

Washington Department of Ecology

Tire Chemicals OECD Toxicity Testing of 6PPD and Related Alternatives

Prepared for: Washington State Department of Ecology

Prepared by:

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Data Quality Assurance:

- Enthalpy Analytical (formerly Nautilus Environmental) is accredited in accordance with NELAP by the State of Oregon Environmental Laboratory Accreditation Program (Certificate No. 4053). It is also certified by the State of California Water Resources Control Board Environmental Laboratory Accreditation Program (Certificate No. 1802) and the State of Washington Department of Ecology (Lab ID C552). Specific fields of testing applicable to each accreditation are available upon request.
- All data have been reviewed and verified.
- All test results have met minimum test acceptability criteria under their respective EPA protocols, unless otherwise noted in this report.
- All test results have met internal Quality Assurance Program requirements.

Peter Arth, Director

Results verified by:

California

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INTRODUCTION

Washington Department of Ecology engaged Enthalpy Analytical (Enthalpy) to generate acute toxicity data on the sensitivity of rainbow trout to 6PPD, 6PPD-quinone, and four alternative compounds. 6PPD-quinone, a chemical found to be present in roadway runoff, was identified as a chemical linked to acute mortality in coho salmon (Oncorhynchus kisutch) in stormwater-impacted watersheds throughout the Puget Sound basin. Notably, 6PPD-quinone is a transformation product of 6PPD, an additive in the process of tire manufacturing to protect the rubber polymers from ozone, and it has a published effect to juvenile coho salmon at concentrations below 0.1 μ g/L (Tian 2022). The objectives of this project are to compare the relative toxicities to rainbow trout of 6PPD and 6PPD-quinone to potential alternative antiozonates (IPPD, 7PPD, TQM, 77PD; alternatives) that might be used in tire production.

Testing was conducted in accordance with the Organization of Economic Cooperation and Development (OECD) method 203, as it would pertain to the United Nations Economic Commission for Europe (UNECE) Globally Harmonized System of Classification and Labeling of Chemicals (GHS; UNECE 2013). Testing was augmented by guidance in OECD method 23 for preparation of difficult to test substances.

The purpose of the GHS is to provide standard criteria for the determination and classification of health, physical, and environmental hazards of chemicals. As part of the current iteration of the GHS hazard characterization system, acute aquatic toxicity tests are conducted to measure the potential of chemicals to cause injury to aquatic organisms subjected to short-term exposure.

Testing was performed to measure acute survival effects to the rainbow trout, *Oncorhynchus mykiss*. All testing was conducted at the Enthalpy Analytical laboratory in San Diego, California. The 6PPD test was conducted between March 9 and 13, 2023; the 6PPD-quinone and four alternative compound tests were conducted between April 13 and 17, 2023.

MATERIALS AND METHODS

The test materials were purchased directly from the supplier and had a listed purity of greater than 95 percent. Upon receipt at the laboratory, the products were stored in cool, dry conditions until used for using.

Compound	CAS Number	Supplier	Product
			Description
6PPD	793-24-8	Alfa Chemistry	Dark brown solid
IPPD	101-72-4	Alfa Chemistry	Purple liquid
7PPD	3081-01-4	Alfa Chemistry	Light brown liquid
TMQ	26780-96-1	Alfa Chemistry	Yellow liquid
77PD	3081-14-9	Alfa Chemistry	Light purple liquid
6PPD-quinone	unknown	HPC Standards	Orange liquid

Based on the relatively low solubility of the chemical compounds in water, each compound was dissolved in acetone, a solvent vehicle, prior to being introduced to water and exposed to the organisms for testing. Stock solutes containing the compounds and solvents were produced and test dilutions were subsequently created by taking an aliquot of the stock and adding it to water to create the final desired exposure concentrations. A solvent control, consisting of the highest concentration of solvent used in the test series, was added to laboratory dilution water, and tested concurrently to ensure the addition of the solvent itself did not cause detrimental effects to the test organisms.

An initial test was performed with 6PPD to identify the concentration which would show an effect to the rainbow trout and could then be used to inform the test concentrations for the alternative products to understand whether they had increased or decreased effects relative to 6PPD. The 6PPD concentration which produced a 50 percent effect to the test organisms (i.e. EC_{50}) would be used as the target for the middle test concentration in the alternative test series; two concentrations above and below that value were tested to form the dose response curve in the alternative compounds.

Nominal concentrations for the 6PPD exposure were 500, 250, 100, 20, 4, 0.8, and 0.16 micrograms per liter (μ g/L). A 1000 milligram per liter (mg/L) acetone control was also tested with this compound.

Nominal concentrations for the IPPD, TMQ, and 77PD tests were 2000, 1000, 500, 250, and 125 μ g/L. A 1000 mg/L acetone control was also tested with each of these compounds. Nominal concentrations for the 7PPD test were 2000, 1000, 500, 250, and 125 μ g/L. A 2000 mg/L acetone control was also tested with this compound; the increased solvent concentration was required to fully dissolve the compound prior to testing. Nominal concentrations for the 6PPD-quinone test were 1.6, 0.8, 0.4, 0.2, and 0.1 μ g/L. A 1000 mg/L acetone control was also tested with this compound.

No subsamples for verification of compound concentrations were collected and analyzed during the testing period. Nominal concentrations were used for all data analysis and reporting.

Toxicity tests were conducted using a listed fish species in accordance with OECD method 203. Concurrent laboratory reference toxicant tests used for quality assurance followed OECD guidelines. Effects were evaluated statistically using the Comprehensive Environmental Toxicity Information SystemTM (CETIS, version 2.1.2.3) from Tidepool Scientific Software. Organism performance in each test was compared to that observed in the concurrent control exposure. The No Observed Effect Levels (NOEL) and Lowest Observed Effect Levels (LOEL) were calculated using a parametric or nonparametric analysis, as appropriate. The concentrations expected to cause a lethal effect to 25 and 50 percent of test organisms (LC₂₅ or LC₅₀, respectively) were calculated using linear interpolation and Spearman-Karber.

Larval Fish Toxicity Test Specifications

Test Period:	6PPD: 3/9/23, 16:05 to 3/13/23, 17:05 IPPD: 4/13/23, 16:00 to 4/17/23, 16:00 7PPD: 4/13/23, 15:35 to 4/17/23, 15:35 TMQ: 4/13/23, 15:55 to 4/17/23, 15:55 77PD: 4/13/23, 16:15 to 4/17/23, 16:15 6PPD-quinone: 4/13/23, 16:15 to 4/17/23, 16:15
Test Organism:	Oncorhynchus mykiss (rainbow trout)
Endpoint(s):	96-hour Acute Survival
Test Organism Source, Size:	Thomas Fish Company (Anderson, CA), 3-6 cm
Test Chamber:	4-L glass jars
Volume per Replicate, Number of Replicates:	3 L, 2 Replicates per concentration
Number of Organisms per Replicate:	5
Photoperiod:	16 hours light:8 hours darkness, ambient laboratory levels (50 – 100 ft-c)
Feeding:	None during the test
Control/Dilution Water:	Moderately hard freshwater
Test Concentrations:	6PPD: 500, 250, 100, 20, 4, 0.8, and 0.16 μg/L; lab and solvent controls IPPD, 7PPD, TMQ, 77PD: 2000, 1000, 500, 250, and 125 μg/L; lab and solvent controls 6PPD-quinone: 1.6, 0.8, 0.4, 0.2, and 0.1 μg/L; lab and solvent controls
Protocol Used:	OECD 203 Fish, Acute Toxicity Test (OECD 2019)
Acceptability Criteria:	Mean lab control survival ≥ 90%
Reference Toxicant Test:	A concurrent reference toxicant test using copper chloride was conducted with the April 13 tests.

RESULTS

A statistically significant effect was detected in the 500 μ g/L concentration for the 6PPD test, resulting in a NOEC of 250 μ g/L. The LC₅₀ was calculated as 375 μ g/L, and the LC₂₅ was calculated as 312 μ g/L.

Statistically significant effects were detected in the 2000 and 1000 μ g/L concentrations for the IPPD test, resulting in a NOEC of 500 μ g/L. The LC₅₀ was calculated as 750 μ g/L, and the LC₂₅ was calculated as 625 μ g/L.

Statistically significant effects were detected in the 2000 and 1000 μ g/L concentrations for the 7PPD test, resulting in a NOEC of 500 μ g/L. The LC₅₀ was calculated as 643 μ g/L, and the LC₂₅ was calculated as 458 μ g/L.

No statistically significant effects were detected in any concentration tested for the TMQ test, resulting in a NOEC of 2000 μ g/L. The LC₅₀ was calculated as greater than 2000 μ g/L, and the LC₂₅ was calculated as 1830 μ g/L.

Statistically significant effects were detected in the 2000, 1000, and 500 μ g/L concentrations for the 77PD test, resulting in a NOEC of 250 μ g/L. The LC₅₀ was calculated as 321 μ g/L, and the LC₂₅ was calculated as 229 μ g/L.

Out of 6PPD and the 4 alternatives, TMQ exhibited the least mortality to the rainbow trout.

No statistically significant effects were detected in any concentration tested for the 6PPDquinone test, resulting in a NOEC of 1.6 μ g/L. The LC₅₀ and LC₂₅ were both calculated as greater than 1.6 μ g/L.

No sublethal abnormalities were observed in any of the chemicals tested.

Summaries of statistical results are provided in Tables 1 to 3. Raw datasheets and complete statistical summaries are provided in Appendix A.

Test Concentration (µg/L)	Mean 96-hr Survival (%)
Lab Control	100
Solvent Control	100
0.16	100
0.8	100
4	100
20	100
100	100
250	100
500	0.0
NOEL (mg/L)	250
LOEL (mg/L)	500
LC ₅₀ (mg/L)	375
LC ₂₅ (mg/L)	312

Table 1. Summary of Toxicity Test Results – 6PPD

NOEL = No Observed Effect Level

LOEL = Lowest Observed Effect Level

 LC_{50} = the concentration at which 50 percent of the organisms show a lethal effect

 $LC_{\rm 25}$ = the concentration at which 25 percent of the organisms show a lethal effect

Test	IPPD	7PPD	TMQ	77PD
Concentration (µg/L)	Mean 96-hr Survival (%)	Mean 96-hr Survival (%)	Mean 96-hr Survival (%)	Mean 96-hr Survival (%)
Lab Control	100	100	100	100
Solvent Control	100	100	100	100
125	100	100	100	100
250	100	100	100	70.0
500	100	70.0	100	0.0
1000	0.0	0.0	100	0.0
2000	0.0	0.0	70.0	0.0
NOEL (mg/L)	500	500	2000	250
LOEL (mg/L)	1000	1000	>2000	500
LC ₅₀ (mg/L)	750	643	>2000	321
LC ₂₅ (mg/L)	625	458	1830	229

Table 2. Summary of Toxicity Test Results – IPPD, 7PPD, TMQ, 77PD

NOEL = No Observed Effect Level

LOEL = Lowest Observed Effect Level

 $LC_{\rm 50}$ = the concentration at which 50 percent of the organisms show a lethal effect

 $LC_{\rm 25}$ = the concentration at which 25 percent of the organisms show a lethal effect

Test Concentration (µg/L)	Mean 96-hr Survival (%)
Lab Control	100
Solvent Control	100
0.1	100
0.2	100
0.4	100
0.8	100
1.6	100
NOEL (mg/L)	1.6
LOEL (mg/L)	>1.6
LC ₅₀ (mg/L)	>1.6
LC ₂₅ (mg/L)	>1.6

Table 3. Summary of Toxicity Test Results – 6PPD-quinone

NOEL = No Observed Effect Level

LOEL = Lowest Observed Effect Level

 LC_{50} = the concentration at which 50 percent of the organisms show a lethal effect

 LC_{25} = the concentration at which 25 percent of the organisms show a lethal effect

QUALITY ASSURANCE

The product material was received in good condition. Mean control responses in all tests met minimum test acceptability criteria, and all procedures followed protocol conditions and requirements, unless otherwise noted. The fish were acclimated to the required test temperature and laboratory control water source upon receipt and were held for a period of at least 9 days before test initiation. Fish were fed to satiation in holding (as often as daily); and feeding was discontinued 24 hours before the exposure began.

The 6PPD test exceeded the loading rate of 0.8 g/L, with a loading rate of 1.18 g/L. However, the dissolved oxygen of the test remained above 60 percent saturation and the test organisms showed sensitivity to the chemical. Therefore, it is unlikely the loading rate affected the final outcome of the test.

Minor QA/QC issues that were not likely to have any bearing on the test results are noted on the data sheets, and a list of data qualifier codes is available in Appendix B.

Reference Toxicant Tests

Concurrent reference toxicant test results are summarized in Table 4 and presented in full in Appendix C. The reference toxicant test met minimum test acceptability criteria, and the EC₅₀ was within two standard deviations of the historical mean, indicating the organisms exhibited typical sensitivity to copper as is usually observed in the laboratory.

Table 4. Reference Toxicant Test Results

Species & Endpoint	NOEL (μg/L copper)	LC₅₀ (µg/L copper)	Historical LC₅₀ ± 2 SD (µg/L copper)	CV (%)
Fathead Minnow: 96-hour Survival	50	107	82.9 ± 70.9	42.8

NOEL = No Observed Effect Level

 LC_{50} = the concentration at which 50 percent of the organisms show a lethal effect

Historical $LC_{50} \pm 2$ SD = the mean LC_{50} from the previous tests performed by Enthalpy, plus or minus two standard deviations CV= Coefficient of Variation

REFERENCES

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Appendix A

Datasheets and Statistical Summaries

CETIS Sumr	mary Rep	ort						•	t Date: code/ID:		•	59 (p 1 of 1) 3-3381-8496
Acute Fish Surv	vival Test									Nautilu	s Environm	nental (CA)
		05 PST F 05 PDT S		irvival (96h) ECD 203 ncorhynchus	mykiss			Dilu Brit	ne: I	Laboratory Free Not Applicable Thomas Fish C		Age: 66d
Sample ID: 1 Sample Date: 0 Receipt Date: 0 Sample Age: 1	bay		Sou	urce:	6PPD Washington De 6PPD	partment of						
Multiple Compa Analysis ID E 21-0771-0939 9	indpoint		Compari Fisher Ex	son Method				NOEL 250	LOEL 500	TOEL 353.6	PMSD	S
Point Estimate	Summary Indpoint		Point Es	timate Metho terpolation (IC			√ I I	Level EC25 EC50	<u>µg/L</u> 312 375	95% LCL 312 375		- <u> </u>
96h Survival Ra	te Summary	1										
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	ľ	Max	Std Ei	r Std Dev	CV%	%Effect
0	S	2	1.000	1.000	1.000	1.000		1.000	0.000	0.000	0.00%	0.00%
0	LC	2	1.000	1.000	1.000	1.000		1.000	0.000	0.000	0.00%	0.00%
0.16		2	1.000	1.000	1.000	1.000		1.000	0.000	0.000	0.00%	0.00%
0.8		2	1.000	1.000	1.000	1.000		1.000	0.000	0.000	0.00%	0.00%
4		2	1.000	1.000	1.000	1.000		1.000	0.000	0.000	0.00%	0.00%
20		2	1.000	1.000	1.000	1.000		1.000	0.000	0.000	0.00%	0.00%
100		2	1.000	1.000	1.000	1.000		1.000	0.000	0.000	0.00%	0.00%
250 500		2 2	1.000 0.000	1.000 0.000	1.000 0.000	1.000 0.000		1.000 0.000	0.000 0.000	0.000 0.000	0.00%	0.00%
96h Survival Ra	to Detail	<u> </u>	0.000	0.000	0.000	0.000				4F656B257D3		
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0	S	1.000	1.000							·		
0	LC	1.000	1.000									
0.16	LU											
0.16		1.000	1.000									
		1.000	1.000									
4		1.000	1.000									
20		1.000	1.000									
100		1.000	1.000									
250		1.000	1.000									
500		0.000	0.000									
	~	DIG PI	4125123						(D)			

Analyst: RL QA: ACS 4/4/23

CETIS Ana	alytical Rep	ort						port Date: st Code/ID:		•	59 (p 1 of 1 18-3381-849
Acute Fish S	urvival Test	_							Nautilu	s Environ	mental (CA)
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Untransforme	d	C > T				250	500	353.6			
Fisher Exact	Test										
Control	vs Conc-µo	g/L	Test Stat	P-Type	P-Value	Decision	ι(α:5%)				
Lab Control	0.16		1.000	Exact	1.0000	Non-Sign		ffect			
	0.8		1.000	Exact	1.0000	Non-Sign					
	4		1.000	Exact	1.0000	Non-Sign					
	20		1.000	Exact	1.0000	Non-Sign					
	100 250		1.000 1.000	Exact Exact	1.0000 1.0000	Non-Sign Non-Sign					
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	Rate Frequenci				-						
Conc-µg/L	LC	NR 10	R0	NR + R 10	Prop NR 1.000	Prop R 0.000	%Eff				
0.16	LO	10	0	10	1.000	0.000	0.00%				
0.8		10	0	10	1.000	0.000	0.00%				
4		10	0	10	1.000	0.000	0.00%				
20		10	0	10	1.000	0.000	0.00%	6			
100		10	0	10	1.000	0.000	0.00%				
250		10	0	10	1.000	0.000	0.00%				
500		0	10	10	0.000	1.000	100.0	0%			
	Rate Summary	_									
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	2	1.000	1.000	1.000	1.000	1.000		0.000	0.00%	0.00%
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4		2	1.000	1.000	1.000	1.000	1.000		0.000	0.00%	0.00%
20		2	1.000	1.000	1.000	1.000	1.000		0.000	0.00%	0.00%
100		2	1.000	1.000	1.000	1.000	1.000		0.000	0.00%	0.00%
250		2	1.000	1.000	1.000	1.000	1.000		0.000	0.00%	0.00%
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Analyst: RL QA: A(5+1/2/3

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Acu	te Fish S	urvival Test								Nautil	us Environi	mental (CA
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	ear Interport	olation Options Y Transform	S	eed	Resamples	Exp 95	% CL	Method				
Line	ar	Linear	1	577310	1000	Yes		Two-Point	Interpolation			
Poin Leve EC2 EC5	5 312		95% UC 312 375	CL								
96h	Survival	Rate Summary			······	Calculate	ed Varia	ate(A/B)			Isoto	nic Variate
Con	c-µg/L	Code	Count	Mean	Median	Min	Мах	CV ⁴	% %Effect	ΣΑ/ΣΒ	Mean	%Effec
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	0	100	200	300	400	500						
			Cone	c-µg/L								

15t: RL QA: Ars 4/26/173

Client: Washington Department of Ecology

Sample ID: 6PPD

Test No .: 2304- 5122

Test Species:	O. mykiss	
Start Date/Time:	319123	1605 PST
End Date/Time:	3/13/23	1705 POT

Concentration	Rep				umbei Orgai					nduct nhos/	-		C,	Ter	npera (°C)	ture	<u> </u>	Q14	Disso) xyger	n			pH			Percent
(ug/L)	Kep	0	1	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	(mg/L 48	72	96	0	24	(units) 48	72	96	Survival
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Lab Control	A	5	5	5	\$	<u> </u>	5	<u> </u>	<u> </u>			341										8.8			7.36		+	100
	B	5				5					1	3-14			+	-	1	-	7.8			1			7.33			
Acetone	A	5	5	5	\$	5	5		337	<u> </u>	1	344			12.7		1.	10,4		<u> </u>	8.7		7.72	1	7.32			100
Control	В	5	5	5	5	5	5	342	338		AVT	345	15.0	10,7	12.6	12.0	12.0				8.3				7.37	7.34	7.30	
0.16	A	5	5	4	\$	5	5	342	338	342	365	343	12.9	10.8	12.8	12.0	12.1	10,4	8.2	6.3	10.60	20.4	7.73	7.30	7.32	7.25	7.21	100
	в	5	5	5	5	5	5	342	338	343	366	345	13.0	10.9	12.7	12.1	12.1	10.4	8.0	5.9	4.3	<i>6. \varpsilon</i>	7.77	7.31	7.27	7.22	7.21	100
0.8	A	5	5	5	5	5	5	343	338	343	366	344	13.0	10.9	12.1	12.1	12.1	10.3	7.6	6.7	7.8	7.2	7.18	7.30	7.29	7.24	7.22	1.00
	в	5	5	5	5	5	5	342	338	343	1	3.14	13.0	10,9	12.7	RIZ.1	12.1	10.4	7.5	6.6		64	7.79		7:30	<i>r</i>		100
4	A	5	5	\$	5	5	5	343			-	345	13.0		12.8		12.1	10:3	8.3			7.5	7.80		7.33			
	в	5	5	5	5	E	5	343	338			344	13.0					10.3	-	6.9	<u> </u>	4.9			7.29			100
20		5	5	5	5	5	5	343		343	1.15. 7		13.0			-		10.3		1. 2			7.81		7.23			
20	A B	5	5	3	5	5		13	338	/	1.74 .	345				12.3		10.3		1 4		<i>Q.O</i>			7.26			100
		<u> </u>	5	3	5	5		5. 2 342	_	/			-			-		10.4		611		7.1	_					
100	A	5			3-		<u> </u>				366		<u> </u>	10.5		11.5	il.7			5.9		6.3			1.17			100
	В	5	5	5		5		342		342		344			12.3		11.6	10.4	7.3	5,9		6.3			7,18			
250	A	5	5	5	5	5		342		345	369	348	13.0	10,6	12.3	11.4	11.4	10.4			5.2	4.6			7.20			100
	В	5	5	5	5	5	5	342			369	347			12.2	11.4	11.6	10.4	8.0	6.2	5,9	5.6	7.84	7.33	7.23	7.14	7.19	
500	A	5	5	4	0	-	0	341	338	346	-	-	12.8		12.4	-	~	10,6	7.9	7.5	~	-	7.85	7.33	7.27	-	-	
	в	5	9	4	1	1		342	339	348	371	349	12.8	10.Ŝ	12,4	11.4	11.7	10.3	7.9	7.0	7.0	4.6	7.85	7.33	7.24	7.18	7.23	0
Tech Initials	Counts	NF	WF	WF	WF	KR	ZK																					
Tech minuais	wq	WF	x	WF	WF	KR	KR	1																				
	QC	D&					1	1																				
			2								Fish	Size a	t test i	nitiati	on*:													
														- 60	- 0		21-					<u> </u>						
	Environ	nental	Chan	nber:		F					weig	hts (g					.552											
											Leng	ths (ci	m):	3.8	4.6) 3.	Ц	4.0	3	.8	μ= <u>]</u>	3.8	Cr		Loadi	ng ra	te =	1.18g/L
e Osmala Davada		0.0	1	Blow		Cass	7					_																
Sample Descrip	uon:	VA		DION		5011	V			A	nimal	Sourc	:e/Date	Rece	erved:	0.1	212	81	1hor	nas I	CO.	Age a	t Initi	ation:	6600	275	POST	hurch swim ut
Comments:		<u>*5 ra</u> n	dom	fish ar	e saci	rificed	at init	tiation	for si	ze det	termin	ation.	Loadi	ոց ու	ust be	less t	han 0.	8 g fis	> sh/L. F	ish m	ust be	3-6 ci	m in le	ength	220	W73	1.031	200100
		(D)4																							117.			
QC Check:	RL		2512																					•	A	1/2	160	
GO GHECK:			010																			Fir	nal Re	view:	ACS	712	61L	<u>}</u>

CETIS Sur	nmary Repo	ort						Report Da Test Cod				2 (p 1 of 1) -8677-3038
Acute Fish Su	urvival Test									Nautilus	Environm	ental (CA)
Batch ID: Start Date: Ending Date: Test Length:	19-5304-1610 13 Apr-23 16:1 17 Apr-23 16:1 96h	5 5	Test Type: Protocol: Species: Taxon:	Survival (96h) OECD 203 Oncorhynchus	mykiss			Analys Diluen Brine: Source	t: L N	aboratory Fres lot Applicable homas Fish Co		Age: 46d
Sample ID: Sample Date: Receipt Date: Sample Age:	of Ecology		Projec Source Statior	e: V	PPD-quinone Vashington Dep PPD-quinone	partment of	Ecology					
-	parison Summa	ary	Comm	orioon Mathad			(NC		051	TOFI	DMCD	
Analysis ID 14-1352-9017	Endpoint 96h Survival Ra	ate		parison Method		~	/ NC 1.6		-OEL >1.6	TOEL	PMSD	S 1
Analysis ID 20-3653-4282	Endpoint 96h Survival Ra	ate		Estimate Methor Interpolation (IC		V		25	µ g/L >1.6 >1.6	95% LCL 	95% UCL 	S
96h Survival	Rate Summary										-	
Conc-µg/L	Code	Coun		95% LCL	95% UCL		Ma		Std Err	Std Dev	CV%	%Effect
0	S	2	1.000	1.000	1.000	1.000			0.000	0.000	0.00%	0.00%
0	LC	2	1.000	1.000	1.000	1.000			0.000	0.000	0.00%	0.00%
0.1 0.2		2 2	1.000 1.000	1.000 1.000	1.000	1.000 1.000			0.000 0.000.0	0.000 0.000	0.00% 0.00%	0.00%
0.2		2	1.000	1.000	1.000 1.000	1.000			0.000	0.000	0.00%	0.00%
0.8		2	1.000	1.000	1.000	1.000			0.000	0.000	0.00%	0.00%
1.6		2	1.000	1.000	1.000	1.000			0.000	0.000	0.00%	0.00%
96h Survival	Rate Detail			÷				MD5:	5FE86	23225CE764A	FBC656420	DB2041E8
Conc-µg/L	Code	Rep 1	Rep 2	1								
0	S	1.000	1.000									
0	LC	1.000	1.000									
0.1		1.000	1.000									
0.2		1.000	1.000									
0.4		1.000	1.000									
												1
0.8		1.000	1.000									

S= solvent control

THUU!	te Fish	Surviva	l Test							-	Nautilu	s Environ	nental (CA
Ana	lysis ID lyzed: Date:	25 A	352-9017 pr-23 14:0 pr-23 14:0	1 A n	•	Survival Ra gle 2x2 Con 14F5810775	tingency Ta		Statu	S Version: s Level: r ID:	CETISv2 1 007-803-	.1.2	
Data	a Trans	form		Alt Hyp				NOEL	LOEL	TOEL	Tox Units	;	
Untr	ansforn	ned		C > T				1.6	>1.6				-
Fish	er Exa	ct Test											
Con	trol	vs	Conc-µ	g/L	Test Stat	P-Type	P-Value	Decision	(α:5%)				
Lab	Control		0.1		1.000	Exact	1.0000	Non-Sign	ificant Effect				
			0.2		1.000	Exact	1.0000	Non-Sign	ificant Effect				
			0.4		1.000	Exact	1.0000	-	ificant Effect				
			0.8		1.000	Exact	1.0000	-	ificant Effect				
			1.6		1.000	Exact	1.0000	Non-Sign	ificant Effect			·	
		al Rate I	Frequenci										
	c-µg/L		Code	NR	R	NR + R	Prop NR	Prop R	%Effect				
0			LC	10	0	10	1.000	0.000	0.00%				
0.1 0.2				10 10	0 0	10 10	1.000 1.000	0.000 0.000	0.00% 0.00%				
0.2				10	0	10	1.000	0.000	0.00%				
0.8				10	0	10	1.000	0.000	0.00%				
1.6				10	0	10	1.000	0.000	0.00%				
96h	Surviv	al Rate \$	Summary										
Con	c-µg/L		Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0			LC	2	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.1				2	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
-					4 000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.2				2	1.000								0.000/
0.2 0.4				2 2	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.4 0.8				2 2	1.000 1.000	1.000 1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.4 0.8				2	1.000	1.000							
0.4 0.8 1.6	phics			2 2	1.000 1.000	1.000 1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.4 0.8 1.6	phics	0		2 2	1.000 1.000	1.000 1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.4 0.8 1.6		0	0	2 2	1.000 1.000	1.000 1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.4 0.8 1.6	1.0 - 0.9 -	0	6	2 2	1.000 1.000	1.000 1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.4 0.8 1.6 Gra ț	1.0 - 0.9 - 0.8 -	0	8	2 2	1.000 1.000	1.000 1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.4 0.8 1.6 Gra ț	1.0 - 0.9 - 0.8 - 0.7 -	6	0	2 2	1.000 1.000	1.000 1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.4 0.8 1.6 Gra f	1.0 - 0.9 - 0.8 - 0.7 - 0.6 -	•	٥	2 2	1.000 1.000	1.000 1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.4 0.8 1.6 Gra f	1.0 - 0.9 - 0.8 - 0.7 -	0	8	2 2	1.000 1.000	1.000 1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.4 0.8 1.6 Gra f	1.0 - 0.9 - 0.8 - 0.7 - 0.6 -	•	•	2 2	1.000 1.000	1.000 1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.4 0.8 1.6	1.0 - 0.9 - 0.8 - 0.7 - 0.6 - 0.5 -	0	8	2 2	1.000 1.000	1.000 1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.4 0.8 1.6 Gra	1.0 - 0.9 - 0.8 - 0.7 - 0.6 - 0.5 - 0.4 -	•		2 2	1.000 1.000	1.000 1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.4 0.8 1.6 Gra ț	1.0 - 0.9 - 0.8 - 0.7 - 0.6 - 0.5 - 0.4 - 0.3 - 0.2 -	•	•	2 2	1.000 1.000	1.000 1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.4 0.8 1.6 Gra ț	1.0 - 0.9 - 0.8 - 0.7 - 0.6 - 0.5 - 0.4 - 0.3 -		8	2 2	1.000 1.000	1.000 1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
0.4 0.8 1.6 Gra ț	1.0 - 0.9 - 0.8 - 0.7 - 0.6 - 0.5 - 0.4 - 0.3 - 0.2 - 0.1 -	0 LC	0.1	2 2	1.000 1.000	1.000 1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%

Analyst: RL QA: 1775 4/26/23

CETI	S Ana	lytical Repo	rt						eport Date: est Code/ID:		5 Apr-23 14: 904-S123 / 1	
Acute	Fish Su	urvival Test								Nautil	us Environr	nental (CA
Analy: Analy: Edit D		20-3653-4282 25 Apr-23 14:01 25 Apr-23 14:01	Ana	Iysis: L	96h Survival R inear Interpol 3D14F581077	ation (ICPI		4C07	CETIS Version: Status Level: Editor ID:	CETISv 1 007-803		
Linear	r Interpo	plation Options										
X Trar	nsform	Y Transform	See	d	Resamples	s Exp 95	% CL Met	thod				
Linear		Linear	781	368	1000	Yes		o-Point	Interpolation	<u>-</u>		
Point	Estimat	es										
Level	µg/L	95% LCL	95% UCL									
EC25	>1.6											
EC50	>1.6		10 10 10									
96h Si	urvival	Rate Summary				Calculate	ed Variate(A	VB)			Isoto	nic Variate
Conc-	µg/L	Code	Count	Mean	Median	Min	Max	CV	% %Effect	ΣΑ/ΣΒ	Mean	%Effec
0		LC	2	1.000	1.000	1.000	1.000	0.00	0.00%	10/10	1.000	0.00%
D.1			2	1.000	1.000	1.000	1.000	0.00	0.00%	10/10	1.000	0.00%
0.2			2	1.000	1.000	1.000	1.000	0.00	0.00%	10/10	1.000	0.00%
0.4			2	1.000	1.000	1.000	1.000	0.00	0.00%	10/10	1.000	0.00%
0.8			2	1.000	1.000	1.000	1.000	0.00	0.00%	10/10	1.000	0.00%
1.6			2	1.000	1.000	1.000	1.000	0.00	0.00%	10/10	1.000	0.00%
Graph	ics											
h Survival Rate	- - - - -	0.2 0.4 0	0.6 0.8			1.6						
	0.0	U.Z U.4 (1.0	1.2 1.4	1.6						
			Conc-µ	g/L								

Analyst:_____ QA: A(54/26/2-3

Freshwater Acute Bioassay Static Conditions DF-018

Client: WADOE

Sample ID: 6PPD-quinone

Test No .: 2304 - 5123

Test Species:	O. mykiss		
Start Date/Time:	4/13/23	1615	
End Date/Time:	4/17/23	1615	

Concentration (ug/L)	Rep				ımber Orgar					nduct nhos/	-			Ter Q \	npera (°C)	ture		014		lved C (mg/L					pH (units)		Percent
(ug/L)		0	1	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24		72	96	Survival
Lab Control	Α	5	5	5	5	5	5	<u> </u>	304			327	11.8							9.1				10			7.37	100
	В	5	5	5	5	5	5	321	305	303	3310	330	11.6	10.9	11.3	11.3	11.3	11.3	9.9	9.2	9.1	9.1	8.04	7.63	7,55	7:49	7,44	1
1,000 mg/L	Α	5	5	5	5	5	-			291	-	330	11.5				-		9.8	9.3	9.4	9.9	8-01	7.62	7.54	7.54	7.51	100
Acetone Control	В	5	\$	5	5	5	5		305			329	11.4	11.1	11.5	11.5	11.5	1.4	10.1	9.4							7.55	100
0.1	А	5	5	5	5	5	5		294				12.1		1	1.1				9.0		9.4						100
	в	5	5	5	5	5	5	310	294	292	323	317	120	10.9	11.3	11.3	11.2	11.1	9.9	9.1							7.52	.00
0.2	Α	5	5	5	5	5	5		294		1			-		-	1		1	8.9						<u> </u>	7.54	100
	В	5	5	5	5	5	5	-				319	12.1	10.9	11.2	11.2	11.2	11.2	9.1	9.0	9.0	8.9	8.02	7.63	7.56	7.52	7.52	100
0.4	Α	5	5	5	5	5	5		295													8.3						100
	В	5	5	5	5	5	5					1					-		-			9.0						
0.8	Α	5	5	5	5	5	5		295													9.4						100
	В	5	5	5	2	5		a francisk and see of the			and the second second																7.53	100
1.6	Α	5	5	5	5	5					1	-		÷													7.50	100
	В	5	5	5	5	5	5	310	295	293	324	314	121	10.9	11.3	11.2	11.2	1.1			9.2	9.1	8.01	7:60	7.55	7.56	7.5)	
Technician Init	ials	DEWE	PX	WF	WF	KR	0R/4P												Q.14	Q14								
							1				Envi	onme	ntal C	hamb	er:	F						_						
											Wein	C hts (iii))	9.346	0.292	0.575	0.341	0.316	0.259	0.340	0.23L	10.282	2 0.30	6			e e	0.3049
											mong	(3	B	0	B	B	(B)	(B)	B	B	B	B	-				
											Leng	ths (c	m):	31.5	31.0	30.5	33,0	345	31	34.5	29.0	B 3.0	3.2				μ=	3.10
									•					5.2		ا -در	2,2	2.2		<i>2- 2</i>	<i>ar -</i> 1	2.0	~ ~		Load	ling ra	te = <u>4</u>	0.51 141912
Sample Description	n:	010	noge	Li	ZUINC)				Α	nimal	Sour	:e/Dat	e Reci	eived:	Ro	ners	Fish	. CO.	4/41	23	Age	at Initi:					hatch
																	,	-										
Comments:		ØC	218 0	NF 4	113/1	-3 B	1 Q I	8 RL	412	5123																		
QC Check:	RL	41	2512	3																		Fi	nal Re	view:	ACS	4/26	123	

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

OECD 203

CETIS Sui	mmary Rep	ort						Report Test C	t Date: ode/ID:			Apr-23 14:0 4-S127 / 10	
Acute Fish S	urvival Test										Nautilus	Environm	ental (CA)
Batch ID: Start Date: Ending Date: Test Length:	03-0476-3407 13 Apr-23 15:3 : 17 Apr-23 15:3 96h	5 P 5 S	est Type: rotocol: pecies: axon:	Survival (96h) OECD 203 Oncorhynchus	mykiss			Dilu Brin	lyst: lent: le: lrce:	Not A	ratory Fres opplicable oas Fish Co		Age: 46d
Sample ID: Sample Date Receipt Date Sample Age:	: 13 Apr-23	M		E1543DF Chemical Produ 3081-01-4 hi-gton Dep		of Ecology	1	Sou	ject: irce: ion:	7PPE Wash 7PPE	nington Dep	partment of	Ecology
	parison Summ	ary	_			57							
Analysis ID	Endpoint			arison Method		~		NOEL	LOEL	-	TOEL	PMSD	S
14-65/2-94/2	96h Survival R	ate	Fisher	Exact Test				500	1000		707.1		1
Point Estima Analysis ID 19-5561-2344	te Summary Endpoint 96h Survival Ra	ate		Estimate Metho Interpolation (IC	-	V		Level EC25	μg/L 458		95% LCL 250	95% UCL 750	S
								EC50	643		405	821	
96h Survival	Rate Summary												
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	1	Max	Std E	rr	Std Dev	CV%	%Effect
0	S	2	1.000	1.000	1.000	1.000		1.000	0.000		0.000	0.00%	0.00%
0	LC	2	1.000	1.000	1.000	1.000		1.000	0.000		0.000	0.00%	0.00%
125		2	1.000	1.000	1.000	1.000		1.000	0.000		0.000	0.00%	0.00%
250		2	1.000	1.000	1.000	1.000		1.000	0.000		0.000	0.00%	0.00%
500		2	0.700	-0.571	1.970	0.600	(0.800	0.100		0.141	20.20%	30.00%
1000		2	0.000	0.000	0.000	0.000		0.000	0.000		0.000		100.00%
2000		2	0.000	0.000	0.000	0.000		0.000	0.000		0.000		100.00%
96h Survival	Rate Detail							MD	5: 0A78	80B55	5A60BE61	0F56473AC	38A3CCD
Conc-µg/L	Code	Rep 1	Rep 2										
0	S	1.000	1.000										
0	LC	1.000	1.000										
125		1.000	1.000										
250		1.000	1.000										
500		0.800	0.600										
1000		0.000	0.000										
2000		0.000	0.000										
2000		0.000	0.000										

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S= solvent control

Analyst: RL QA: ATS 4/26/23

			ort					Test Co	de/ID:	230	4-S127 / 10	0-0189-677
Acute Fish S	urvival 1	ſest								Nautilu	s Environn	nental (CA
Analysis ID:	14-657	2-9472	Er	ndpoint: 96h	Survival Ra	ate		CETIS	S Version:	CETISv2	.1.2	
Analyzed:		-23 14:06		-	gle 2x2 Cont				s Level:	1		
Edit Date:	20 Apr-	-23 14:05	M	D5 Hash: 0DA	C07DE7DE	3F7D919A28	86A1EC559	87E Edito	r ID:	007-803-	386-7	
Data Transfo			Alt Hyp	,			NOEL	LOEL	TOEL	Tox Units	;	
Untransforme	d		C > T				500	1000	707.1			
Fisher Exact	Test											
Control		Conc-µg/	L	Test Stat	P-Type	P-Value	Decision					
Lab Control		125		1.000	Exact	1.0000		ficant Effect				
		250		1.000	Exact	1.0000		ficant Effect				
		500		0.105	Exact	0.1053	Non-Signi	ficant Effect				
96h Survival	Rate Fre	equencie	s									
Conc-µg/L		ode	NR	R	NR + R	Prop NR	Prop R	%Effect				
0	L	.C	10	0	10	1.000	0.000	0.00%				
125			10	0	10	1.000	0.000	0.00%				
250			10	0	10	1.000	0.000	0.00%				
500			7	3	10	0.700	0.300	30.00%				
1000			0	10	10	0.000	1.000	100.00%				
2000			0	10	10	0.000	1.000	100.00%				
96h Survival		mmary Code	Count	Mean	05% 1 Cl	95% UCL	Median	Min	Мах	Std Err	CV%	%Effect
Conc-µg/L		.C	2	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
125	-	.0	2	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
250			2	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
500			2	0.700	0.000	1.000	0.700	0.600	0.800	0.100	20.20%	30.00%
1000				0.000	0.000	0.000	0.000	0.000	0.000	0.000	20.2070	100.00%
				0.000	0.000	0.000	0.000	0.000	0.000	0.000		
			2		0.000	0.000	0.000	0.000	0.000	0 000		100 00%
2000			2	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
					0.000	0.000	0.000	0.000	0.000	0.000		100.00%
2000	•	•			0.000	0.000	0.000	0.000	0.000	0.000		100.00%
2000 Graphics	0	0	2		0.000	0.000	0.000	0.000	0.000	0.000		100.00%
2000 Graphics	•	0	2		0.000	0.000	0.000	0.000	0.000	0.000		100.00%
2000 Graphics 1.0 - 0.9 - 0.8 -	•	0	2		0.000	0.000	0.000	0.000	0.000	0.000		100.00%
2000 Graphics 1.0 - 0.9 - 0.8 -	0	6	2		0.000	0.000	0.000	0.000	0.000	0.000		100.00%
2000 Graphics 1.0 - 0.9 - 0.8 -	•	0	2		0.000	0.000	0.000	0.000	0.000	0.000		100.00%
2000 Graphics 1.0 - 0.9 - 0.8 -	•	•	2		0.000	0.000	0.000	0.000	0.000	0.000		100.00%
2000 Graphics 1.0 - 0.9 - 0.8 -	•	•	2		0.000	0.000	0.000	0.000	0.000	0.000		100.009
2000 Graphics 1.0 - 0.9 - 0.8 - 0.7 - 0.6 - 0.6 - 0.5 - 0.4 - 0.4 -	•	•	2		0.000	0.000	0.000	0.000	0.000	0.000		100.009
2000 Graphics 1.0 - 0.9 - 0.8 - 0.8 - 0.7 - 0.8 - 0.6 - 0.5 - 0.5 - 0.4 - 0.3 -	•	6	2		0.000	0.000	0.000	0.000	0.000	0.000		100.009
2000 Graphics 1.0 - 0.9 - 0.8 - 0.7 - 0.6 - 0.6 - 0.5 - 0.4 - 0.4 - 0.2 - 0.2 -	٩	•	2		0.000	0.000	0.000	0.000	0.000	0.000		100.00%
Graphics 1.0 - 0.9 - 0.8 - 0.8 - 0.7 - 0.6 - 0.5 - 0.4 - 0.3 -	•	0	2		0.000	0.000	0.000	0.000	0.000	0.000		100.00%
2000 Graphics 1.0 - 0.9 - 0.8 - 0.7 - 0.6 - 0.6 - 0.5 - 0.4 - 0.4 - 0.2 - 0.2 -	•	•	2			0.000	0.000	0.000	0.000	0.000		100.00%
2000 Graphics 1.0 - 0.9 - 0.8 - 0.8 - 0.7 - 0.8 - 0.6 - 0.7 - 0.6 - 0.5 - 0.4 - 0.3 - 0.2 - 0.1 -	0 LC	•	2	0.000	•		0.000	0.000	0.000	0.000		100.00%



CETIS	S Ana	lytical Repo	rt						leport est Co	Date: ode/ID:		Apr-23 14:0 04-S127 / 1	
Acute I	Fish Su	Irvival Test									Nautilu	is Environn	nental (CA
Analys Analyz Edit Da	ed:	19-5561-2344 20 Apr-23 14:07 20 Apr-23 14:05	An	alysis: L	6h Survival Ra inear Interpola DAC07DE7DI	ation (ICPII		5987E	Statu	S Version: us Level: or ID:	CETISv2 1 007-803		
Linear	Interpo	lation Options											
X Trans	sform	Y Transform	Se	ed	Resamples	Exp 95	%CL Me	ethod					
Linear		Linear	607	/14	1000	Yes	Τw	/o-Point	Interp	olation			
Point E	Estimat	es											
Level	µg/L	95% LCL	95% UCL	_									
EC25	458	250	750										
EC50	643	405	821										
96h Su	ırvival F	Rate Summary				Calculate	d Variate(A/B)				Isotor	nic Variate
Conc-µ	ıg/L	Code	Count	Mean	Median	Min	Max	CVS	%	%Effect	ΣΑ/ΣΒ	Mean	%Effec
0		LC	2	1.000	1.000	1.000	1.000	0.00	0%	0.00%	10/10	1.000	0.00%
125			2	1.000	1.000	1.000	1.000	0.00	0%	0.00%	10/10	1.000	0.00%
250			2	1.000	1.000	1.000	1.000	0.00	0%	0.00%	10/10	1.000	0.00%
500			2	0.700	0.700	0.600	0.800	20.2	20%	30.00%	7/10	0.700	30.00%
1000			2	0.000	0.000	0.000	0.000			100.00%	0/10	0.000	100.00%
2000			2	0.000	0.000	0.000	0.000			100.00%	0/10	0.000	100.00%
Graphi	ics												
.0 Beh Survival Rate .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	.0 .0 .9												
	0	400	800	1200	1600	2000							
			Conc-	µg/L									

Analyst: RL QA: ALS 4/26/23

Freshwater Acute Bioassay Static Conditions DF-018 **OECD 203**

Client: WADOE

Sample ID: 7PPD

Test No .: 2304 - 5127

Test Species: O. mykiss		
Start Date/Time: 4/13/23	1535	
 End Date/Time: <u> </u>	1535	

Concentration	Rep				umber Orgar					nduct nhos/				Ter Q I	npera (°C)	ture			Disso QıY						pH (units)		Percent
(ug/L)		0	1	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24		72	96	Survival
Lab Control	A	5	5	5	5	5	5	314	300	299												9.3	7,93	7.50	7.41	7.50	7.49	100
	В	5	5	5	5	5	5	320	306	303	319	330	11.4	10.8	11.2	11.4	11.3	11.5	9,8	9.0	9:2	9.1	7.97	7.54	7.44	7.46	7.49	100
2,000 mg/L	Α	5	5	5	5	5	5					328															7.49	100
Acetone Control	В	5	5	4	\$	5	5	3\6	303	301	334	329	11.4	10,9	11.4	11.4	11.3	11.4	10.0	9.0	9.2	9.1	7.98	7.58	7.46	7.51	7.50	10
125	Α	5	5	5	5	5	5	321	306	303	33:0	329	11,4	11.1	11.5	11.5	11.5	11.4	9,8	8.4		1	-		+	+		100
	В	5	5	5	5	5	5	321	306	303	334	329	11.4	11.0	11,4	11.4	11.3	11.4	9,9	8.7	9.7	8.4	8,01	7.60	7.47	7.49	7.47	
250	Α	5	5	5	5	5	5				337																7.43)00
	В	5	5	5	5	5	5	320	305	303	337	330	1	1		1	1	1	1		1	1	-	the second s		The second second	-	-
500	Α	5	5	5	4	4	4				337	330	11.4	11.1	11.5	11.5	11.5	11.4	9.1	7.2	6.1	5.0	7,99	7.5	7.43	7.35	7.26	70
	В	5	5	5	3	3	3	320	306	304	337	330	11.4	11.0	11.4	11.4	11,4	11.4	9.2	7.3	6.7					7.35	7.28	
1,000	Α	5	5	Ø	\geq			1	305	-			11.4	Ilil					10.5			Ĩ.	7,97	7.62				0
	в	5	5	0				320	305			\geq	1.4	11.0		\geq		11.4	10,3				7.97	7.63			-	0
2,000	Α	5	5	0	\geq			320	305	<u> </u>			11.9	11.2					10.8				7.96					\mathcal{O}
	В	5	5	0			~	320	305			\succ	11.5	11.1			\geq	11.4	10.9			\geq	7.95	7.74			\geq	
Technician Init	ials	HEINF	RK	WF	SER.F	KR	OPHP													0-14								
											Envi	ronme	ntal C	hamb	er:	F						_						
											Main)hts (n	3	0.746	0.79	1 1 27	50 70	10-21/		1	2072	دەدما	0.30	C.			C	0.304 57 .296
											weig	jiits (ii	ų).	(D)	6	<u>, ()</u>	6)	Ø	6	(D)	(D)	(D)	<u></u>	0			µ= <u>e</u>	
											Leng	iths (c	m):	345	045	30.4	370	31.5	30.5	31.5	29.0	30-0	<u> </u>					103.1 cm
														5.1	3. (5.1	3. 5	5.2	5. (يد ،و	3-4	3.0	3-2		Load	ling ra		0.5/01L
Sample Descriptio	on:	Lis	ht B	slowi	n Li	<u>20</u> 10				A	nimal	Sour	ce/Dat	e Reco	eived:	The	mers	Fist	- <i>(</i> 0	. 4/1	1/23	Age a	at Initia	ation:		•		hatch
Comments:		BQIS	08	04/12	112	BRIZ	LOF L	11312	3 C																			
		V. Sol C	11-	<u>.</u>		<u></u>			-			- 1 \$							<u>U</u>	1 410 0	<u>+ + + + +</u>							
QC Check:	RL	412	151)	3																		Fi	nal Re	view:	AI	4/2	6/23	

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

CETIS Sun	nmary Repo	ort						-	t Date: ode/ID:			•	7 (p 1 of 1) -9618-8936
Acute Fish Su	urvival Test										Nautilus	Environm	ental (CA)
Batch ID: Start Date: Ending Date: Test Length:	20-4180-6527 13 Apr-23 16:15 17 Apr-23 16:15 96h	5 F 5 S	Test Type: Protocol: Species: Taxon:	Survival (96h) OECD 203 Oncorhynchus	mykiss			Dilu Brir	lyst: ient: ne: irce:	Not	oratory Fres Applicable mas Fish Co		Age: 46d
Sample ID: Sample Date: Receipt Date: Sample Age:	: 13 Apr-23	N C		40513EAC Chemical Produ 3081-14-9 shing fon Dep		E tolog	4	Sou	ject: irce: tion:	77P Was 77P	shington Dep	partment of	Ecology
Multiple Com	parison Summa					·····/·;	·						
Analysis ID	Endpoint		Comp	oarison Method			\checkmark	NOEL	LOEI	-	TOEL	PMSD	S
15-5632-5297	96h Survival Ra	te	Fisher	r Exact/Bonferro	ni-Holm Tes	t		250	500		353.6		1
Point Estimat	te Summary												
Analysis ID	Endpoint		Point	Estimate Metho	bd		\checkmark	Level	μg/L		95% LCL	95% UCL	S
02-2680-4330	96h Survival Ra	te	Linear	r Interpolation (IC	CPIN)			EC25 EC50	229		20.8	562 536	1
96h Suprival I	Rate Summary						· ;	EC30	321			536	
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min		Max	Std E	rr	Std Dev	CV%	%Effect
0	S	2	1.000	1.000	1.000	1.000		1.000	0.000)	0.000	0.00%	0.00%
0	LC	2	1.000	1.000	1.000	1.000		1.000	0.000)	0.000	0.00%	0.00%
125		2	1.000	1.000	1.000	1.000		1.000	0.000)	0.000	0.00%	0.00%
250		2	0.700	-3.110	4.510	0.400		1.000	0.300)	0.424	60.61%	30.00%
500		2	0.000	0.000	0.000	0.000		0.000	0.000)	0.000		100.00%
1000		2	0.000	0.000	0.000	0.000		0.000	0.000)	0.000	***	100.00%
2000		2	0.000	0.000	0.000	0.000		0.000	0.000)	0.000		100.00%
96h Survival I	Rate Detail							ME	5: 0C3	37EC	28DD093F35	5EE4A9463	0F4BDCD2
Conc-µg/L	Code	Rep 1	Rep 2										
0	S	1.000	1.000										
0	LC	1.000	1.000										
125		1.000	1.000										
250		1.000	0.400										
		0.000	0.000										
500													
500 1000		0.000	0.000										

5=solvent control

Analyst:_____ QA: Ars 4/26/13

Acute Fis	h Sur	vival Test								Nautilu	s Environn	nental (CA
Analysis I Analyzed: Edit Date:	: 2	5-5632-5297 0 Apr-23 14:09 0 Apr-23 14:09	ə 4	Endpoint: 96h Analysis: ST AD5 Hash: 825	P 2xK Contii	ngency Tabl		State	S Version: us Level: or ID:	CETISv2 1 007-803-	.1.2	
Data Tran	sform	······································	Alt Hy	p			NOEL	LOEL	TOEL	Tox Units		
Untransfor	rmed		C > T	•			250	500	353.6			
Fisher Ex	act/Bo	onferroni-Holi	n Test									
Control	v	s Conc-µg	ı/L	Test Stat	P-Type	P-Value	Decision	(α:5%)				
Lab Contro	ol	125		1.000	Exact	1.0000		ficant Effect				
		250		0.105	Exact	0.2105	Non-Signi	ficant Effect				
		500*		0.000	Exact	2.7E-05	Significan					
		1000*		0.000	Exact	2.7E-05	Significan					
		2000*		0.000	Exact	0.0010	Significan	t Effect				
		ate Frequenci	es									
Conc-µg/l	L	Code	NR	R	NR + R	Prop NR	Prop R	%Effect				
0		LC	10	0	10	1.000	0.000	0.00%				
125 250			10 7	0 3	10 10	1.000 0.700	0.000 0.300	0.00% 30.00%				
250 500			0	3 10	10	0.000	1.000	30.00% 100.00%				
1000			0	10	10	0.000	1.000	100.00%				
2000			0	5	5	0.000	1.000	100.00%				
96h Survi	val Ra	ate Summary										
		ate Summary Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Conc-µg/l		-	Count 2	Mean 1.000	95% LCL 1.000	95% UCL	Median 1.000	Min 1.000	Max 1.000	Std Err 0.000	CV%	%Effec
Conc-µg/l 0		Code										
Сопс-µg/l 0 125 250		Code	2	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00% 0.00%
Сопс-µg/l 0 125 250 500		Code	2 2 2 2	1.000 1.000 0.700 0.000	1.000 1.000 0.000 0.000	1.000 1.000 1.000 0.000	1.000 1.000 0.700 0.000	1.000 1.000 0.400 0.000	1.000 1.000 1.000 0.000	0.000 0.000	0.00% 0.00%	0.00% 0.00% 30.00% 100.00%
Сопс-µg/l 0 125 250 500 1000		Code	2 2 2 2 2 2	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.000	1.000 1.000 1.000	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.400 0.000 0.000	1.000 1.000 1.000 0.000 0.000	0.000 0.000 0.300	0.00% 0.00% 60.61%	0.00% 0.00% 30.00% 100.00%
Сопс-µg/l 0 125 250 500 1000		Code	2 2 2 2	1.000 1.000 0.700 0.000	1.000 1.000 0.000 0.000	1.000 1.000 1.000 0.000	1.000 1.000 0.700 0.000	1.000 1.000 0.400 0.000	1.000 1.000 1.000 0.000	0.000 0.000 0.300 0.000	0.00% 0.00% 60.61%	
Сопс-µg/l 0 125 250 500 1000 2000	L	Code	2 2 2 2 2 2	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.000 0.000	1.000 1.000 1.000 0.000	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.400 0.000 0.000	1.000 1.000 1.000 0.000 0.000	0.000 0.000 0.300 0.000 0.000	0.00% 0.00% 60.61% 	0.00% 0.00% 30.00% 100.00%
Сопс-µg/l 0 125 250 500 1000 2000	L	Code	2 2 2 2 2 2	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.000 0.000	1.000 1.000 1.000 0.000	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.400 0.000 0.000	1.000 1.000 1.000 0.000 0.000	0.000 0.000 0.300 0.000 0.000	0.00% 0.00% 60.61% 	0.00% 0.00% 30.00% 100.00%
Сопс-µg/l 0 125 250 500 1000 2000 Graphics	L	Code	2 2 2 2 2 2	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.000 0.000	1.000 1.000 1.000 0.000	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.400 0.000 0.000	1.000 1.000 1.000 0.000 0.000	0.000 0.000 0.300 0.000 0.000	0.00% 0.00% 60.61% 	0.00% 0.00% 30.00% 100.00%
Сопс-µg/l 0 125 250 500 1000 2000 Graphics	L	Code	2 2 2 2 2 2	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.000 0.000	1.000 1.000 1.000 0.000	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.400 0.000 0.000	1.000 1.000 1.000 0.000 0.000	0.000 0.000 0.300 0.000 0.000	0.00% 0.00% 60.61% 	0.00% 0.00% 30.00% 100.00%
Сопс-µg/I 0 125 250 500 2000 Graphics 1.0 - 0.9 - 0.8 -	L	Code	2 2 2 2 2 2	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.000 0.000	1.000 1.000 1.000 0.000	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.400 0.000 0.000	1.000 1.000 1.000 0.000 0.000	0.000 0.000 0.300 0.000 0.000	0.00% 0.00% 60.61% 	0.00% 0.00% 30.00% 100.00%
Сопс-µg/I 0 125 250 500 2000 Graphics 1.0 - 0.9 - 0.8 -	L	Code	2 2 2 2 2 2	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.000 0.000	1.000 1.000 1.000 0.000	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.400 0.000 0.000	1.000 1.000 1.000 0.000 0.000	0.000 0.000 0.300 0.000 0.000	0.00% 0.00% 60.61% 	0.00% 0.00% 30.00% 100.00%
Сопс-µg/l 0 125 250 500 1000 2000 Graphics 1.0 - 0.9 - 0.8 -	L	Code	2 2 2 2 2 2	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.000 0.000	1.000 1.000 1.000 0.000	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.400 0.000 0.000	1.000 1.000 1.000 0.000 0.000	0.000 0.000 0.300 0.000 0.000	0.00% 0.00% 60.61% 	0.00% 0.00% 30.00% 100.00%
Сопс-µg/l 0 125 250 500 1000 2000 Graphics 1.0 - 0.9 - 0.8 -	L	Code	2 2 2 2 2 2	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.000 0.000	1.000 1.000 1.000 0.000	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.400 0.000 0.000	1.000 1.000 1.000 0.000 0.000	0.000 0.000 0.300 0.000 0.000	0.00% 0.00% 60.61% 	0.00% 0.00% 30.00% 100.00%
Сопс-µg/l 0 125 250 500 1000 2000 Graphics 1.0 - 0.9 - 0.8 -	L	Code	2 2 2 2 2 2	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.000 0.000	1.000 1.000 1.000 0.000	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.400 0.000 0.000	1.000 1.000 1.000 0.000 0.000	0.000 0.000 0.300 0.000 0.000	0.00% 0.00% 60.61% 	0.00% 0.00% 30.00% 100.00%
Сопс-µg/l 0 125 250 500 1000 2000 Graphics 1.0 - 0.9 - 0.8 - 9 0.7 - 2 10 - 0.5 -	L	Code	2 2 2 2 2 2	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.000 0.000	1.000 1.000 1.000 0.000	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.400 0.000 0.000	1.000 1.000 1.000 0.000 0.000	0.000 0.000 0.300 0.000 0.000	0.00% 0.00% 60.61% 	0.00% 0.00% 30.00% 100.00%
Conc-µg/l 0 125 250 500 1000 2000 Graphics 1.0 - 0.9 - 0.8 - 9 0.7 - 9 0.7 - 0.6 - 0.5 - 0.5 - 0.5 - 0.0 - 0.7 - 0.0 - 0	L	Code	2 2 2 2 2 2	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.000 0.000	1.000 1.000 1.000 0.000	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.400 0.000 0.000	1.000 1.000 1.000 0.000 0.000	0.000 0.000 0.300 0.000 0.000	0.00% 0.00% 60.61% 	0.00% 0.00% 30.00% 100.00%
Сопс-µg/I 0 125 250 500 1000 2000 Graphics 1.0 - 0.8 - 0.8 - 0.7 - 1.0 - 0.8 - 0.7 - 0.8 - 0.7 - 0.6 - 0.5 - 0.5 - 0.5 - 0.3 -	L	Code	2 2 2 2 2 2	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.000 0.000	1.000 1.000 1.000 0.000	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.400 0.000 0.000	1.000 1.000 1.000 0.000 0.000	0.000 0.000 0.300 0.000 0.000	0.00% 0.00% 60.61% 	0.00% 0.00% 30.00% 100.00%
Сопс-µg/I 0 125 250 500 1000 2000 Graphics 1.0 - 0.9 - 0.8 - 0.7 - 0.8 - 0.7 - 0.6 - 0.5 - 0.4 - 0.5 - 0.2 -	L	Code	2 2 2 2 2 2	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.000 0.000	1.000 1.000 1.000 0.000	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.400 0.000 0.000	1.000 1.000 1.000 0.000 0.000	0.000 0.000 0.300 0.000 0.000	0.00% 0.00% 60.61% 	0.00% 0.00% 30.00% 100.00%
Conc-µg/l 0 125 250 500 1000 2000 Graphics 1.0 - 0.9 - 0.8 - 9 0.7 - 1.0 - 0.8 - 0.7 - 0.6 - 0.7 - 0.6 - 0.7 - 0.6 - 0.7 - 0.6 - 0.7 - 0.7 - 0.6 - 0.7 - 0.7 - 0.6 - 0.7 - 0.3 - 0.2 - 0.1 -	L	Code LC	2 2 2 2 2 2	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.000 0.000	1.000 1.000 1.000 0.000	1.000 1.000 0.700 0.000 0.000	1.000 1.000 0.400 0.000 0.000	1.000 1.000 1.000 0.000 0.000	0.000 0.000 0.300 0.000 0.000	0.00% 0.00% 60.61% 	0.00% 0.00% 30.00% 100.00%

Analyst: RL QA: 15 4/26/23

Acute Fish Survival TestAnalysis ID:02-2680-4330Endpoint:96h Survival RateAnalyzed:20 Apr-23 14:09Analysis:Linear Interpolation (ICPIN)Edit Date:20 Apr-23 14:09MD5 Hash:825E0D712267A5EAB1538B2E39E4ALinear Interpolation OptionsX TransformY TransformSeedResamplesExp 95% CLMethodLinearLinear18691261000YesTwo-fPoint EstimatesExp 95% LCL95% UCLEC2522920.8562EC50321536Scalculated Variate(A/E96h Survival Rate SummaryCalculated Variate(A/E	Stat A7DA Edit	IS Version: us Level: or ID: polation			mental (CA
Analyzed: 20 Apr-23 14:09 Analysis: Linear Interpolation (ICPIN) Edit Date: 20 Apr-23 14:09 MD5 Hash: 825E0D712267A5EAB1538B2E39E4A Linear Interpolation Options X Transform Y Transform Seed Resamples Exp 95% CL Meth- Linear Linear 1869126 1000 Yes Two-f Point Estimates Ec25 229 20.8 562 536 EC50 321 536 536 536 536 536	Stat A7DA Edit	us Level: or ID:	1		
X Transform Y Transform Seed Resamples Exp 95% CL Meth- Linear Linear 1869126 1000 Yes Two-I Point Estimates Ecvel μg/L 95% LCL 95% UCL Ec25 229 20.8 562 Ec50 321 536 Economic Economic </th <th>-Point Interp</th> <th>polation</th> <th></th> <th></th> <th></th>	-Point Interp	polation			
Linear Linear 1869126 1000 Yes Two-I Point Estimates Evel µg/L 95% LCL 95% UCL EC25 229 20.8 562 EC50 321 536	-Point Interp	polation			
Point Estimates Level μg/L 95% LCL 95% UCL EC25 229 20.8 562 EC50 321 536		polation			
Level μg/L 95% LCL 95% UCL EC25 229 20.8 562 EC50 321 536	/B)				
EC25 229 20.8 562 EC50 321 536	/B)				
EC25 229 20.8 562 EC50 321 536	/B)				
	/B)				
96h Survival Rate Summary Calculated Variate(A/E	/B)				
				Isoto	nic Variate
Conc-µg/L Code Count Mean Median Min Max	CV%	%Effect	ΣΑ/ΣΒ	Mean	%Effect
0 LC 2 1.000 1.000 1.000 1.000	0.00%	0.00%	10/10	1.000	0.00%
125 2 1.000 1.000 1.000 1.000	0.00%	0.00%	10/10	1.000	0.00%
250 2 0.700 0.700 0.400 1.000	60.61%	30.00%	7/10	0.700	30.00%
500 2 0.000 0.000 0.000 0.000		100.00%	0/10	0.000	100.00%
1000 2 0.000 0.000 0.000 0.000		100.00%	0/10	0.000	100.00%
2000 1 0.000 0.000 0.000		100.00%	0/5	0.000	100.00%
Graphics					
1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.5 0.4 0.5 0.4 0.5 0.4 0.5 0.4 0.5 0.4 0.5 0.4 0.5 0.4 0.5 0.4 0.5 0.7 0.4 0.5 0.7 0.4 0.5 0.4 0.5 0.4 0.5 0.4 0.5 0.4 0.5 0.4 0.5 0.5 0.4 0.5 0.5 0.4 0.5 0.5 0.5 0.4 0.5 0.5 0.4 0.5 0.5 0.4 0.5 0.5 0.4 0.5 0.5 0.4 0.5 0.5 0.4 0.5 0.5 0.4 0.5 0.5 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5					

Conc-µg/L

Analyst: RL QA: A(5 4/26/23

Freshwater Acute Bioassay Static Conditions DF-018

Sample ID: 77PD

Test No .: 2304-5126

Concentration					umbei					nduct				Ter	npera	ture			Disso	lved (Dxyge	n			pH			_
(ug/L)	Rep			Live	Orgar	nisms			(ur	nhos/				QI	(°C)	_		014	Q14	(mg/L	.)	014			(uniṫs)	1		Percent
		0	1	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	Survival
Lab Control	Α	5	5	5	S	5	5	321	305	301	335	327	11.6	11.0	11.5	11.4	11.4	11.4	9.8	8.9	9.0	9.1	8.04	7.60	7.45	7.49	7.50	1
	В	5	5	5	S	5	5	320	304	301	335	328	11.5	10.9	11.3		1				8.6					_	7.47	100
1,000 mg/L	Α	5	5	5	5	5	5	303	293	291	320	315	11.9	[].0	11.5	11.5	11.5	11.3	9.3	8.5	8.7				7.48			100
Acetone Control	В	5	5	5	5	5	5	30-3	293	291	320		11,8				1			-					7.48			100
125	Α	5	5	5	5	5	5	310	299	297	328	321	11,9	geg	11.5	1.5	11.5								7.52			100
	В	5	5	5	\$	5	5	310	295	293	323	317	11.8	10,9			11.3	11.2	10.0	8.9					7.54			100
250	Α	5	5	4	5	5	5	309	296	295	326	319	12.0	11.1	11.5	11.5	11.5	11.3	9.3	7.3					7.47			
	В	5	5	5	5	5	2	309	296	296	330	328	11.9	11.0	11.3	11.3	11.3	11.2	9,3	8,8	7.8				7.47 .			70
500	Α	5	5	0	~			310					12.0	11,0	/			11.2	11.9 11.0				7.99	7.90	$\overline{\}$			0
	В	5	5	0				309	296				11.9	10 A				11.3	10,1		/		8.01	7.65		\smallsetminus		0
1,000	Α	5	5	0				309	૮૧૬				11.9	· · · · · · · · · · · · · · · · · · ·				11.2	10.9	/		-	8.01	7.75				∂
	В	5	5	0				309	295				11.9	10,9				11.2	10.7			/	8,02	7.75				U
2,000	A	5	3	0				308		\ \			12.0	11.1				11.2	10.8	-			8:02	7.83	\neg			Э
	В	5	5	0			<u> </u>	303	2.99				12.0	11.0				11.2	11.1			/	8.02	7.85				0
Technician Init	als	BEWF	K	WF	UBOWE	KR	07/KR																					
				[onme				1-			·								_	
											Weig	o () hts (mì) g): (6.346	0.242	D.275	0.341	0.316	0.259	0.340	0.234	0.282	0.300	5			ц = С	0.304 g
														© _	O	Ø,	0	0	©_	0	\odot	C	O				Ò	
L											Leng	ths (cı	n):	3-2	3-1	<u>३०-</u> 5 3.1	3.3	3.)	<u>جنو2</u> ع.ا	3.2	240	<u>38-0</u> 3.0	31.5					+.0 3.1 cm
																					,				Loadi	ng raf	00 ف = ف	.51 49 91L
Sample Descriptio	n:	Lio	hT	8019	ĸL	Qui	0			A	nimal	Sourc	e/Date	Rece	ived:	Tho	mus	Fis	400	0.41	4/23	Age a	t Initia	ation:	46	dau	<u>15 p</u>	ost hatch
Comments:		ØG	218 W	FUI	13/23	<u>B</u>	<u>18 v</u>	JF41	14/2	-3	OQ	18 P		1251	23													
	RL	41	51)7	2																								
QC Check:	RL	110	- 212	1.																					1	11-1	1	

Conductivity

Test Species: O. mykiss

End Date/Time:

Start Date/Time: 4(13/23

4/17/23

1615

1615

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Final Review: Ars 4/26/23

Client: WADOE

QC Check:

Number of

CETIS Sui	mmary Rep	ort						•	t Date: ode/ID:		Apr-23 14:04 4-S124 / 14	
Acute Fish S	urvival Test									Nautilus	Environm	ental (CA)
Batch ID: Start Date: Ending Date: Test Length:	11-8467-6680 13 Apr-23 16:0 : 17 Apr-23 16:0 96h	10 F	Protocol:	Survival (96h) OECD 203 Oncorhynchus	mykiss			Dilu Brit	ne: M	aboratory Fres. Not Applicable Thomas Fish Co		Age: 46d
Sample ID: Sample Date Receipt Date Sample Age:	: 13 Apr-23	n C	/laterial: CAS (PC):	7C51F957 Chemical Prod Ol-72-4 Nington Depur		cology		Sol	irce: V	PPD Vashington Dep PPD	partment of	
	parison Summ	ary					,					
Analysis ID	Endpoint			arison Method			\checkmark	NOEL	LOEL	TOEL	PMSD	S
10-7007-3162	96h Survival R	ate	Fisher	Exact Test				500	1000	707.1		1
Point Estima Analysis ID 10-0781-1029	te Summary Endpoint 96h Survival R	ate		Estimate Meth			√	Level EC25	μ g/L 625	95% LCL 625	95% UCL	S
10 0101 1020	o on our num	ato	Linour		51 114)			EC50	750	750	750	
96h Survival	Rate Summary											
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min		Мах	Std Er	r Std Dev	CV%	%Effect
0	S	2	1.000	1.000	1.000	1.000		1.000	0.000	0.000	0.00%	0.00%
0	LC	2	1.000	1.000	1.000	1.000		1.000	0.000	0.000	0.00%	0.00%
125		2	1.000	1.000	1.000	1.000		1.000	0.000	0.000	0.00%	0.00%
250		2	1.000	1.000	1.000	1.000		1.000	0.000	0.000	0.00%	0.00%
500		2	1.000	1.000	1.000	1.000		1.000	0.000	0.000	0.00%	0.00%
1000		2	0.000	0.000	0.000	0.000		0.000	0.000	0.000		100.00%
2000		2	0.000	0.000	0.000	0.000		0.000	0.000	0.000	00 mi mi	100.00%
96h Survival	Rate Detail							ME	05: 806D1	11DB5F6C2AFE	BBEEF9B96	A07C7E76
Conc-µg/L	Code	Rep 1	Rep 2									
0	S	1.000	1.000									
	LC	1.000	1.000									
0		1.000	1.000									
-												
125		1.000	1.000									1
125 250			1.000 1.000									
0 125 250 500 1000		1.000										

S= solvent control

Acute Fish Analysis ID Analyzed: Edit Date: Data Trans Untransform Fisher Exac Control Lab Control 250 500 1000 2000 96h Surviva Conc-µg/L	D: 16-76 25 A 25 A sform med oct Test vs I	607-3162 or-23 14:04 or-23 14:03 Conc-µg/ 125 250 500	Ana MD! C > T L	lysis: Sing	032BE06328	tingency Ta	DED7E39D NOEL 500 Decision Non-Sign	Statu 7E6A Edito LOEL 1000 (α:5%)	S Version: s Level: r ID: TOEL 707.1	Nautilu: CETISv2 1 007-803- Tox Units	.1.2 386-7	nental (CA
Analyzed: Edit Date: Data Trans Untransform Fisher Exac Control Lab Control 96h Surviva Conc-µg/L 0 125 250 500 1000 2000 96h Surviva	25 A 25 A eform med tot Test vs I ral Rate F	Conc-µg/ 125 250 500 Frequencies Code	Ana MD C > T L	Iysis: Sing 5 Hash: EB0 Test Stat 1.000 1.000 1.000	gle 2x2 Con 32BE06328 P-Type Exact Exact	tingency Ta 8145FED55 P-Value 1.0000 1.0000	DED7E39D NOEL 500 Decision Non-Sign	Statu 7E6A Edito LOEL 1000 (a:5%) (ficant Effect	s Level: r ID: TOEL	1 007-803- Tox Units	386-7	
Edit Date: Data Trans Untransform Fisher Exac Control Lab Control 96h Surviva Conc-µg/L 0 125 250 500 1000 2000 96h Surviva	25 A form med net Test vs I ral Rate F	Conc-µg/ 125 250 500 Frequencies Code	MD: Alt Hyp C > T L s	5 Hash: EB0 Test Stat 1.000 1.000	P-Type Exact Exact	P-Value 1.0000 1.0000	DED7E39D NOEL 500 Decision Non-Sign	7E6A Edito LOEL 1000 (α:5%) fficant Effect	r ID: TOEL	007-803- Tox Units		
Data Trans Untransform Fisher Exac Control Lab Control 96h Surviva Conc-µg/L 0 125 250 500 1000 2000 96h Surviva	ned net Test vs l	Conc-µg/ 125 250 500 Frequencies Code	Alt Hyp C > T L	Test Stat 1.000 1.000	P-Type Exact Exact	P-Value 1.0000 1.0000	NOEL 500 Decision Non-Sign	LOEL 1000 (a:5%) fficant Effect	TOEL	Tox Units		
Untransform Fisher Exac Control Lab Control 96h Surviva Conc-µg/L 0 125 250 500 1000 2000 96h Surviva	ned oct Test vs I val Rate F	125 250 500 Frequencies Code	C > T L	1.000 1.000	Exact Exact	1.0000 1.0000	500 Decision Non-Sign	1000 (α:5%) ificant Effect				
Fisher Exac Control Lab Control 96h Surviva Conc-µg/L 0 125 250 500 1000 2000 96h Surviva	vs vs I val Rate F	125 250 500 Frequencies Code	LS	1.000 1.000	Exact Exact	1.0000 1.0000	Decision Non-Sign	(α:5%) ificant Effect	707.1			
Control Lab Control 96h Surviva Conc-µg/L 0 125 250 500 1000 2000 96h Surviva	vs I val Rate F	125 250 500 Frequencies Code	s	1.000 1.000	Exact Exact	1.0000 1.0000	Non-Sign	ificant Effect				
Lab Control 96h Surviva Conc-µg/L 0 125 250 500 1000 2000 96h Surviva	al Rate F	125 250 500 Frequencies Code	s	1.000 1.000	Exact Exact	1.0000 1.0000	Non-Sign	ificant Effect				
96h Surviva Conc-μg/L 0 125 250 500 1000 2000 96h Surviva	al Rate F	250 500 Frequencies Code		1.000	Exact	1.0000	-					
Conc-µg/L 0 125 250 500 1000 2000 96h Surviva		500 Frequencies Code					Non-Sign					
Conc-µg/L 0 125 250 500 1000 2000 96h Surviva		Frequencies Code		1.000	Exact	1.0000	-	ificant Effect				
Conc-µg/L 0 125 250 500 1000 2000 96h Surviva		Code					Non-Sign	ficant Effect				
0 125 250 500 1000 2000 96h Surviv a			NR									
125 250 500 1000 2000 96h Surviva		LC		R	NR + R	Prop NR	Prop R	%Effect				
250 500 1000 2000 96h Surviva			10	0	10	1.000	0.000	0.00%				
500 1000 2000 96h Surviva			10	0	10	1.000	0.000	0.00%				
1000 2000 96h Surviva			10	0	10	1.000	0.000	0.00%				
2000 96h Surviva			10	0	10	1.000	0.000	0.00%				
96h Surviva			0	10	10	0.000	1.000	100.00%				
			0	10	10	0.000	1.000	100.00%				
Conc-ua/l	al Rate S	Summary										
oono pg/E		Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0		LC	2	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
125			2	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
250			2	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
500			2	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
1000			2	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
2000			2	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
Graphics		<u></u>	·				······					
• 1.0 -[
0.9 -	•	•	•	•								
0.8 -												
9 0.7 -												
96h Survival Rate												
< S												
0.5 -												
ภ ั 0.4 -												
196 0.3 -												
0.2 -												
0.1 -												
0.0 -												
0.0 -	0 LC	125	250	500	1000	2000						
	010	120	Conc-		,000	2000						

CETIS ™ v2.1.2.3 (007-803-386-7)

Analyst: RL QA: Ars 4/26/22

CET	'IS Ana	lytical Repo	rt						eport Date: est Code/ID:		•	04 (p 1 of 1 4-4803-402
Acut	e Fish Su	urvival Test								Nautilu	us Environ	nental (CA
Anal	ysis ID: yzed: Date:	10-0781-1029 25 Apr-23 14:04 25 Apr-23 14:03	Ana	Iysis: L	6h Survival R inear Interpol B032BE0632	ation (ICPI		9D7E6A	CETIS Version: Status Level: Editor ID:	CETISv 1 007-803		
Line	ar Interpo	olation Options										
X Tra	ansform	Y Transform	See	d	Resamples	Exp 95	%CL Me	ethod				
Linea	ar	Linear	142	9582	1000	Yes	Τw	/o-Point	Interpolation			
Poin	t Estimat	tes										
Leve	el μg/L	95% LCL	95% UCL									
EC2		625	625									
EC50	0 750	750	750									
96h 3	Survival	Rate Summary				Calculate	d Variate(A/B)			Isoto	nic Variate
Cond	c-µg/L	Code	Count	Mean	Median	Min	Max	CV%	% %Effect	ΣΑ/ΣΒ	Mean	%Effect
0		LC	2	1.000	1.000	1.000	1.000	0.00	0.00%	10/10	1.000	0.00%
125			2	1.000	1.000	1.000	1.000	0.00	0.00%	10/10	1.000	0.00%
250			2	1.000	1.000	1.000	1.000	0.00	0% 0.00%	10/10	1.000	0.00%
500			2	1.000	1.000	1.000	1.000	0.00	0.00%	10/10	1.000	0.00%
1000			2	0.000	0.000	0.000	0.000		100.00%	0/10	0.000	100.00%
2000	1		2	0.000	0.000	0.000	0.000		100.00%	0/10	0.000	100.00%
Grap	hics											
96h Survival Rate	1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.0 0.0	400	800	1200	1600	2000						
	Ũ	100			,	2000						
			Conc-J	ıg/L								

Analyst: RL QA: Ars 4/26/27

Water Quality Measurements & Test Organism Survival

Sample ID: IPPD

Test No .: 2304 - 5124.

Test Species:	O. mykiss		
Start Date/Time:	4/13/23	1600	
End Date/Time:	4/17/23	1600	

Concentration	Rep				umber	r of nisms				nduct mhos/				Tei	npera	ture				lved ((mg/L		n			pH (units			Percent
(ug/L)	TOP	0	1	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	Survival
Lab Control	Α	5	5	5	5	5	5	320	305	302	1	328			11.5	1	11.5	11.4	Contract Street		1		-	1	-	1	7.40	
	в	5	5	5	5	5	5	-	1	302		328	· ·	11.0	-					8.9							7.45	001
1,000 mg/L	А	5	5	3	\$	5	5	308	293	291	323	317	11.7	11.1	11.5		11.5						1		1		7.47	1
Acetone Control	в	5	5	5	5	5	5	308	293	291	323	316	1,,7	11.0	11.4					8.7			1				7.48	00
125	Α	5	5	5	5	5	5	309	294	292	324	314	11.8	11.1	11.5	11.5	11.5	11.2	9.5	8.3	8.5	1	1				7.46	100
	в	5	5	5	5	5	5	309	294	292	325	319	11.7	11.1	11.5	11.4	11.4	11,2	9.6	8,9	9.8	8.6	8.04	7.60	7.51	7.52	7.48	100
250	Α	5	5	5	5	5	5	309	297	294	327	320	11.7	11.2	11.6	11.5	11.5	11.3	9.2	8.3	8.2	8.3	8.04	7.59	7.49	7.48	7.46	1
	В	5	5	5	5	5	5	304	294	292	325	318	11.7	11.1	11.5	11.5	11.5	11.3	9.6	8.6	8.4	8.8	8.04	7.59	7.49	7.50	7.49	001
500	Α	5	5	5	5	5	5	309	1	293	1	319	11.8	11.2	11.6	11.6			9.5		8.4	7,9	8.03	7.59	7.52	7.48	7:44	100
	В	5	5	5	5	5	5	-		293	325	319	11.7	nı	11.5	11.5	11.5		-	8.7	8.1	7.7	8.07	7.61	7.53	7.47	7.43	100
1,000	Α	5	5	BX0					295	\geq			11.8	11.2	~				9.7	\geq			<u> </u>	7.63				0
	В	5	5	650			\geq	<u> </u>	293			\geq	11.7				<u> </u>	_	9.8				8.02					<u> </u>
2,000	Α	5	5	0		-	ļ	309	<u> </u>			L		11.2	<u> </u>				9.8				8,02					\bigcirc
	В	5	5	0	40	ļ	<u> </u>	308	95				11.8	11.2				11.3	9.7				8.03	7.65			-	0
Technician Init	ials	KE WF	R	WF	KP2 OBONE	KR	0AKR																					
		·	<u>г</u>			1	1				Envir	onme	ntal C	hamb	er:	F												
	·						-				Weig	ې hts (۱۳) a):	0.346	0.292	0.275	0.301	0.316	0.254	0.340	0.234	0.287	0.3	6			u = ();304g ; <u>-246</u> g ; <u>-246</u> ; ; <u>-246</u> g ; <u>-246</u> g ; <u>-246</u> g/L
							1				0	hts (ກັ ເອີ ths (ci	5	0	O	O	O	0	\odot	3	0	Õ	C					2
]				Leng	ths (cı	n):	3.1	3.1	3.1	<u>3.3</u>	31.5 3.2	30.5	3.2	27.0	70.0 3.0	<u>31.5</u> 32				h = 1	H-Q 3-1:"
															2.1	ſ			. ,	F		-			Load	ling ra	ite =	-49-g/L
Sample Descriptio	n:	Pul	Pie	Liau	0					. A	nimal	Sourc	e/Date	e Reco	eived:	Tho	mns	Fish	10.	4/4/	23	Age a	at Initi					ost hutch
Comments:		(DQ	18-01	74/13	123	<u>(B)</u> Q	18 1	FY	14/2	-3	() Q	18 F	L L	1/25	13													
QC Check:	RL	4	251	13,		_																Fi	nal Re	view:	Ars	4/2	6/23	3、

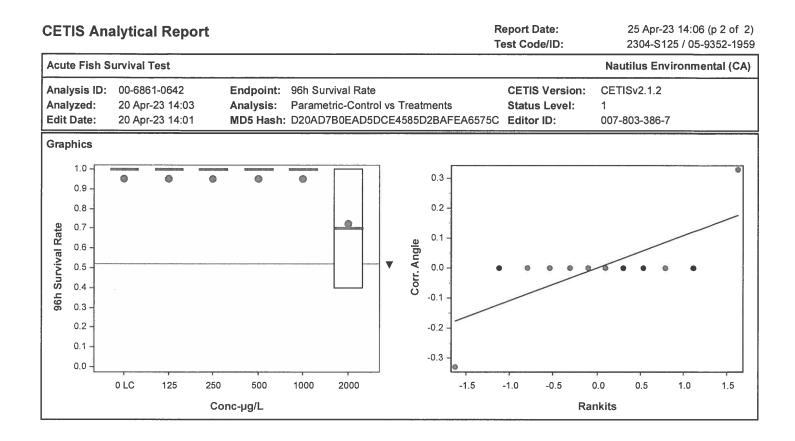
Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

CETIS Sun	nmary Rep	ort						Report Test C	Date: ode/ID:		•	6 (p 1 of 1) -9352-1959
Acute Fish Su	irvival Test									Nautilus	Environm	ental (CA)
Batch ID: Start Date: Ending Date: Test Length:	03-0476-3407 13 Apr-23 15:5 17 Apr-23 15:5 96h	5 P 5 S	rotocol:	Survival (96h) OECD 203 Oncorhynchus	mykiss			Dilu Brir	ie: N	aboratory Fresl lot Applicable 'homas Fish Co		Age: 46d ₽
Sample ID: Sample Date: Receipt Date: Sample Age:	13 Apr-23	M C	laterial: AS (PC):	3AAE90D Chemical Produ 26780-96-1 sh:hgfon Depa	. 1	Ecology	1	Sou	rce: V	MQ Vashington Dep MQ	partment of	
Multiple Com Analysis ID	parison Summ Endpoint	ary	Comp	arison Method			,	NOEL	LOEL	TOEL	PMSD	s
	96h Survival R	ate		tt Multiple Com			~	2000	>2000		47.9%	
Analysis ID 03-2312-3728	Endpoint 96h Survival R	ate		Estimate Methe			✓ 	Level EC25 EC50	μ g/L 1830 >2000	95% LCL 167 	95% UCL 	S 1
	Rate Summary											
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL			Max	Std En		CV%	%Effect
0 0	S LC	2 2	1.000 1.000	1.000 1.000	1.000 1.000	1.000 1.000		1.000 1.000	0.000 0.000	0.000 0.000	0.00% 0.00%	0.00%
125	LO	2	1.000	1.000	1.000	1.000		1.000	0.000	0.000	0.00%	0.00%
250		2	1.000	1.000	1.000	1.000		1.000	0.000	0.000	0.00%	0.00%
500		2	1.000	1.000	1.000	1.000		1.000	0.000	0.000	0.00%	0.00%
1000		2	1.000	1.000	1.000	1.000		1.000	0.000	0.000	0.00%	0.00%
2000		2	0.700	-3.110	4.510	0.400		1.000	0.300	0.424	60.61%	30.00%
96h Survival I	Rate Detail							MD	5: 68563	7667C5CD16C	7CE40BEB	1E16F2FC
Conc-µg/L	Code	Rep 1	Rep 2									
0	S	1.000	1.000									
0	LC	1.000	1.000									
125		1.000	1.000									
250		1.000	1.000									
500		1.000	1.000									
1000		1.000	1.000									
1000												

S= solvent control

CETIS An	alyti	cal Repo	ort		0			Report Test Co				06 (p 1 of 2) 5-9352-1959
Acute Fish S	Surviva	al Test								Nautilus	s Environn	nental (CA)
Analysis ID: Analyzed: Edit Date:	20 A	861-0642 pr-23 14:03 pr-23 14:01	Ana	I ysis: Par	Survival Ra ametric-Cor DAD7B0EAD	ntrol vs Trea			IS Version: us Level: or ID:	CETISv2 1 007-803-		
Data Transfo	orm		Alt Hyp				NOEL	LOEL	TOEL	Tox Units	MSDu	PMSD
Angular (Corr	rected)		C > T				2000	>2000			0.479	47.92%
Dunnett Mul	tiple C	omparison	Test									
Control	vs	Conc-µg/L	. df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)		
Lab Control		125	2	0	2.83	0.539	CDF	0.8333	Non-Signi	icant Effect		
		250	2	0	2.83	0.539	CDF	0.8333	Non-Signit	icant Effect		
		500	2	0	2.83	0.539	CDF	0.8333	Non-Signit	icant Effect		
		1000	2	0	2.83	0.539	CDF	0.8333	Non-Signit	icant Effect		
		2000	2	1.73	2.83	0.539	CDF	0.1959	Non-Signi	icant Effect		
ANOVA Tabl	e											
Source		Sum Squa	res	Mean Squ	lare	DF	F Stat	P-Value	Decision(α:5%)		
Between		0.18181		0.036362		5	1	0.4894	Non-Signi	icant Effect		
Error		0.218172		0.036362		6						
Total		0.399982				11						
ANOVA Assu	umptio	ons Tests										
Attribute		Test				Test Stat	Critical	P-Value	Decision(α:1%)		
Variance		Bartlett Eq	uality of Va	riance Test					Indetermin	ate		
Distribution		Shapiro-W	ilk W Norm	ality Test		0.599	0.802	0.0001	Non-Norm	al Distributi	on	
96h Survival	Rate	Summary										
Conc-µg/L		Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0		LC	2	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
125			2	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
250			2	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
500			2	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
1000			2	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
2000			2	0.700	0.000	1.000	0.700	0.400	1.000	0.300	60.61%	30.00%
Angular (Coi	rrected	d) Transform	ned Summ	ary								
		Code	Count	Mean	95% LCL	95% UCL	Median	Min	Мах	Std Err	CV%	%Effect
Conc-µg/L				4.050	1.340	1.350	1.350	1.350	1.350	0.000	0.00%	0.00%
		LC	2	1.350	1.540							
0		LC	2 2	1.350 1.350	1.340	1.350	1.350	1.350	1.350	0.000	0.00%	0.00%
0 125		LC							1.350 1.350	0.000 0.000	0.00% 0.00%	0.00% 0.00%
Conc-μg/L 0 125 250 500		LC	2	1.350	1.340	1.350	1.350	1.350				
0 125 250		LC	2 2	1.350 1.350	1.340 1.340	1.350 1.350	1.350 1.350	1.350 1.350	1.350	0.000	0.00%	0.00%

Analyst:_____ QA: 18 54/26/23



CETIS An	alytical Repo	ort						eport Date: est Code/ID:		6 Apr-23 14: 04-S125 / 0	
Acute Fish S	urvival Test								Nautilu	us Environi	nental (CA
Analysis ID: Analyzed: Edit Date:	03-2312-3728 20 Apr-23 14:03 20 Apr-23 14:01	Ana	Iysis: L	6h Survival Ra inear Interpola 20AD7B0EAI	ation (ICPI		A6575C	CETIS Version: Status Level: Editor ID:	CETISv 1 007-803		
Linear Interp	olation Options										
X Transform	Y Transform	See	d	Resamples	Exp 95	% CL M	ethod				
Linear	Linear	177	4031	1000	Yes	T۱	vo-Point	Interpolation			
Point Estima Level µg/L EC25 1830 EC50 >200	95% LCL	95% UCL									
	Rate Summary		· · · · · · · · · · · · · · · · · · ·		Calculate	ed Variate	(A/B)			Isoto	nic Variate
Conc-µg/L	Code	Count	Mean	Median	Min	Мах	CV%	% %Effect	ΣΑ/ΣΒ	Mean	%Effect
0 125 250 500 1000 2000 Graphics	LC	2 2 2 2 2 2 2	1.000 1.000 1.000 1.000 1.000 0.700	1.000 1.000 1.000 1.000 1.000 0.700	1.000 1.000 1.000 1.000 1.000 0.400	1.000 1.000 1.000 1.000 1.000 1.000	0.00 0.00 0.00 0.00 0.00 60.6	% 0.00% % 0.00% % 0.00% % 0.00%	10/10 10/10 10/10 10/10 10/10 7/10	1.000 1.000 1.000 1.000 1.000 0.700	0.00% 0.00% 0.00% 0.00% 30.00%
1.00 - 0.90 - 0.80 - 0.80 - 0.60 - 0.60 - 0.40 - 0.20 - 0.10 - 0.00 - 0.00 - 0.00 - 0.00 -	400	800	1200	1600	2000						

Analyst: RL QA: 415 4/26/23

Freshwater Acute Bioassay Static Conditions DF-018

Client: WADOE

Sample ID: TMQ

Test No.: 2304- 5125.

 & Test Organism Survival

 Test Species:
 0. mykiss

 Start Date/Time:
 ٩/١٦/٢٤

1555

Water Quality Measurements

Concentration	Rep				umber	r of nisms				nduct nhos/				Ter Q I	npera (°C)	ture		QIH	Disso Q14	lved C	xyger	1			pH			Percent
(ug/L)		0	1	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	(units) 48	72	96	Survival
Lab Control	Α	5	5	5	5	5	5				336		11.4		11.5		N. 6	11.4					- 1	and the second s	7.47			1.0.
	в	5	5	5	5	5	5	321	305	303	337	330	11.3	1	11.5	1	11.4	11.4		9.0	8.9	8.7	8.03	7,62	2,51			100
1,000 mg/L	Α	5	S	5	5	5	5	320	305	303	337	330	11.5	$ _{\ell} $	11.6	11.6	11.5	11.4	9.8	9.3			8.01		7.54			100
Acetone Control	в	5	5	5	5	5	5	320	305	302	335	329	11.4	11.1	11.5	11.5	11.5	11.4		- 11	9:5		7,99	A 1 .	7.57			100
125	Α	5	5	5	5	5	5		306		-	330	11.4	11. (11.6	11.5	11.4	11,4	9,8	8,9	8.9				7.50		7.52	100
	В	5	5	5	5	5	5	321	305	303	334	330	11,4	11.1	11.6	11.5	11.3	11.3	9.8	9,2	9.2	9.2	7.95	7.63	7:54	7.55	7.54	100
250	Α	5	5	5	5	5	5		306			331	11.4	10.9	11.6	11.4	11.9	11.4	9.5	8.5	95	8.9	7.97	7.61	7.51	751	7.5z	100
	В	5	5	5	5	5	5	321	306	303	334	330	11.4	11.1	11.6	11.6	11.3	11.4	9.9	9.2	9.2	9.0	7.98	7.62	7.56	755	.53	100
500	Α	5	5	5	\$	5	5	34			- · · · · ·	330				11.6	11.4	11.4	9.7	8.8	0.8	8.7	7,96	7.62	7.54	7.54	7,52	100
	В	5	5	5	5	5	5	-		_	-	1	11.3		11.6	11.4	11.3				8.3	8.6	7,94	7.61	7.52	7.46	7.51	
1,000	Α	5	3	5	5	5	5	-	306		336		11.3		11,6	11.6	11.4		9.8						7.5Z :		7.50	100
	В	5	5	5	3	5		<u> </u>	306		337	50 1	11.3		11.6	11.6	11.3		9.5		8.3				7.52	-	1,46	
2,000	<u>A</u>	5	5	\$	5	5	5				326			· ·		11.7	-	11.39			6.8				7,49		7.38	70
	В	5	5	S	5	5	2	309	294	293	325	319	11.6	[1.1	11,6	11-6	11. 4	11.3	9,4		6.9	7.4	8.04	7.59	7.50 :	7.30	7.39	
Technician Init	als	684NT	K	WF	WF	KR	DRAAR									/				QIL								
	ſ						1				Envir	-		hambe	ər:	F												
											Weig	ې 🕘 hts(na	u). (0.346	0.292	0.275	mzal	0.316	0.259	0.740	0.084	10280	2 10.20	6			Ø	0.304 g
													\$1.	B	B	B	(B)	(B)	B	B	B	$\overrightarrow{\mathbb{D}}$	0	0				
											Leng	ths (cı	n):	31.5	31.0	305	<u>55.0</u>	(B) 3.2	305	345	29.0	70. 0	31.5				μ = <u>3</u>	to 3.1 cm
														1,1	5.1	2-1	2.5	2.7	>.1	2-1	1-9	50	2.7		Loadi	ng rat	e = <u>0</u>	7.51 44-91L
Sample Descriptio	n: .	Yei	100	Lia	uin.					A	nimal	Sourc	e/Dat	e Rece	eived:	Tho	mai	s Fish	10.	4/4	123	Age a	t Initia	ition:	-16 c	lays	po	st-hatch
Comments:		Ba	118 WF	4/13	123	B (218 F	21 41	172173	۶ <u>.</u>																-		
	n	Ц	1251	12																					<u> </u>			

QC Check: RL 4/25/23

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

OECD 203

End Date/Time: 4/17/23

Appendix B

Data Qualifier Codes

Glossary of Qualifier Codes

- Q1 Temperature out of recommended range; corrective action taken and recorded in Test Temperature Correction Log
- Q2 Temperature out of recommended range; no action taken, test terminated same day
- Q3 Sample pH adjusted to within range of 6-9 with reagent grade NaOH or HCl, as needed
- Q4 Test aerated; D.O. levels dropped below 4.0 mg/L
- Q5 Test initiated with continuous aeration due to an anticipated drop in D.O.
- Q6 Airline obstructed or fell out of replicate and replaced; drop in D.O. occurred
- Q7 Salinity out of recommended range
- Q8 Spilled test chamber/ Unable to recover test organism(s)
- Q9 Inadequate sample volume remaining, partial renewal performed
- Q10 Inadequate sample volume remaining, no renewal performed
- Q11 Sample out of holding time; refer to QA section of report
- Q12 Replicate(s) not initiated; excluded from data analysis
- Q13 Survival counts not recorded due to poor visibility or heavy debris
- Q14 D.O. percent saturation was checked and was ≤ 110%
- Q15 Did not meet minimum test acceptability criteria. Refer to QA section of report.
- Q16 Percent minimum significant difference (PMSD) was <u>below</u> the lower bound limit for acceptability. This indicates that statistics may be over-sensitive in detecting a difference from the control due to low variability in the data set. Test results were reviewed and reported in accordance with guidance found in EPA-833-R-00-003, 2000 unless otherwise specified.
- Q17 Percent minimum significant difference (PMSD) was <u>above</u> the upper bound limit for acceptability. This indicates that statistics may be under-sensitive in detecting a difference from the control due to high variability in the data set. Test results were reviewed and reported in accordance with EPA-833-R-00-003, 2000 guidance unless otherwise specified.
- Q18 Incorrect or illegible Entry
- Q19 Miscalculation
- Q20 PMSD criteria do not apply to the test of significant toxicity (TST) analysis
- Q21 Other (provide reason in comments section)
- Q22 Greater than 10% batch <u>mortality</u> observed upon receipt and/or in holding prior to test initiation. Organisms acclimated to test conditions at Enthalpy and ultimately deemed fit to use for testing.
- Q23 Test organisms experienced a <u>temperature</u> shift greater than 3°C within 1 day or were received at a temperature greater than 3°C outside the recommended test temperature range and had minimal time to acclimate prior to test initiation. However, due to age-specific protocol requirements and/or sample holding time constraints, the organisms were used to initiate test(s). Organisms were ultimately deemed fit to use for testing.
- Q24 Test organisms experienced a <u>salinity</u> shift greater than 3 ppt within 1 day or were received at a salinity greater than 3 ppt outside the recommended test salinity range and had minimal time to acclimate prior to test initiation. However, due to age-specific protocol requirements and/or sample holding time constraints, the organisms were used to initiate test(s). Organisms were ultimately deemed fit to use for testing.



Appendix C

Reference Toxicant Test Data

CETIS Sur	nmary Rep	ort						-	rt Date: Code/ID:		•	7 (p 1 of 1) -5815-1771	
Acute Fish S	urvival Test	-									Environm		-
Batch ID: Start Date: Ending Date: Test Length:	12-0462-1472 13 Apr-23 15:1 17 Apr-23 15:1 96h	5 I 5 I	Test Type: Protocol: Species: Taxon:	Survival (96h) Washington DC Oncorhynchus				Dil Bri	alyst: uent: ne: urce:	Laboratory Fres Not Applicable Thomas Fish Co		Age: 32d	post Swim
Sample ID: Sample Date: Receipt Date: Sample Age:	13 Apr-23	l	Code: Material: CAS (PC): Client:	230413omra Copper chloride	9			So	oject: urce: ation:	Internal Copper Chloride			
Multiple Com	parison Summ	ary		<u> </u>									ĺ
Analysis ID 16-6843-3165	Endpoint 96h Survival R	ate		oarison Method r Exact Test			√	NOEL 50	LOEI 100	L TOEL 70.71	PMSD	S	
Point Estimat Analysis ID 04-7188-7445	te Summary Endpoint 96h Survival R	ate		Estimate Methorman-Kärber	od		\checkmark	Level EC50	μg/L 107	95% LCL 91.1	95% UCL 126	S 1	
	Rate Summary							2000	107		120		ĺ
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min		Max	Std E	Err Std Dev	CV%	%Effect	
0 25 50 100 200 400	LC	2 2 2 2 2 2 2	1.000 1.000 0.950 0.650 0.000 0.000	0.315	1.000 1.000 1.590 1.290 0.000 0.000	1.000 1.000 0.900 0.600 0.000 0.000		1.000 1.000 1.000 0.700 0.000 0.000	0.000 0.000 0.050 0.050 0.000	0 0.000 0 0.071 0 0.071 0 0.000	0.00% 0.00% 7.44% 10.88% 	0.00% 0.00% 5.00% 35.00% 100.00% 100.00%	
96h Survival	Rate Detail							M	D5: 1D7	70E2714660A0D	9BBA0485/	D912D6F]
Conc-µg/L	Code	Rep 1	Rep 2										
0 25 50 100 200 400	LC	1.000 1.000 0.900 0.700 0.000 0.000	1.000 1.000 1.000 0.600 0.000 0.000										

Analyst:_____ QA: 11(5 4/24/123

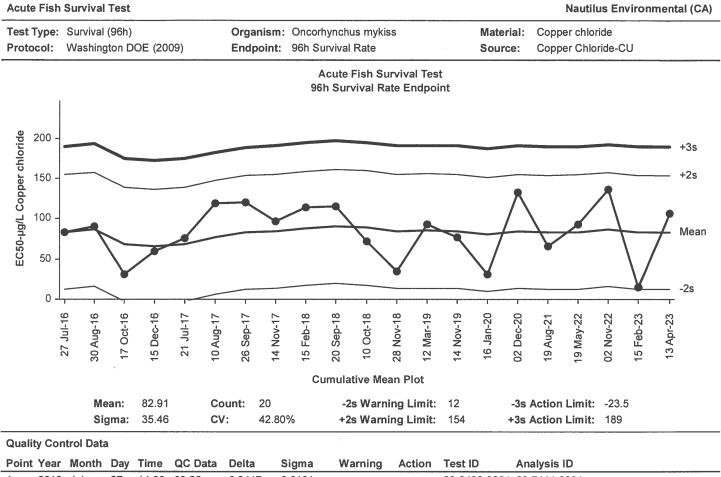
0 LC 2 1.000 1.000 1.000 1.000 1.000 0.000 0.00% 0.00 25 2 1.000 1.000 1.000 1.000 1.000 1.000 0.000 0.00% 0.00% 0.00% 50 2 0.950 0.315 1.000 0.950 0.900 1.000 0.050 7.44% 5.00 100 2 0.650 0.015 1.000 0.650 0.600 0.700 0.050 10.88% 35.0 200 2 0.000 0.000 0.000 0.000 0.000 0.000 0.000 100. 400 2 0.000 0.000 0.000 0.000 0.000 0.000 100. Graphics						Test C	ode/ID:	230413omra / 04-5815-177						
Analyzei: 26 Apr:3 11:46 Analysis: Single 3::22 Contingency Table Status Level: 1 Edit Date: 26 Apr:3 11:46 MD5 Hash: 1077022714660A0D9BBA0485AD912D6F Editor JD: 007-803-386-7 Data Transform AIL Hyp NOEL LOEL TOX ToX Units Data Transformed C > T 50 100 70.71 - - Fisher Exact Test C > T Test Stat P.Yape P.Value Decision(c:5%) -	Acute I	Fish S	urviva	l Test						Nautilu	s Environn	nental (C/		
Edit Date: 28 Apr-23 11:45 MD5 Hash: 1D770E2714660A0D9BBA0485AD91206F Editor ID: 007-803-386-7 Data Transform AH: Hyp NOEL LOEL TOEL Tox Units										CE	IS Version:	CETISv2	2.1.2	
Data Transform Alt Hyp NOEL LOEL TOEL TOX Units Untransformed C > T 50 100 70.71 Fisher Exact Test Conc-yg/L Test Stat P-Type P-Value Dacision(a:5%) Lab Control 25 0.000 Exact 0.000 Non-Significant Effect 96h Survival Rate Frequencies Conc-yg/L Code NR R NR + R Prop R %Effect 0 LC 20 0 20 1.000 0.000 0.00% 0 LC 20 0 20 1.000 0.000 0.00%	-						-							
Untransformed C > T 50 100 70.71 Fisher Exact Test Control vs Conc-µg/L Test Stat P-Type P-Value Decision(a:5%) Lab Control 25 1.000 Exact 1.0000 Non-Significant Effect 98h Survival Rate Frequencies Conc-µg/L O 20 1.000 0.000 0.00% 20 LC 20 0 20 1.000 0.000 0.00% 50 LC 20 0 20 1.000 0.000 0.00% 50 19 1 20 0.950 0.050 5.00% 100 13 7 20 0.650 1.000 1.000 0.000	Edit Da	ite:	26 Ap	or-23 11:45		1D5 Hash: 1D	//UE2/1466	SOAOD9BBA	0485AD912	2D6F Edi	tor ID:	007-803	-386-7	
Fisher Exact Test Control vs Conc-µg/L Test Stat P-Value Decision(c:5%) Lab Control 25 1.000 Exact 1.0000 Non-Significant Effect						р							5	
Control vs Conc-µg/L Test Stat P-Type P-Value Decision(c:5%) Lab Control 25 1.000 Exact 1.0000 Non-Significant Effect					C > 1				50	100	70.71			
Lab Control 25 1.000 Exact 1.0000 Non-Significant Effect 96h Survival Rate Frequencies 0.004 Exact 0.0042 Significant Effect 0 LC 20 0 20 1.000 0.004 50 100 0.004 Exact 0.0042 Significant Effect Significant Effect Significant Effect Onc-ug/L Code NR R NR + R Prop NR Prop R %Effect 0 LC 20 0 20 1.000 0.000 0.00% 50 19 1 20 0.950 0.050 5.00% 100.00% 400 0 20 20 0.000 1.000 100.00% 96h Survival Rate Summary Code Count Mean 95% LCL 95% UCL Median Min Max Std Err CV% %Eff 0 LC 2 1.000 1.000 1.000 1.000 0.000 0.000 0.000 2 0.950			Test											
50 100* 0.500 0.004 Exact Exact 0.500 0.004 Non-Significant Effect Significant Effect 98h Survival Rate Frequencies Conc-ug/L Code NR R NR+R Prop NR Prop R %Effect 0 LC 20 0 20 1.000 0.000 0.00% 5.00% 50 19 1 20 0.950 0.500 35.00% 5.00% 100 . 13 7 200 0.600 1.000 1.000 0.000% 0.00% 200 20 20 0.000 1.000 1.000 1.000 1.000 0.00% 200 20 20 0.000 1.000 1.000 1.000 1.000 0.00% 980h Survival Rate Summary Cone-ug/L Code Count Mean 95% LCL 95% UCL Median Min Max Std Err CV% %Effect 0 LC 2 1.000 1.000 1.000 1.000 0		-	VS		/L									
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200 2 0.000 0.000 0.000 0.000 0.000 0.000 0.000 100. 2 0.000 0.000 0.000 0.000 0.000 0.000 100. Graphics	50				2	0.950	0.315	1.000	0.950	0.900	1.000	0.050	7.44%	5.00%
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Graphics 1.0 0.9 0.8 0.7 0.6 0.5 0.5 0.5 0.4 0.2 0.2 0.1 0.1 0.0 0.4 0.2 0.1 0.1 0.0 0.4 0.1 0.0 0.4 0.1 0.0 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	200				2	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
1.0 0.9 0.8 0.7 0.6 0.6 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	400				2	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
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Conc-µg/L



CET	IS An	alytica	al Rep	oort			eport l est Co	Date: de/ID:	26 Apr-23 11:47 (p 1 of 230413omra / 04-5815-177						
Acut	e Fish S	urvival	Test						Nautil	us Environi	mental (CA)				
Anal	ysis ID: yzed: Date:	26 Apr	8-7445 -23 11:4 -23 11:4		Analys	sis:	96h Survival I Untrimmed S 1D770E2714	pearman-Kä		12D6F		S Version: Is Level: In ID:	CETISv 1 007-803		
Spea	arman-K	ärber Es	stimates	5											
Thre	shold O	ption		Thresh	old "	Trim	Mu	Sigma	EC50	95%	LCL	95% UCL			
Cont	rol Thres	shold	1	0	(0.00%	2.03	0.0353	107	91.1		126			
96h S	Survival	Rate Su	ımmary	,	_			Calculate	ed Variate(/	√В)				Isoto	nic Variate
Conc	c-µg/L	C	Code	Cou	nt I	Mean	Median	Min	Мах	CV%	6	%Effect	ΣΑ/ΣΒ	Mean	%Effect
0 25 50 100 200 400		L	-C	2 2 2 2 2 2 2	((1.000 1.000 0.950 0.650 0.000 0.000	1.000 1.000 0.950 0.650 0.000 0.000	1.000 1.000 1.000 0.950 0.900 1.000 0.650 0.600 0.700 0.000 0.000 0.000		0.00 0.00 7.44 10.8	% %	0.00% 0.00% 5.00% 35.00% 100.00%	20/20 20/20 19/20 13/20 0/20 0/20	1.000 1.000 0.950 0.650 0.000 0.000	0.00% 0.00% 5.00% 35.00% 100.00% 100.00%
96h Survival Rate	1.0	50	100	150	200	250	300 350) 400							
					onc-µg/	L.									





Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2016	Jul	27	14:00	83.55	0.6417	0.0181			03-8490-8254	08-7411-8094
2		Aug	30	13:05	90.13	7.215	0.2035			06-6522-4245	11-7821-6703
3		Oct	17	15:45	31.5	-51.41	-1.45			11-9706-2514	03-3027-4661
4		Dec	15	13:00	59.46	-23.45	-0.6613			07-2059-1930	21-0698-8947
5	2017	Jul	21	11:45	75.79	-7.124	-0.2009			12-6230-4373	10-5665-4943
6		Aug	10	13:35	119.1	36.15	1.02			09-7390-4688	11-1885-9400
7		Sep	26	15:10	120.1	37.16	1.048			12-0767-7259	14-1478-0761
8		Nov	14	11:25	96.22	13.31	0.3754			21-0521-5529	14-2305-2435
9	2018	Feb	15	15:00	114.5	31.63	0.892			08-5122-1964	18-9847-1069
10		Sep	20	14:05	114.9	31.96	0.9013			14-1527-8451	21-3828-6142
11		Oct	10	16:40	72.55	-10.36	-0.2922			06-8408-1163	05-7761-5868
12		Nov	28	12:00	35.36	-47.55	-1.341			21-0374-7072	19-9377-5872
13	2019	Mar	12	12:10	93.3	10.39	0.2931			11-1972-1376	05-1051-7815
14		Nov	14	11:55	77.34	-5.574	-0.1572			08-3948-6775	01-9304-4998
15	2020	Jan	16	12:50	30.63	-52.28	-1.474			15-5355-8442	09-8383-1081
16		Dec	2	13:30	133.3	50.42	1.422			07-0223-4669	10-8492-8883
17	2021	Aug	19	14:25	65.98	-16.93	-0.4776			11-4973-5943	08-1400-5422
18	2022	May	19	12:45	93.3	10.39	0.2931			03-2996-8953	07-9626-2312
19		Nov	2	10:05	136.6	53.69	1.514			14-6511-1746	10-0042-0505
20	2023	Feb	15	11:30	14.71	-68.2	-1.923			17-0773-8757	02-8314-6307
21		Apr	13	15:15	107.2	24.27	0.6844			04-5815-1771	04-7188-7445



Freshwater Acute Bioassay Static Conditions DF-019

Dangerous Waste Characterization

Water Quality Measurements & Test Organism Survival

Client: Internal

Sample ID: CuCl₂

Test No .: 230413 OMra.

Test Species:	O. mykiss		
Start Date/Time:	4/13/23	1515	
End Date/Time:	4/17/23	1515	

Concentration				umbe			Conductivity						Temperature					Disso					Dereent				
(µg/L)	RAND #	STATISCH.	C. Strendstory	Orgai		100000000000000000000000000000000000000	-		nhos/	1	1. State State State			(°C)			014	Q14	(mg/L	Q14	214			(units)		Percent Survival
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	Survival
Lab Control	10	10	10	10	10	10	· ·	302			323	11.2	11.0	11.4	11.0	11.0	11.5	10,6	9;7	9.9	9.9	8.04		1.52		7.46	100
	8	10	10	10	10	10	321	305	304	336	330	11.2	11,0	11.3	(1.1	η.Ν	11.4	10,3	9,6	9.8	9.8	8.04	7.67	7.53	7.45	7.47	100
25	9	10	10	10	10	10	322	306	304	337	331	11.4	011,0	11.4	11.0	11.0	11.4	10,4	9.6	9.9	9.9	8.06	7.67	7.54	7.48	7.48	100
	5	10	10	10	10	10	322	306	304	336	330	11.3	11.1	11,4	11.2	11.3	11.4	10.4	9,4	9.6	9.6	8.06	7.67	7.52	7.47	7.45	100
50	7	10	10	9	9	9	322	306	305	336	330	11.4	11.1	11.4	11.1	11.1	11.5	10,2	9.2	9.8	9.3	8.02	7.67	7,50	7.44	7.43	90
	4	10	10	10	10	10	322	308	307	3390	331	11.6	12.1	12.4	12.0	12.1	11.3	9.8	9,0	9.3	9.3	8.02	7,66	7.50	7.49	7.44	100
100	12	10	10	7	7	7	322	306	304	3290	331	11.0	11.0	11.2				10.5				-	7.68				70
	3	10	8	6	φ	6		307				11.6		12,4				9,9						7.51			60
200	1	10	5	0			· · · ·	308				11.7	11.9				11.3	10,0	(0,0)				7.64			-	0
	11	10	3	0			322	307	304			11.1	11.0	11.3			11 5	10.6	10,6					7.61			0
400	2	10	2	0			321	308	305			11.7			~		. 11	10,2					7.62	7.62			0
	6	10	0	~			321	306	Las			11.3	11.1	-		\searrow	11.4	10.9	-				7.63	-			0
Tech Initiales	Counts	NH 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1												1.1	orded												
Tech Initials:	Readings	DR	WF	WF	KR	OR-																					
	QC	HITIKR									Envir	onme	ntal Ci	hambe	er:		F	•									
Dilution Calcs (fin	al volume	8L)		n	ade b	y: F-T																				1	3049
Conc. μg/L		25	50	100	200	400				٧	Veight	ts (g):	0.346	0.292	0.27	50.341	0,310	0.25	10.34	0 0.234	10.282	0.30	6			µ≡_₫	304 g
Vol. Cu stock add	ed (mL)	2.0	41	8.2	V6.3	32.7																				B	
Cu Stock Conc. (µ	ıg/L)	18000	48000	98000	4800	78900				Ler	ngths ((mm):	31.5	31.0	30.5	33,0	31.5	30.5	31.5	29,0	30,0	31.	5			µ=_3	1.0 cm
										Loa	dina:	D.	49	-97	τΟ	.38	9/2						l ei	ath m			9.0/33.0
Animal S	ourco/Date	Poor	aivadı	_	Π.,		T.)	1								.		İnch	2	Ra	atio of	longe				
Animai S	ource/Dau	Date Received: Thomas Fish Co/ 4/4/23 Hatch Date: 2/26/23																									
	Swim-up Date: 3/12/23																										
Commonter		b40		fich		oulfi	- 1 4 م ا	141-41-		dance of		mette	-		•	t Swin			32						<u> </u>		
Comments:	^b 10 random fish are sacrificed at initiation for size determination. The standard length of the longest fish should be no (B) Q18 LAT 4/13/23												no mo	ore tha	n 2X t	he sho	ortest	tish.									
	0.			in O	71()	127	U.	na		11 11	1010	<u></u>													,		
QC Check:	RL 4	1126	123																		Fir	nal Re	view:]	Ars Y	126/2	-3	

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.