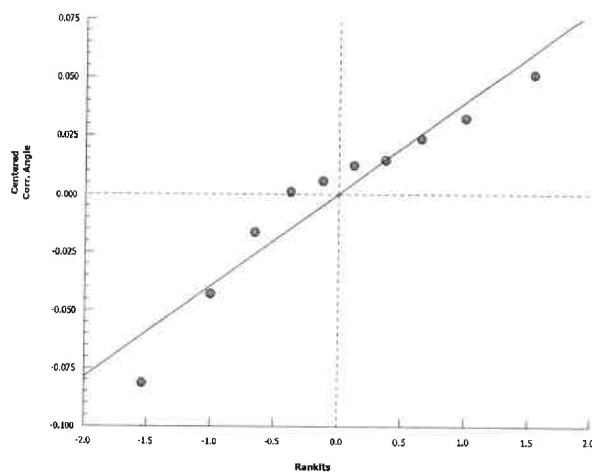
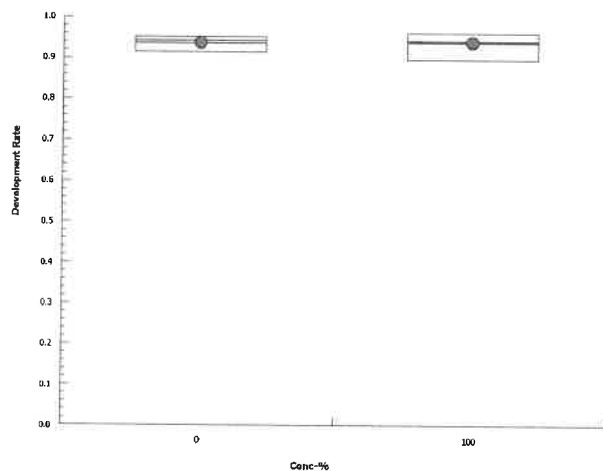
Analysis ID: 18-2692-6993 Endpoint: Development Rate
Analyzed: 29 Nov-16 9:57 Analysis: Parametric Bioequivalence-Two Sample

CETIS Version: CETISv1.8.1
Official Results: Yes

Development Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	0.9159	0.9528	0.9439	0.93	0.945
100		0.963	0.9519	0.9417	0.8974	0.9439

Graphics



CETIS Test Data Worksheet

SMB 1

Report Date: 21 Nov-16 07:57 (p 1 of 1)
Test Code: 11-3245-5173/1611072A.H

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Start Date: 22 Nov-16 1402 Species: Haliotis rufescens
End Date: 24 Nov-16 1452 Protocol: EPA/600/R-95/136 (1995)
Sample Date: 31 Oct-16 12102 Material: Stormwater Monitoring Sample

Sample Code: 4D6BE9FC
Sample Source: WPD
Sample Station: RW-SMB-1

Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
0	D	1	6	107	98	
0	D	2	11	106	101	
0	D	3	12	107	101	
0	D	4	1	100	93	
0	D	5	8	109	103	
100		1	14	108	104	
100		2	13	104	99	
100		3	3	103	97	
100		4	2	117	105	
100		5	4	107	101	

sample received on 11/21/2016 @ 14:45. RE (T=13.4°C)
HT530508

set-up @ 8:30 AM .RE 11/22/16

CETIS Measurement Worksheet

SMB 1

Report Date: 21 Nov-16 07:57 (p 1 of 1)
Test Code: 1611072A.H | 11-3245-5173

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Start Date: 22 Nov-16 Species: *Haliotis rufescens* Sample Code: 4D6BE9FC
End Date: 24 Nov-16 Protocol: EPA/600/R-95/136 (1995) Sample Source: WPD
Sample Date: 31 Oct-16 Material: Stormwater Monitoring Sample Sample Station: RW-SMB-1

Dissolved Oxygen-mg/L				
Conc.-%	Code	Reading 1	Reading 2	
0	D	7.77	7.37	Dilution control shared w/SMB 3
100		8.07	7.33	
Measure Time:		1008	1405	
Instrument ID:		#2	#2	
Analyst:		RB	RB	
pH				
Conc.-%	Code	Reading 1	Reading 2	
0	D	8.09	7.95	
100		8.19	7.96	
Measure Time:		1008	1405	
Instrument ID:		#4	#4	
Analyst:		RB	RB	
Salinity-ppt				
Conc.-%	Code	Reading 1	Reading 2	
0	D	33	33	
100		33	33	
Measure Time:		1008	1405	
Instrument ID:		#4 cond	#4 cond	
Analyst:		RB	RB	
Temperature-°C				
Conc.-%	Code	Reading 1	Reading 2	Reading 3
0	D	14.5	14.8	15.0
100		14.5	14.9	15.0
Measure Time:		1008	0756	1405
Instrument ID:		#4	2	#4
Analyst:		RB	RB	RB

ABALONE SPAWNING WORKSHEET

TYPE OF EFFLUENT: Stormwater

TEST START DATE: Nov 22, 2016
 TEST ID: 1611RT2B,H, 1611072A,H, 1611072B,H
 TIME SPAWNING START: 9:15

Batch #: 161103

Number of abalone
 3 Males 3 3 3 -
 3 Females 3 3 3 -

Gonad index
 3.0
 3.0

Temperature
 15° C
 15° C

Time
 Male Female
 Beginning of spawning treatment: 10:28 9:31
 Taken out of H2O2: 12:30 12:01
 First male abalone spawn: 12:40
 First female abalone spawn: 12:57
 Fertilization start: 13:06
 Fertilization completed: 14:32

Male Temperature
 15° C
 15° C
 15° C
 15° C

Female Temperature
 15° C
 15° C
 15° C
 15° C

Fertilized eggs density count:

Mean 145 eggs / 0.5 ml

Add 1000 embryos/test container divided by the number of embryos/ml
 580 eggs / 0.3 ml / beaker ml/test per beaker

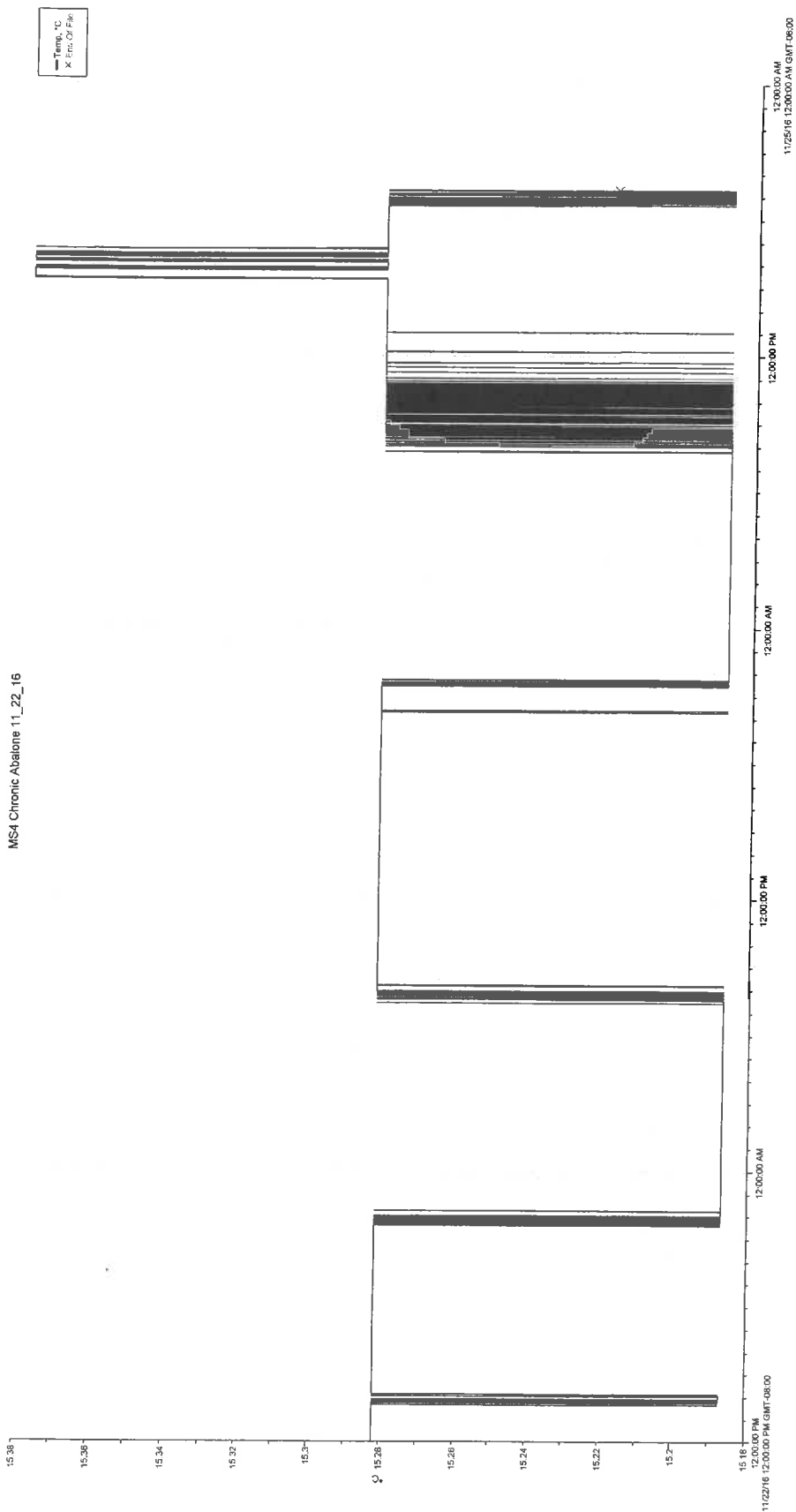
Temperature of embryos: 15.2° C
 Temperature of test containers: 14.8° C
 Time embryos added to test chambers (TEST START): 14:02

① 73 eggs / 0.3 ml
 ② 113 eggs / 0.3 ml
 ③ 93 eggs / 0.3 ml
 ④ 90 eggs / 0.3 ml
 ⑤ 66 eggs / 0.3 ml

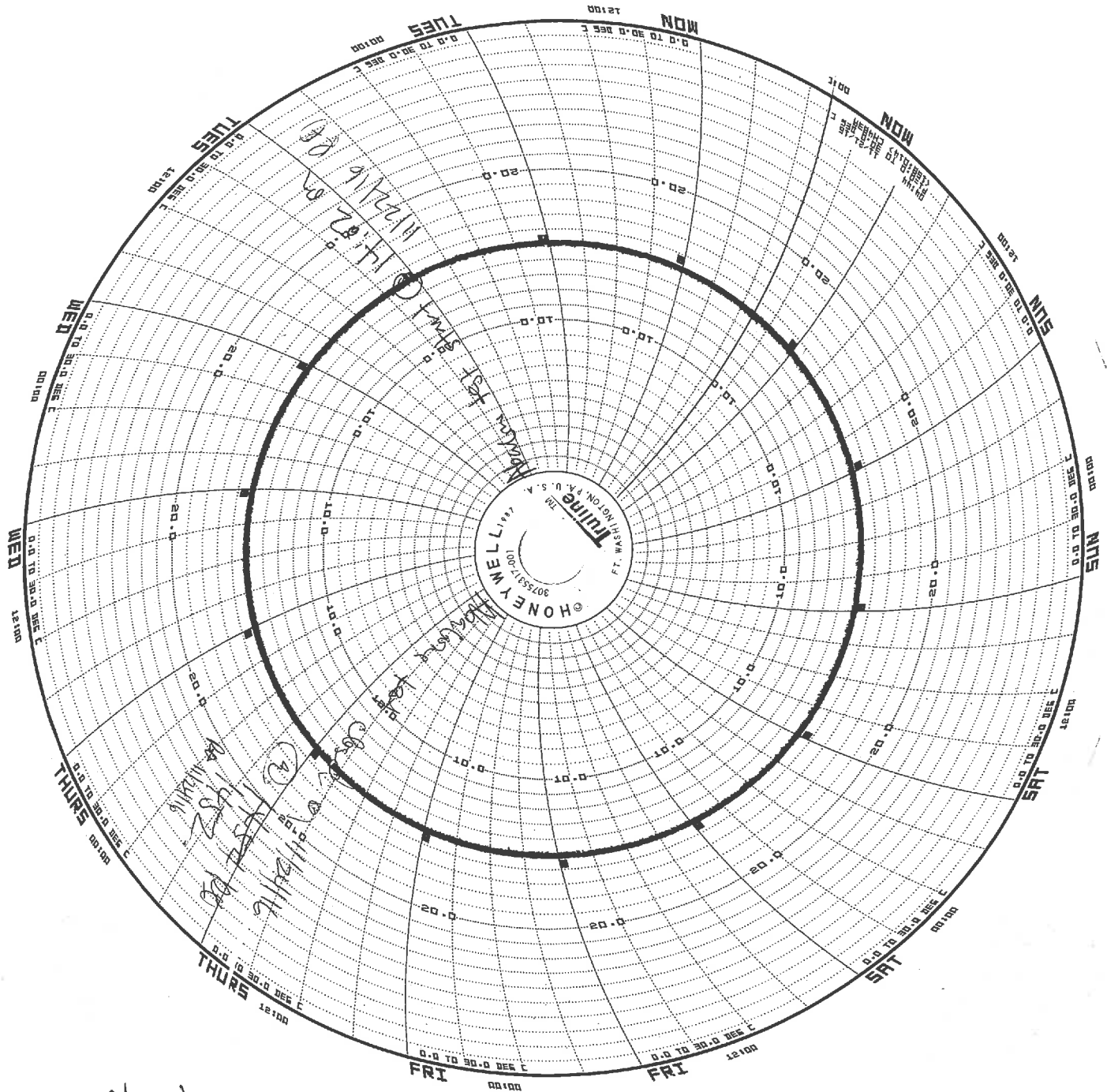
Are = 87 eggs / 0.3 ml = X / 0.5 ml
 X = 145 eggs

TEST CLOSING
 DATE: 11/24/2016

TIME: 14:52 RE



Abalone Chronic
Test start: Tuesday, November 22, 2016
Test end: Thursday, November 24, 2016



Ababne Chronic

Test Start: Tuesday, November 22, 2016

Test End: Thursday, November 24, 2016

RT - 1611RT2B.H

SMB-1 - 1611072A.H

SMB-3 - 1611072B.H

ENVIRONMENTAL MONITORING DIVISION
BUREAU OF SANITATION
CITY OF LOS ANGELES

STORMWATER MONITORING PROGRAM

TOXICITY TESTING REPORT

SAMPLE DATE: November 21, 2016

TEST DATE: November 22, 2016

TEST NUMBER: 1611072B.H

TEST MATERIAL: Station RW-SMB-3

TEST SPECIES: *Haliotis rufescens*

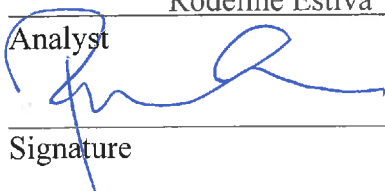
PROTOCOL: EPA/600/R-95/136

TEST TYPE: Chronic

REFERENCE TOXICANT TEST: 1611RT2B.H

RESULT: PASS

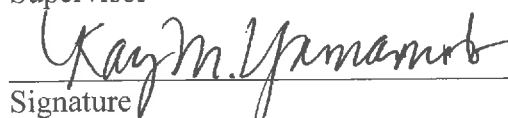
% Effect = -1.66 %

Rodeline Estiva
Analyst


Signature

Water Biologist II
Title
November 30, 2016

Date

Kay Yamamoto
Supervisor


Signature

Water Biologist III
Title
11/30/16

Date

CETIS Summary Report

Report Date: 29 Nov-16 13:58 (p 1 of 1)
Test Code: 1611072B.H | 08-6088-3744

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Batch ID:	07-0008-8704	Test Type:	Development	Analyst:	Rodeline Estiva
Start Date:	22 Nov-16 14:02	Protocol:	EPA/600/R-95/136 (1995)	Diluent:	Laboratory Seawater
Ending Date:	24 Nov-16 14:52	Species:	Haliotis rufescens	Brine:	Frozen Seawater
Duration:	49h	Source:	American Abalone	Age:	
Sample ID:	06-1214-0088	Code:	HT530509	Client:	Watershed Protection Division
Sample Date:	21 Nov-16 12:32	Material:	Stormwater Monitoring Sample	Project:	MS4
Receive Date:	21 Nov-16 14:45	Source:	WPD (WATERSHED)		
Sample Age:	26h (17.1 °C)	Station:	RW-SMB-3		

Sample Note: The sample was set-up at 8:30am on 11/22/2016. The sample age is 20 hours. RE 11/29/2016

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
07-6862-9041	Development 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
07-6862-9041	Development Rate	Control Resp	0.9375	0.8 - NL	Yes	Passes Acceptability Criteria

Development Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	5	0.9375	0.9321	0.943	0.9159	0.9528	0.006539	0.01462	1.56%	0.0%
100		5	0.9531	0.9462	0.96	0.9346	0.9806	0.008285	0.01853	1.94%	-1.66%

Development Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	0.9159	0.9528	0.9439	0.93	0.945
100		0.9524	0.9806	0.9381	0.96	0.9346

CETIS Analytical Report

Report Date: 29 Nov-16 13:58 (p 1 of 2)

Test Code: 1611072B.H | 08-6088-3744

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Analysis ID: 07-6862-9041 Endpoint: Development Rate
 Analyzed: 29 Nov-16 10:02 Analysis: Parametric Bioequivalence-Two Sample

CETIS Version: CETISv1.8.1
 Official Results: Yes

Batch ID: 07-0008-8704 Test Type: Development
 Start Date: 22 Nov-16 14:02 Protocol: EPA/600/R-95/136 (1995)
 Ending Date: 24 Nov-16 14:52 Species: Haliotis rufescens
 Duration: 49h Source: American Abalone

Analyst: Rodeline Estiva
 Diluent: Laboratory Seawater
 Brine: Frozen Seawater
 Age:

Sample ID: 06-1214-0088 Code: HT530509
 Sample Date: 21 Nov-16 12:32 Material: Stormwater Monitoring Sample
 Receive Date: 21 Nov-16 14:45 Source: WPD (WATERSHED)
 Sample Age: 26h (17.1 °C) Station: RW-SMB-3

Client: Watershed Protection Division
 Project: MS4

Sample Note: The sample was set-up at 8:30am on 11/22/2016. The sample age is 20 hours. RE 11/29/2016

Data Transform	Zeta	Alt Hyp	MC Trials	TST b	Test Result
Angular (Corrected)	0	C*b > T	Not Run	0.75	Sample passes development rate endpoint

TST-Welch's t Test

Control	vs	Conc-%	Test Stat	Critical	DF	MSD	P-Value	Decision(α:5%)
Dilution Water		100*	15.59	2.015	5		<0.0001	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.9375	0.8 - NL	Yes	Passes Acceptability Criteria

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	0	1.988	2.29	0.2463	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003441378	0.003441378	1	2.181	0.1780	Non-Significant Effect
Error	0.01262554	0.001578192	8			
Total	0.01606691	0.00501957	9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.584	23.15	0.3801	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9305	0.7411	0.4527	Normal Distribution

Development Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	5	0.9375	0.932	0.9431	0.9159	0.9528	0.006539	0.01462	1.56%	0.0%
100		5	0.9531	0.9461	0.9602	0.9346	0.9806	0.008285	0.01853	1.94%	-1.66%

Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	5	1.319	1.308	1.331	1.277	1.352	0.01327	0.02968	2.25%	0.0%
100		5	1.357	1.338	1.375	1.312	1.431	0.02133	0.04771	3.52%	-2.81%

CETIS Analytical Report

Report Date: 29 Nov-16 13:58 (p 2 of 2)
Test Code: 1611072B.H | 08-6088-3744

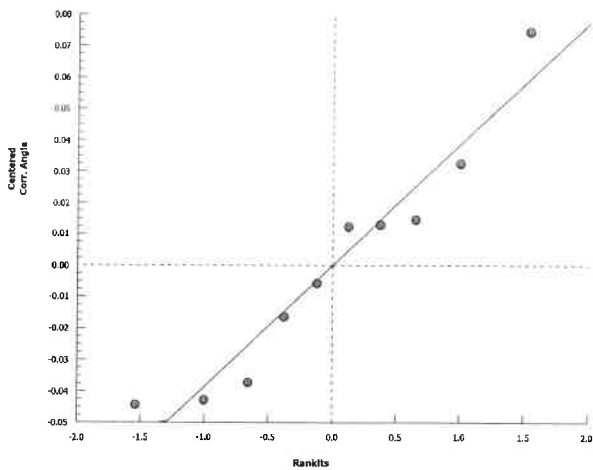
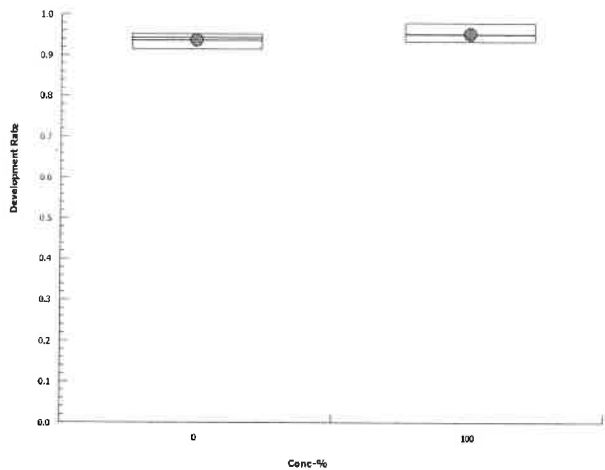
Abalone Larval Development Test Hyperion Treatment Plant Laboratory

Analysis ID: 07-6862-9041 Endpoint: Development Rate CETIS Version: CETISv1.8.1
Analyzed: 29 Nov-16 10:02 Analysis: Parametric Bioequivalence-Two Sample Official Results: Yes

Development Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	0.9159	0.9528	0.9439	0.93	0.945
100		0.9524	0.9806	0.9381	0.96	0.9346

Graphics



CETIS Test Data Worksheet

SMB 3

 Report Date: 21 Nov-16 07:57 (p 1 of 1)
 Test Code: 08-6088-3744/1611072B.H

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Start Date: 22 Nov-16 ¹⁴⁰² Species: Haliotis rufescens Sample Code: 247C8438
 End Date: 24 Nov-16 ¹⁴⁵² Protocol: EPA/600/R-95/136 (1995) Sample Source: WPD
 Sample Date: 31 Oct-16 ^{12:32} Material: Stormwater Monitoring Sample Sample Station: RW-SMB-3

Conc-%	Code	Rep	Pos	# Counted	# Normal	Notes
0	D	1	6	107	98	
0	D	2	11	106	101	
0	D	3	12	107	101	
0	D	4	1	100	93	
0	D	5	8	109	103	
100		1	9	105	100	
100		2	5	103	101	
100		3	15	113	106	
100		4	7	100	96	
100		5	10	107	100	

Sample received on 11/21/2016 @ 14:45. RE (T=17.1°C)
 HT530509

Set-up @ 8:30 AM. RE 11/22/16

CETIS Measurement Worksheet

Report Date: 21 Nov-16 07:57 (p 1 of 1)
 Test Code: 1611072B.H | 08-6088-3744

SMB 3

Abalone Larval Development Test

Hyperion Treatment Plant Laboratory

Start Date: 22 Nov-16 Species: *Haliotis rufescens*
 End Date: 24 Nov-16 Protocol: EPA/600/R-95/136 (1995)
 Sample Date: 31 Oct-16 Material: Stormwater Monitoring Sample

Sample Code: 247C8438
 Sample Source: WPD
 Sample Station: RW-SMB-3

Dissolved Oxygen-mg/L				
Conc.-%	Code	Reading 1	Reading 2	
0	D	7.77	7.37	
100		8.11	7.33	7.34 pt 11/24/16
Measure Time:		1008	1406	
Instrument ID:		#2	#2	
Analyst:		BO	BO	

Dilution control shared w/SMB1

pH				
Conc.-%	Code	Reading 1	Reading 2	
0	D	8.09	7.95	
100		8.19	7.98	
Measure Time:		1008	1406	
Instrument ID:		#4	#4	
Analyst:		BO	BO	

Salinity-ppt				
Conc.-%	Code	Reading 1	Reading 2	
0	D	33	33	
100		33	33	
Measure Time:		1008	1406	
Instrument ID:		#4 cond	#4 cond	
Analyst:		BO	BO	

Temperature-°C					
Conc.-%	Code	Reading 1	Reading 2	Reading 3	
0	D	14.5	14.8	15.0	
100		14.2	14.9	15.0	
Measure Time:		1008	0754	1406	
Instrument ID:		#4	#2	#4	
Analyst:		BO	AG	BO	

ABALONE SPAWNING WORKSHEET

TYPE OF EFFLUENT: Stormwater

TEST START DATE: Nov 22, 2016

Batch #: 161103

TEST ID: 1611RT2B.H, 1611072A.H, 1611072B.H

TIME SPAWNING START: 9:15 ^{PE}

Number of abalone	<u>11/22</u>	Gonad index	Temperature
3 Males	<u>3 3 3 -</u>	<u>310</u>	<u>15° C</u>
3 Females	<u>3 3 3 -</u>	<u>310</u>	<u>15° C</u>

	Time	Male	Female
Beginning of spawning treatment:	<u>1028</u>	<u>931</u>	
Taken out of H2O2:	<u>1230</u>	<u>1201</u>	
First male abalone spawn:	<u>1240</u>	<u>15° C</u>	<u>15° C</u>
First female abalone spawn:	<u>1257</u>	<u>15° C</u>	<u>15° C</u>
Fertilization start:	<u>1306</u>	<u>15° C</u>	<u>15° C</u>
Fertilization completed:	<u>11/24/16 4:32</u>	<u>15° C</u>	<u>15° C</u>

Fertilized eggs density count:

Mean 145 eggs / 0.5 ml

Add 1000 embryos/test container divided by the number of embryos/ml
~~580 eggs/0.3ml/beaker~~ ml/test per beaker

Temperature of embryos: 15.2° C

Temperature of test containers: 14.8° C

Time embryos added to test chambers (TEST START): 1402

① 73 eggs / 0.3 ml

② 113 eggs / 0.3 ml

③ 93 eggs / 0.3 ml

④ 90 eggs / 0.3 ml

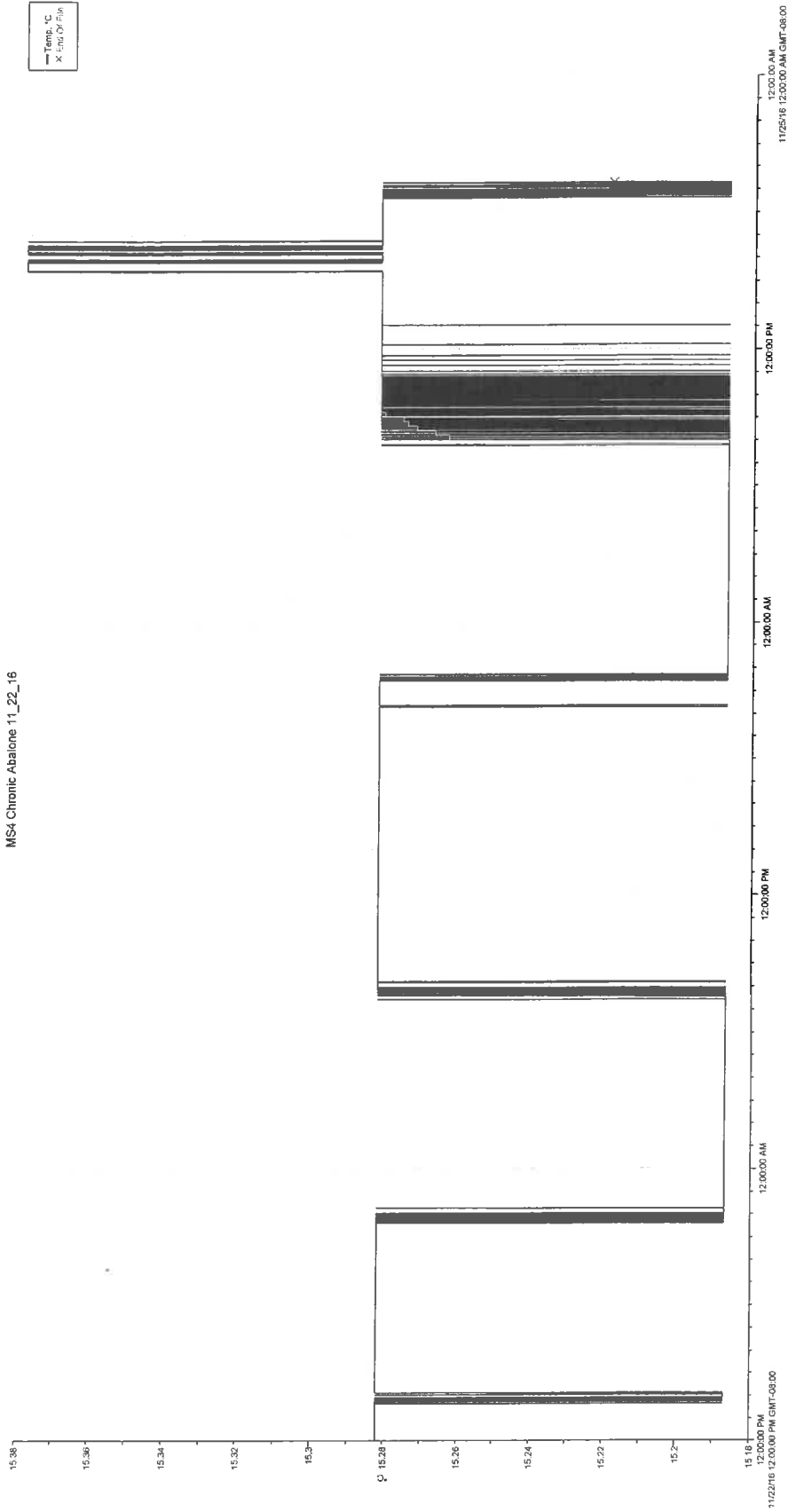
⑤ 66 eggs / 0.3 ml

Ave = $87 \text{ eggs} / 0.3 \text{ ml} = X / 0.5 \text{ ml}$

$X = 145 \text{ eggs}$

TEST CLOSING
 DATE: 11/24/2016 TIME: 14:52 ^{PE}

MS4 Chronic Abalone 11_22_16



Abalone Chronic
Test Start: Tuesday, November 22, 2016
Test end: Thursday, November 24, 2016

RT - 1611RT2B.H
SMB-1 - 1611072A.H
SMB-3 - 1611072B.H