Final Report

Restoration of Local Recharge Sources from Invasive Dreissenid Mussels



Prepared for: Metropolitan Water District of Southern California City of Santa Ana Orange County Water District





January 2022



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- Copies to:Water Replenishment District of Southern California
United Water Conservation District
Main San Gabriel Basin Watermaster
Central Basin Municipal Water District
California Department of Fish and Wildlife
California Department of Water Resources
- Authors: Kelly Stockton-Fiti, KASF Consulting Emily Owens-Bennett, P.E., Trussell Liana Olivas, Trussell Chao-Chun Yang, Trussell
- Reviewers: David Hokanson, Ph.D., P.E., BCEE, Trussell Rhodes Trussell, Ph.D., P.E., BCEE, Trussell Adam Hutchinson, PG, CHG, OCWD Christine Pham, OCWD Megan H. Plumlee, Ph.D., P.E., OCWD

Table of Contents

TABLE	E OF CONTENTS	3
LIST C	OF FIGURES	4
LIST C	OF TABLES	4
1 EX	CECUTIVE SUMMARY	5
2 IN	TRODUCTION	7
3 C	OST SUMMARY	9
4 SC	CHEDULE SUMMARY	
5 ST	FUDY RESULTS AND ANALYSIS	14
5.1 5.2	SUSCEPTIBILITY OF QUAGGA VELIGERS TO EARTH TEC QZ SUSCEPTIBILITY OF NON-TARGETS TO EARTHTEC QZ	
5.3 5.4 5.5	RAW WATER QUALITY STUDY GOALS AND OBJECTIVES MAJOR PROBLEMS IN ACHIEVING STUDY GOALS AND OBJECTIVES	
5.6	APPLICATION OF STUDY TO OTHER AREAS OF THE REGION	
6 C	ONCLUSION	
6.1 6.2	LESSONS LEARNED NEXT STEPS OF THE STUDY	
ACKN	OWLEDGEMENTS	
REFE	RENCES	

APPENDIX A. TECHNICAL MEMORANDUM 1 EVALUATION OF EARTHTEC QZ VELIGER TREATMENT

APPENDIX B. TECHNICAL MEMORANDUM 2 TOXICITY ASSESSMENT



List of Figures

Figure 1-1. Mortality with cumulative exposure to EarthTec QZ (hours x mg/L copper)	6
Figure 5-1. Map of Study sample locations in Southern California	15
Figure 5-2. Veliger dose-response mortality	17
Figure 5-3. Veliger mortality for cumulative exposure to EarthTec QZ	19
Figure 5-4. Average acute toxicity for (A)water flea; (B)rainbow trout; and (C)fathead	
minnow with EarthTec QZ following 96=hour exposure durations	21
Figure 5-5. Mortality with cumulative exposure to EarthTec QZ	22
Figure 5-6. Veliger mortality with exposure to EarthTec QZ	26
Figure 6-1. Mortality of quagga mussel veligers for 3 µL/L EarthTec QZ	30

List of Tables

Table 1-1. Sampling site location and owner	5
Table 3-1. Summary of project costs incurred and FSA funds dispersed	
Table 4-1. Summary of project efforts by task	
Table 4-2. Study schedule	
Table 5-1. Time-Dose variable calculation	
Table 5-2. Raw water quality	24
Table 5-3. Size class distribution of veligers used in testing	
Table 5-4. Average percent veliger mortality observed at each location	

1 Executive Summary

Invasive quagga mussels (Dreissena bugensis) have impacted critical imported water systems in Southern California, which restricts the beneficial uses of affected reservoirs, rivers, streams, and recharge basins. A study entitled "Restoration of Local Recharge Sources from Invasive Dreissenid Mussels" (Study) was conducted to evaluate the efficacy of the molluscicide EarthTec QZ[™] (active ingredient is copper sulfate pentahydrate) in controlling the veliger stage of quagga mussels, which is the larval stage when the guagga mussels are mobile. For the remainder of this report, guagga mussel veligers will be referred to as veligers. Veliger mortality was evaluated via bench-scale testing using veligers collected from three Southern California locations identified in Table 1-1 – Lake Piru, Lake Mathews, and Weymouth Water Treatment Plant (WTP). Lake Piru is a mix of State Water Project water and local run-off and Lake Mathews is Colorado River Aqueduct water. The Weymouth WTP receives untreated water from two sources: Colorado River water from Lake Mathews via the Upper Feeder and State Water Project (SWP) water from the East Branch of the SWP via the Rialto Pipeline or from the Upper Feeder via the Etiwanda Pipeline from the Rialto Pipeline. During this study, sampling at the Weymouth WTP was during periods of exclusive delivery of Colorado River water from Lake Mathews that had been chlorinated prior to entering the Upper Feeder. The travel time from Lake Matthews to the Weymouth WTP is approximately 8 hours. The same experimental conditions were used for each of the locations: a range of EarthTec QZ concentrations and exposure times at two different testing temperatures.

Sampling Site	Location	Owner
Lake Piru	Ventura County, CA	United Water Conservation District
Lake Mathews	Riverside County, CA	Metropolitan Water District of Southern California
Weymouth WTP	La Verne, CA	Metropolitan Water District of Southern California

EarthTec QZ was able to produce 100% veliger mortality; however, several variables contributed to the efficacy of EarthTec QZ on veliger mortality, including EarthTec QZ dose, exposure duration, sampling location, and site-specific water quality. Veliger mortality was found to increase with both EarthTec QZ dose and exposure time. The veligers collected from Weymouth WTP exhibited the highest response to EarthTec QZ at lower concentrations and shorter exposure times, compared to the same conditions tested at Lake Mathews and Lake Piru. This is likely due to the cumulative exposure to chlorine and EarthTec QZ for the veligers collected from Weymouth WTP.

The toxicity of EarthTec QZ to veligers from each test location was compared to that of non-target indicator organisms (water flea, rainbow trout, or fathead minnow) from all locations using a time-dose variable representing total exposure (Figure 1-1), presented in terms of hours x mg/L of copper. Non-target organisms were exposed to EarthTec QZ for 96 hours, following standard test methods for measuring the acute toxicity of

effluents and receiving water to freshwater and marine organisms (EPA-821-R-02-012, 2002; EPA/600/4-90/027F, 1993). Water fleas and rainbow trout were very sensitive to EarthTec QZ and fathead minnows were the least susceptible. Veligers had similar sensitivity to EarthTec QZ as the water fleas and rainbow trout.

The Study results can be applied to other Southern California waterbodies with high hardness values and similar alkalinity and DOC levels. Since variations of mortality results were observed, which were attributed to water quality parameters, it is recommended that site-specific field assessments be conducted to assess the appropriate dose and exposure time to achieve the desired mortality. During field treatment, veliger mortality should be monitored along with relevant water quality parameters – hardness, alkalinity, dissolved organic carbon, pH, dissolved oxygen, temperature, and ions. To limit exposure of EarthTec QZ and resulting toxicity to non-target aquatic organisms, it is ideal to identify treatment configurations that allow for long exposure times to veligers with a low dose of EarthTec QZ (e.g., within an aqueduct or pipeline) prior to discharge to a lake, river, or stream.

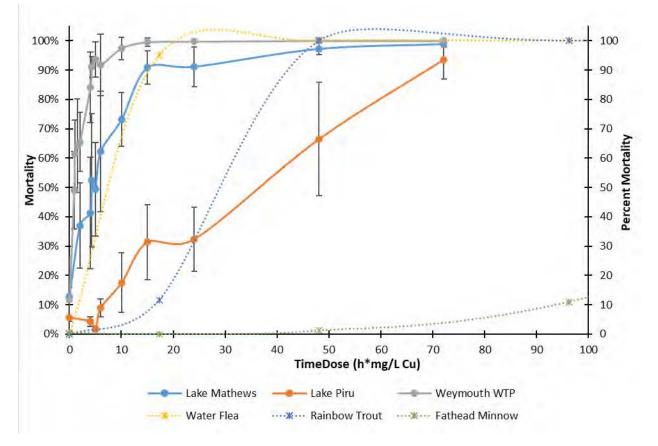


Figure 1-1. Mortality with cumulative exposure to EarthTec QZ (hours x mg/L copper) For veligers by location, plus water flea, rainbow trout, and fathead minnow (non-target indicator results for all locations combined).



Key lessons learned from the Study include the following:

- Although a prior study with veligers exposed to EarthTec QZ in water from Lake Mead found 100% mortality at 3 µL/L EarthTec QZ with 30 minutes of exposure time, the 3 µL/L EarthTec QZ dose did not result in 100% veliger mortality with any of the southern California waters tested as part of this Study, even after 24 hours of exposure time.
- No tested concentration of EarthTec QZ achieved 100% veliger mortality with an exposure duration of 30 minutes.
- The use of a 24-hour recovery period, during which veligers were exposed to clean water following each tested exposure duration with EarthTec QZ, allowed for improved determination of veliger mortality.
- Lower doses of EarthTec QZ are safer for non-target aquatic organisms but require longer contact time to achieve high veliger mortality.

2 Introduction

The communities of Southern California rely heavily on water supplied from the Colorado River Aqueduct (CRA) and California State Water Project (SWP). These vital water supplies are conveyed hundreds of miles from their sources and stored within a network of reservoirs. Since 2007, invasive quagga mussels (Dreissena bugensis) have spread from Lake Mead in Nevada through the CRA system to many California lakes, reservoirs, and watersheds that receive raw water from the CRA. MWD implements guagga mussel controls on the CRA system, including chlorination, desiccation, and physical removal. Quagga mussels in the SWP system have been more limited, to-date, with detections in Pyramid Lake, Castaic Lake, and Lake Piru, as well as downstream rivers and streams.

The presence of quagga mussels in imported water systems threatens the beneficial uses of the reservoirs, rivers, streams, and recharge basins. Key uses include providing habitat for aquatic species, recharging groundwater with local and imported water, storing local runoff, and facilitating flood control. The California Department of Fish and Wildlife (CDFW) requires impacted facilities to implement control strategies and complete monitoring to prevent the spread of invasive guagga mussels. Desiccation (allowing a basin or stream bed to dry) is the primary control method for quagga mussels, but this strategy can only be implemented on a small scale. Without a viable quagga mussel control strategy for rivers and reservoirs, the use of the imported water systems for valuable groundwater replenishment has been restricted.

This Study, entitled "Restoration of Local Recharge Sources from Invasive Dreissenid Mussels" was conducted to evaluate the efficacy of the molluscicide EarthTec QZ (active ingredient is copper sulfate pentahydrate) for controlling guagga veligers (veligers for the remainder of this report), which are the larval stage of the mussels. Five rounds of bench-scale dose-response testing were completed between December 2019 and July 2021 using veligers collected from three Southern California locations impacted by guagga mussels representing distinct water gualities (SWP with local

runoff, CRA, and combined impact of CRA water with pipeline chlorine treatment). For each round of testing, veligers were exposed to five concentrations of EarthTec QZ at two temperatures and mortality was evaluated over a range of hold times. This robust testing matrix allowed for comparison of veliger mortality based on EarthTec QZ concentration, exposure time, cumulative time-dose exposure, veliger size, and site-specific water quality.

In addition to assessing veliger mortality with exposure to EarthTec QZ, the Study also measured residual free and total copper for all test conditions along with other water quality parameters. Acute toxicity of EarthTec QZ to three non-target aquatic indicator species was also evaluated. Limiting the EarthTec QZ dose and residual total copper concentration is important if this treatment strategy is going to be viable for use on a larger scale. Residual copper levels must be compatible with the United States Environmental Protection Agency (USEPA) regulations for copper in drinking water, which include an action level of 1.3 mg/L as Cu and a secondary maximum contaminant level (sMCL) of 1.0 mg/L as Cu. The toxicity of EarthTec QZ in aquatic organisms is also an important consideration, as the imported water systems, associated reservoirs, and potential conveyance systems for recharge provide habitat for a variety of aquatic organisms.

This Final Report provides an overview of the Study efforts, summarizes results and key findings, and puts these findings in context by identifying lessons learned and potential next steps. In addition, this document compares the costs incurred and funds distributed to support the Study with the planned budget. Finally, the project schedule is discussed, along with adjustments made over the course of the Study, and the tasks accomplished.

Overall, EarthTec QZ was found to be effective in controlling veligers with exposure times of 24 hours or less. The efficacy of this treatment method varied as a function of the EarthTec QZ dose concentration, exposure duration, and site-specific water quality. Transitioning from the proof-of-concept bench-scale testing approach adopted for the Study, it is recommended to complete additional site-specific testing to optimize EarthTec QZ dosing and exposure times based on available full-scale treatment configurations (e.g., pipeline, basin, tank, lake).

The Study was conducted by Trussell Technologies (Trussell), KASF Consulting, and Orange County Water District (OCWD). Funding was provided by the Metropolitan Water District of Southern California (MWD) Future Supply Actions Funding Program, along with project partners including OCWD, the Water Replenishment District of Southern California (WRD), the United Water Conservation District (UWCD), the Main San Gabriel Basin Watermaster, and the Central Basin Municipal Water District (CBMWD). Additional technical assistance and support were provided by CDFW and the California Department of Water Resources (DWR). As a member agency of MWD, the City of Santa Ana was involved as a partner with OCWD and thus the FSA funding agreement with MWD was between MWD and the City of Santa Ana.

3 Cost Summary

Cumulative costs and funds disbursed (May 2019 through September 2021) associated with the original Study scope of work (testing at 4 locations) are summarized by invoice and task in Table 3-1. All project costs that are reported in Table 3-1 were incurred by Trussell and project partner KASF Consulting. The FSA funds were dispersed from MWD to the City of Santa Ana, then to the project team, and the totals are summarized in Table 3-1.

The originally planned budget that was funded through the FSA Funding Program with additional financial support from the aforementioned project partners included a single round of testing at four different locations. Challenges with scheduling in the first half of 2020 related to Covid-19 restrictions precluded sampling from one of the original test locations, OCWD's OC-28 turnout. The project team met with MWD to identify an alternative sampling location with representative water quality (chlorinated water from Lake Mathews) and Weymouth WTP was determined to be the most appropriate location. Both Weymouth WTP and OC-28 receive water from Lake Matthews with nearly the same travel time. As a result, both locations are essentially equivalent having equal contact times with the chlorine dosage. Since Weymouth WTP was already one of the project test locations, it was decided to complete another round of testing at both Weymouth WTP and the upstream Lake Mathews location in 2021. This resulted in five rounds of testing overall, which would allow for investigation of seasonality variability and variability of the quagga veliger size distribution. The fifth round of testing was funded separately by OCWD, WRD, Main San Gabriel Basin Watermaster and CBMWD, without additional funding from the FSA Funding Program; the associated costs from the fifth round of testing are thus not reflected in Table 3-1.

Table 3-1. Summary of project costs incurred and FSA funds dispersed

	Cost Incurred and Funds Disbursed Thoughout the Duration of the Study																					
Task No.	Cost Estimate from FSA Agreem between City of Santa An Task No. and Metropolita		Invoice No. 18928001Rev3 (2019)		8928001Rev3 189280028		Invoic 1892 (2020	8003	Invoid 1892 (2020	8004	Invoid 1892 (2020	8005		:e No. 8006 1 Q1)	Invoic 1892 (2021	3007	Invoid 1892 (202:	8008	Invoice		Invoice No. 18928009 Retention	Total Funds Disbursed (Invoice
	Total Study Cost	Requested Metropolitan Funding Match	Costs Incurred	Funds Disbursed	Costs Incurred	Funds Disbursed	Costs Incurred	Funds Disbursed	Costs Incurred	Funds Disbursed	Costs Incurred	Funds Disbursed	Costs Incurred	Funds Disbursed	Costs Incurred	Funds Disbursed	Costs Incurred	Funds Disbursed	Costs Incurred	Funds Disbursed	Funds Disbursed	Totals plus Retention)
Task 1: Evaluation of EarthTec OZ																						
Veliger Treatment	\$154,180	\$77,090	\$71,039.09	\$35,519.55	\$6,504.82	\$3,252.41	\$500.00	\$250.00	\$36,935.93	\$18,467.97	\$3,747.09	\$1,873.55	\$9,352.50	\$4,676.25	\$200.00	\$100.00	\$25,865.72	\$12,932.86	\$154,145.15	\$77,072.59		\$77,072.59
Task 2: Toxicity Assessment	\$62,228	\$31,114	\$19,364.56	\$9,682.28	\$1,910.00	\$955.00	\$0.00	\$0.00	\$10,509.94	\$5,254.97	\$12,890.00	\$6,445.00	\$12,520.00	\$6,260.00	\$540.00	\$270.00	\$4,492.50	\$2,246.25	\$62,227.00	\$31,113.50		\$31,113.50
Task 3: Project Management	\$29,184	\$14,592	\$16,062.50	\$8,031.25	\$4,778.00	\$2,389.00	\$5,155.00	\$2,577.50	\$2,910.00	\$1,455.00	\$0.00	\$0.00	\$270.00	\$135.00	\$0.00	\$0.00	\$0.00	\$0.00	\$29,175.50	\$14,587.75		\$14,587.75
Subtotals	\$245,592	\$122,796	\$106,466.15	\$53,233.08	\$13,192.82	\$6,596.41	\$5,655.00	\$2,827.50	\$50,355.87	\$25,177.94	\$16,637.09	\$8,318.55	\$22,142.50	\$11,071.25	\$740.00	\$370.00	\$30,358.22	\$15,179.11	\$245,547.65	\$122,773.84		\$122,773.84
Retention @ 25%				-\$13,308.27		-\$1,649.10		-\$706.88		-\$6,294.48		-\$2,079.64		-\$2,767.81		-\$92.50		-\$3,794.78		-\$30,693.46	\$30,693.46	\$0.00
Totals	\$245,592	\$122,796	\$106,466.15	\$39,924.81	\$13,192.82	\$4,947.31	\$5,655.00	\$2,120.62	\$50,355.87	\$18,883.46	\$16,637.09	\$6,238.91	\$22,142.50	\$8,303.44	\$740.00	\$277.50	\$30,358.22	\$11,384.33	\$245,547.65	\$92,080.38	\$30,693.46	\$122,773.84
Note: Reported cost		ed disbursemen			•					the date of this	Final Report,	but are not ant	icipated to ch	ange.								

Invoice No. 18928002Rev2 Costs Incurred for Task 1 includes a \$0.18 deduction due to a prior overcharge in Invoice No. 18928001Rev3. Invoice No. 18928005 Costs Incurred for Task 1 includes a \$32.91 deduction due to a prior overcharge in Invoice No. 18928004.

4 Schedule Summary

This collaborative Study involved multiple meetings with various stakeholders, planning efforts for the veliger and non-target toxicity testing, permitting for collection of invasive quagga mussels, field sampling and testing, as well as reporting. A summary of the main project efforts and deliverables is provided in Table 4-1.

Project Effort	Timing									
Task 1 Evaluation of EarthTec QZ V	eliger Treatment									
Veliger Dose-Response Test Plan	Q2 2019									
CDFW Scientific Collecting Permit Approval	Q4 2019									
Lake Piru Testing	Q4 2019									
Lake Mathews Testing, Part 1	Q3 2020									
Weymouth WTP Testing, Part 1	Q3 2020									
Draft Technical Memorandum 1	Q4 2020									
Lake Mathews Testing, Part 2	Q3 2021									
Weymouth WTP Testing, Part 2	Q3 2021									
Final Technical Memorandum 1	Q3 2021									
Task 2 Toxicity Assessment										
Non-Target Toxicity Test Plan	Q2 2019									
Lake Piru Testing	Q4 2019									
Lake Mathews Testing, Part 1	Q3 2020									
Weymouth WTP Testing, Part 1	Q3 2020									
Draft Technical Memorandum 2	Q4 2020									
Lake Mathews Testing, Part 2	Q3 2021									
Weymouth WTP Testing, Part 2	Q3 2021									
Final Technical Memorandum 2	Q3 2021									
Combined Task 1 and 2 E	Efforts									
Project Kickoff Meeting	Q2 2019									
Stakeholder Review Meeting (Internal)	Q2 2019									
FSA Funding Agreement Meeting	Q1 2020									
Semi Annual Progress Report 2019 No. 1	Q1 2020									
Semi Annual Progress Report 2020 No. 1	Q3 2020									
Semi Annual Progress Report 2020 No. 2	Q1 2021									
Draft Final Report	Q3 2021									
Final Report	Q4 2021									
Task 3 Project Manager	nent									
Webinar Presentation of Final Report	Q4 2021									

The Study schedule is provided in Table 4-2. Yellow shading represents the original schedule established in the Final Agreement between MWD and the City of Santa Ana,

and blue shading (or cross hatching where the original and actual schedules coincided) represents the actual timing of project activities.

A Specific Use Scientific Collecting Permit is required by CDFW prior to collecting, transporting, or using quagga veligers in any tests. This effort was not anticipated as part of the original project planning, and testing was delayed until the permit was secured. The project team worked with CDFW to apply for this permit and provide the supporting documentation. The permit was finalized in November 2019, and the first round of testing at Lake Piru was completed in December 2019.

As discussed in Section 3, testing planned for Lake Mathews, Weymouth WTP, and OCWD's OC-28 turnout in quarter 2 of 2020 was delayed due to Covid-19 restrictions. The OC-28 turnout location was unavailable in fiscal year 2021, and the project team worked with MWD to identify Weymouth WTP as the most appropriate surrogate location for OC-28. Repeating the testing at Weymouth WTP was expected to also introduce some seasonal variability in the veliger size and water quality. Considering the benefit of the repeat testing, as well as the desired correlation of the veliger dose-response for Weymouth WTP with the upstream, unchlorinated water from Lake Mathews, OCWD, WRD, Main San Gabriel Basin Watermaster and CBMWD funded one additional round of testing at Lake Mathews in July 2021. These additional 2021 testing efforts delayed the development of the Final Report.

Table 4-2. Study schedule

The original plan is indicated in yellow, with actual timing indicated in blue; where these period coincide, the shading is striped.

		Jan- Mar	Apr- Jun	Jul- Sep	Oct- Dec	Jan- Mar	Apr- Jun	Jul- Sep	Oct- Dec	Jan- Mar	Apr- Jun	Jul- Sep	Oct- Dec
Task	Task Name		20	19			20	20	•	2021			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Collect and compile available data												
1	Develop Draft Veliger Dose Response Test Plan												
1	Stakeholder Review Meeting 1												
1	Finalize Veliger Dose Response Test Plan												
1	Obtain Scientific Collecting Permit from CDFW												
1	Conduct Field Sampling/Dose Response Testing												
1	Compile Results												
1,2	Semi-Annual Progress Report 2019 No. 1 (May 2019 – December 2019)												
1	Conduct Additional Sampling (If needed)												
1,2	Semi-Annual Progress Report 2020 No. 1 (January 2020 – June 2020)												
1	Compile Season 2 Results (If needed)												
1	Stakeholder Review Meeting 2 (If needed)												
1	Prepare Draft Technical Memorandum 1												
1	Review Draft Technical Memorandum 1												
1	Submit Final Technical Memorandum 1												
1,2	Semi-Annual Progress Report 2020 No. 2 (July 2020 – December 2020)												
2	Develop Toxicity Test Plan												
2	Stakeholder Review Meeting 1												

Einal Report: Quagga Mussel Evaluation

		Jan- Mar	Apr- Jun	Jul- Sep	Oct- Dec	Jan- Mar	Apr- Jun	Jul- Sep	Oct- Dec	Jan- Mar	Apr- Jun	Jul- Sep	Oct- Dec
Task	Task Name		20	19			20	20		2021			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
2	Finalize Toxicity Test Plan												
2	Conduct Toxicity Testing												
2	Compile Results												
2	Conduct Additional Testing (If needed)												
2	Compile Season 2 Results (If needed)												
2	Stakeholder Review Meeting 2 (If needed)												
2	Prepare Draft Technical Memorandum 2												
2	Review Draft Technical Memorandum 2												
2	Submit Final Technical Memorandum 2												
1,2	Draft Final Report												
1,2	Final Report												
3	Symposium Presentation of Study Findings												
3	Project Management												

5 Study Results and Analysis

Three locations, indicated in Figure 5-1, were sampled over a two-year period of December 2019 to July 2021: Lake Piru, Lake Mathews, and Weymouth WTP. Lake Piru is managed by UWCD. This reservoir, located in Ventura County, CA, impounds storm flows from the Piru Creek watershed and supplemental imported SWP water supplied by DWR via Pyramid Lake. Lake Mathews, a reservoir located in Riverside County, CA owned and operated by MWD, is primarily used to store CRA water. Water from Lake Mathews is delivered into raw water pipelines that are dosed with chlorine for quagga mussel control. One location that receives chlorinated Lake Mathews water is MWD's Weymouth WTP which is connected to the Upper Feeder pipeline (Figure 5-1). Testing was completed on samples from a) Lake Piru in December 2019, b) Lake Mathews in September 2020 and July 2021, and c) Weymouth WTP in September 2020 and June-July 2021.



Figure 5-1. Map of Study sample locations in Southern California

5.1 Susceptibility of Quagga Veligers to Earth Tec QZ

Live guagga veligers and raw water were collected from each aforementioned location. Subsets of the collected veligers were placed in beakers with raw water for testing a range of EarthTec QZ doses, various exposure times, and two different temperatures (15°C and 20°C). The same test conditions were repeated using water from each location. The range of EarthTec QZ (ET) doses tested include 0, 3.0, 16.7, 33.4, 50.1 µL/L (equivalent to 0, 0.18, 1.0, 2.0, and 3.0 mg/L as Cu). Copper ions are the active ingredient in EarthTec QZ that cause veliger mortality. Veliger mortality was evaluated with the Fast Green method (Stockton-Fiti and Claudi 2017) after 0.5, 2, 5, and 24 hours of exposure time (i.e., end mortality) for each EarthTec QZ dose and temperature condition. Directly following this count at the end of the exposure time, the veligers were placed in a beaker and exposed to raw sample water (without the addition of EarthTec QZ) for a 24-hour recovery period. A final mortality assessment was made at the end of the recovery time to allow for analysis of delayed mortality. The complete set of quagga veliger dose-response results from each location is summarized in a separate Technical Memorandum 1 (TM1) in Appendix A. The discussion in this Final Report is focused on significant trends and findings from TM1.

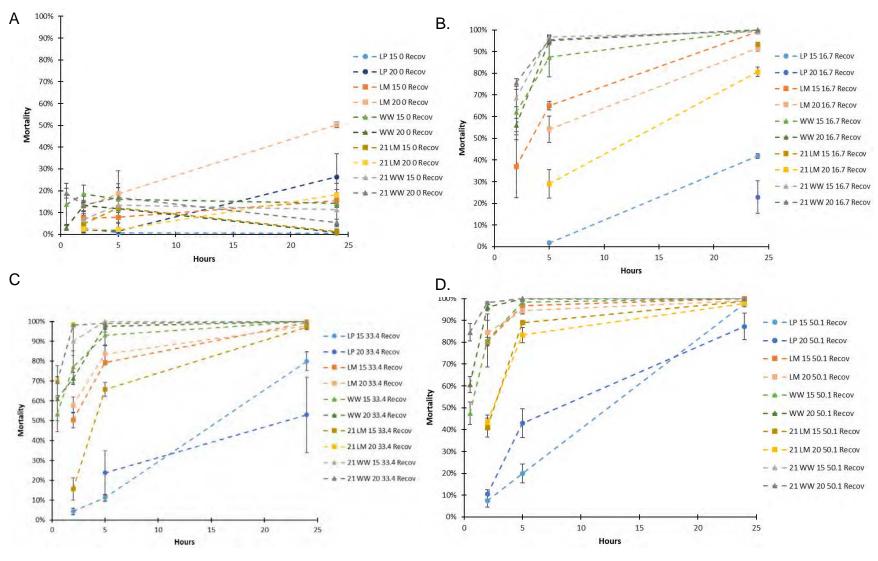
In general, veliger mortality increased with EarthTec QZ dose at all sampling locations. Veliger mortality increased with exposure time to EarthTec QZ (see TM1 in Appendix A for individual site results). Recovery mortality results for all three locations were greater

than the corresponding end mortality assessment for each condition. Considering the objective of the study to characterize the impact of EarthTec QZ treatment on the quagga veligers, the recovery results are displayed in this Final Report; all data can be found in TM1 (Appendix A). Statistical analysis showed that EarthTec QZ concentration, exposure duration, and location were significant variables. Recovery mortality results for veliger dose-response test conditions are presented in Figure 5-2.

Weymouth WTP veligers were the most susceptible to EarthTec QZ, exhibiting higher mortality in shorter times at lower concentrations (Figure 5-2) when compared with the corresponding results from Lake Piru and Lake Mathews. The results for the 16.7 μ L/L EarthTec QZ dose (1.0 mg/L as Cu) test condition (see Figure 5-2 part B) are the main point of reference for assessing the efficacy of EarthTec QZ as a viable treatment strategy. This corresponds to the established drinking water limits for copper of 1.0 mg/L as Cu. In the Weymouth WTP tests, greater than 85% mortality was achieved at the 5 hours of exposure at 16.7 μ L/L EarthTec QZ. Mortality increased with exposure time and concentration beyond this condition. Veligers from Lake Mathews were not as susceptible to EarthTec QZ (1.0 mg/L as Cu). Lake Piru only achieved approximately 30% mortality at the 24-hour exposure time at 16.7 μ L/L EarthTec QZ (1.0 mg/L as Cu). The two higher concentrations tested, 33.4 and 50.1 μ L/L EarthTec QZ, exhibited higher mortality and quicker response (Figure 5-2 parts C and D).

Control condition veliger mortality was usually less than 20% with two exceptions for 24hour recovery (Figure 5-2, part A): Lake Piru at 20°C and Lake Mathews 2020 at 20°C. The control showed that there is a baseline mortality, which can increase with time for batch tests. Holding the veligers in beakers for 48 hours contributes to mortality regardless of EarthTec QZ dosing, so longer duration studies are not advisable without flowing water. The lowest dose tested was 3 μ L/L EarthTec QZ. Although this condition achieved high mortality (>85%) in the Weymouth WTP samples at 24 hours of exposure, the Lake Mathews and Lake Piru samples did not exhibit significant increased mortality when compared with the control. For this reason, the 3 μ L/L EarthTec QZ results are not presented in Figure 5-2. Additional discussion of the 3 μ L/L EarthTec QZ experimental results is provided in Section 6 (Figure 6-1).

Einal Report: Quagga Mussel Evaluation





Standard deviation bars for the 24-hour recovery (Recov) measurement for each test condition from Lake Piru (LP), Lake Mathews (LM) in 2020 and 2021, and Weymouth WTP (WW) in 2020 and 2021 at the two test temperatures (15 & 20°C). (A) 0 μ L/L control mortality; (B) 16.7 μ L/L EarthTec QZ; (C) 33.4 μ L/L EarthTec QZ; (D) 50.1 μ L/L EarthTec QZ.

The water quality while testing was suitable for veliger survival. As expected, the pH decreased with increasing EarthTec QZ concentration. The free and total copper concentrations increased with increased EarthTec QZ concentration. Over the 24-hour exposure time for each experimental condition (EarthTec QZ dose and temperature), copper concentrations decreased but were still within 20% of the initial dosed concentration for all sampling locations. The water at Weymouth WTP represents CRA water from Lake Mathews that had been exposed to free chlorine during the approximate 8 hours of travel time within the Upper Feeder pipeline (chlorine is dosed at the pipeline inlet, as the water leaves Lake Mathews). The measured residual chlorine levels in the Weymouth WTP influent samples were very low (0.07 mg/L), consistent with levels measured from Lake Mathews samples (0.06 mg/L); these levels, which approach the method detection limit (0.02 mg/L), are expected to be related to interferences from other ions in the water and not residual oxidant.

Further analysis was completed on the veliger mortality data to look for significant trends. The recovery mortality data was used to perform linear regression modeling. In order to get the data to fit normality assumptions, the recovery mortality was transformed with a square root of the arcsine value of the recovery mortality. Linear regression modeling showed that concentration, duration, and location were significant variables. For simplicity, the copper concentration of each dose was multiplied by the testing duration to get a time-dose variable (Table 5-1). Testing temperature (15 or 20°C) and year conducted were not significant variables in mortality results, therefore results were combined for each location to get a simplified model with a good fit (linear regression fit of $r^2=0.91$) (Figure 5-3).

Veligers collected from Weymouth WTP had the highest mortality and quickest response. Veligers from Lake Mathews were not as susceptible to the copper: longer times and higher concentration required to achieve close to 100% mortality. Similarly, Lake Piru water veligers were less susceptible to copper.

Table 5-1. Time-Dose variable calculation

Units are hours of exposure duration multiplied by concentration of EarthTec QZ as Cu (h*mg/L Cu)

	Duration (hours)									
Concentration as EarthTec QZ (as Cu)	0.5	2	5	24						
3 µL/L (0.18 mg/L)	0.09	0.36	0.9	4.32						
16.7 μL/L (1 mg/L)	0.5	2	5	24						
33.4 μL/L (2 mg/L)	1	4	10	48						
50.1 µL/L (3 mg/L)	1.5	6	15	72						

Einal Report: Quagga Mussel Evaluation

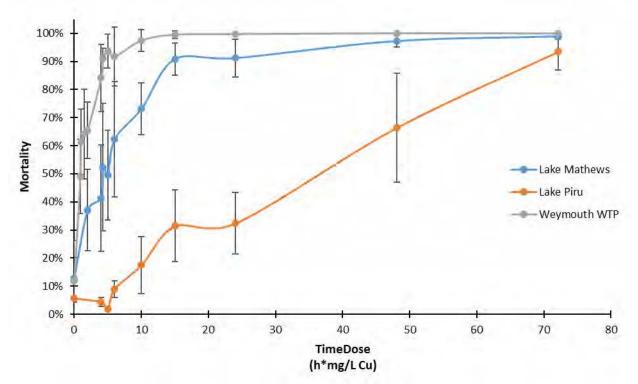


Figure 5-3. Veliger mortality for cumulative exposure to EarthTec QZ Standard deviation bars for each sample location combine all temperatures and years tested.

5.2 Susceptibility of Non-targets to EarthTec QZ

Large volumes of water were collected from each test location and delivered to Aquatic Bioassay and Consulting Laboratories (ABC Labs) in Ventura, CA to conduct acute toxicity testing on three non-targeted indicator species: water flea (*Ceriodaphnia dubia*), rainbow trout (*Oncorhynchus mykiss*), and fathead minnow (*Pimephales promelas*).

ABC Labs completed acute toxicity tests using guidelines prescribed in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (EPA-821-R-02-012, 2002; EPA/600/4-90/027F, 1993), where the indicator species are exposed to the test water (sample water collected a given test location and spiked with the selected dose of EarthTec QZ) and evaluated over a 96hour exposure period. This testing was completed in parallel with the dose-response veliger testing. Each round of toxicity testing utilized the same site-specific water and EarthTec QZ stock that was used during the veliger dose-response testing and results are presented in Technical Memorandum 2 (TM2) in Appendix B. The selected EarthTec QZ doses used for the acute toxicity testing were determined based on the most effective dose identified from the preliminary veliger dose-response results for each location.

For all sampling locations, the water flea was the most susceptible to EarthTec QZ (Figure 5-4). One round of testing with the Weymouth WTP influent water reported 0%



mortality for the 8.35 and 16.7 μ L/L EarthTec QZ (0.5 and 1.0 mg/L as Cu), but test condition repeats demonstrated 100% mortality which caused the large standard deviation bars. The reason for the discrepancy between the two tests is unknown: possible hypotheses include different size classes of test subjects used, laboratory error (though ABC Labs provided quality assurance/quality control (QA/QC) review and did not identify any deviation from their protocol), or water quality differences. The chlorine for the 2021 testing at Weymouth WTP was higher than in 2020 and the water flea test subjects are very sensitive to chlorine exposures (the lethal concentration for 50% of the sample population (LC50) for free chlorine species hypochlorous acid and hypochlorite ion are 0.14 mg/L and 0.08 mg/L, respectively (Taylor 1993)). The repeated test results with 100% mortality were used to provide conservative estimates for evaluating EarthTec QZ toxicity for the non-target indicator species.

Rainbow trout were very sensitive to Earth Tec QZ concentrations (Figure 5-4). All sample locations had the same mortality curves. Fathead minnows were not as sensitive to copper as EarthTec QZ (Figure 5-4). In Lake Mathews and Weymouth WTP water, there was little to no mortality observed even at 16.7 μ L/L EarthTec QZ or 1.0 mg/L as Cu. In Lake Piru water 42.5% mortality was observed at 16.7 μ L/L EarthTec QZ (1.0 mg/L as Cu). However, it should be noted that Lake Piru water had an initial copper concentration of 0.15 mg/L (Table 5-2) whereas Lake Mathews and Weymouth had an initial copper concentration of 0.01 mg/L. This could have increased the dose of copper to 1.15 mg/L, which could be a tipping point in the toxicity to fathead minnows given the Lake Piru water quality.

The difference in acute toxicity response observed between the two different waters can potentially be further explained by the differences in water quality that affect the bioavailability of metals in water as well as competitive ions. Copper toxicity in fish can be predicted using the biotic ligand model which uses a wide array of water quality to predict bioavailability and toxicity: pH, dissolved organic carbon (DOC), ions, alkalinity, and temperature (USEPA 2016). As discussed in Section 5.3, these water quality parameters affect the chemical composition of copper in the water and determine the bioavailability. For example, alkalinity, pH, hardness, and anions affect the saturation indices for copper and the percentage of total copper existing in dissolved form. It has been demonstrated that copper toxicity decreases when pH and hardness increase (Welsh et al. 1995). Meanwhile, other cations, especially sodium, can compete with free copper ions for binding sites in the gills of fish (Nelson et al., 1986; Welsh et al. 1995, Parametrix and HydroQual 2006; USEPA 2016). In other studies conducted by KASF Consulting, sodium levels in Lake Piru in 2019 were lower (65 mg/L) than those measured in Colorado River water (100 mg/L) in 2015. While sodium measurements were not included in this study, the higher sodium concentration for Lake Mathews and Weymouth WTP should have provided more protection from the copper toxicity. The suite of water quality for predicting toxicity with the biotic ligand model was not measured for the tests; however, the water quality clearly affects copper toxicity and could be the reason for the difference in Lake Piru fathead minnow mortality.

Einal Report: Quagga Mussel Evaluation

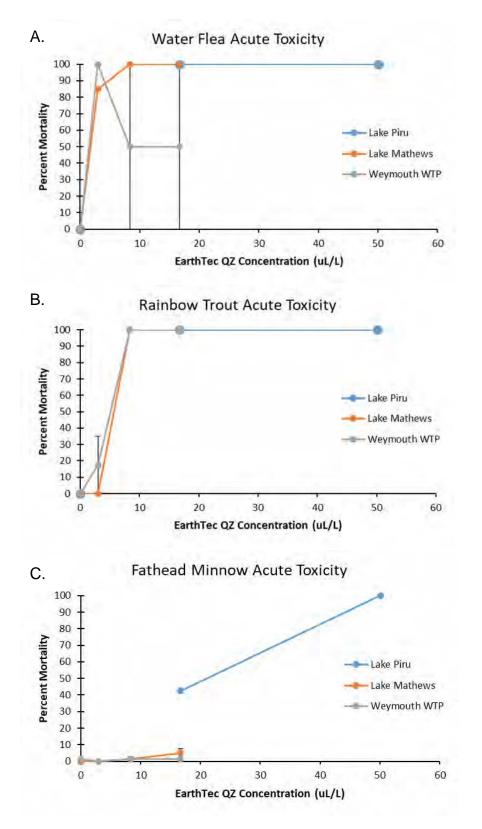


Figure 5-4. Average acute toxicity for (A)water flea; (B)rainbow trout; and (C)fathead minnow with EarthTec QZ following 96=hour exposure durations Standard deviation bars for each sample location combine all acute toxicity results.

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The acute toxicity tests were 96-hour exposure durations for the water flea, rainbow trout, and the fathead minnow. To obtain a similar metric to compare the veliger mortality, the exposure time was multiplied by the EarthTec QZ concentration as mg/L of copper tested to obtain a time-dose variable. Mortality is correlated with cumulative EarthTec QZ exposure in Figure 5-5 for veligers from each test location (data from each temperature condition is combined) and for all non-target indicator species (combined data from all locations) for exposures of up to 100 h*mg/L.

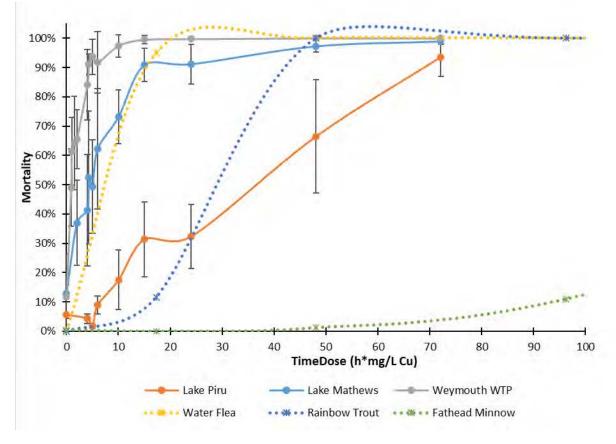


Figure 5-5. Mortality with cumulative exposure to EarthTec QZ For veligers by location, plus water flea, rainbow trout, and fathead minnow (non-target indicator results for all locations combined).

Higher veliger mortality was observed in Weymouth WTP water with lower cumulative exposure (e.g., shorter time exposure, lower EarthTecQZ dose, or both) to EarthTec QZ relative to the exposure required for similar mortality levels in the water flea, rainbow trout, or fathead minnow (Figure 5-5). In Lake Mathews water, the veligers had approximately the same mortality rate as the water flea and died with lower EarthTec QZ exposure relative to the rainbow trout and the fathead minnow. Veligers in Lake Piru survived at a higher rate relative to the water flea and rainbow trout (above 24 h*mg/L exposure), but had higher mortality with lower exposure compared to the fathead minnow. This time-dose assessment allowed for a broad comparison of the impact of EarthTec QZ exposure on both the veligers and non-target indicators, given the

differences in experimental setup; the veliger exposure times were limited to 24 hours, while the non-target indicators were all tested using a 96-hour exposure time. Further testing of co-mortalities of veligers and the non-target indicators is recommended using a wider range of EarthTec QZ exposures with field-based test methods, such as a mesocosm (e.g., pilot-scale water enclosure system adjacent to treatment site), to better replicate expected full-scale conditions.

5.3 Raw Water Quality

Raw water quality was measured for each veliger collection and acute toxicity sampling event. Many of the water quality parameters were the same for Lake Mathews and Weymouth WTP, which was expected since Weymouth WTP influent water is the chlorinated water downstream of Lake Mathews (Table 5-2). Background copper levels were higher at Lake Piru compared to Lake Mathews and Weymouth WTP. Chlorine levels were also higher in Lake Piru water, but this could have been due to interferences in testing or residual levels from washing the test vials with tap water. Copper and chlorine levels did not impact veliger results but in some instances were high enough to impact the acute toxicity results. Dissolved oxygen, conductivity, and pH were at levels suitable for organism growth and survival. Oxidation reduction potential (ORP) was consistent for all samples.

The alkalinity of Lake Piru (mean=171 mg/L as CaCO₃) was higher than Lake Mathews and Weymouth WTP (mean=126 mg/L as CaCO₃), which indicated that Lake Piru water was able to buffer more of the effects of the addition of EarthTec QZ (a very acidic compound). Hardness measurements were also highest for Lake Piru (mean=315 mg/L as CaCO₃). Tests conducted in June 2021 for Lake Mathews and Weymouth WTP had higher hardness measurements (mean=278 mg/L as CaCO₃) than sampling 2 weeks later in 2021 (mean=182 mg/L as CaCO₃). Water from the 2020 sampling events had the lowest hardness (mean=143 mg/L as CaCO₃). Calcium competes with copper for binding sites in low hardness waters but is not a factor in waters that are considered hard like both Lake Piru and Lake Mathews waters (Parametrix and HydroQual 2006). DOC levels were different by location, with the highest levels measured at Lake Piru (Table 5-2). Chemical oxygen demand (COD) varied widely, and no trend was apparent.

Researchers have shown that along with calcium, other competing cations such as magnesium, sodium, and hydrogen, as well as complexing ligands (DOC, OH⁻, Cl⁻ and CO₃²⁻) decrease the toxicity of copper as their concentrations increase in natural waters (Parametrix and HydroQual 2006). Alkalinity can affect copper by changing which complex is bioavailable (Parametrix and HydroQual 2006). When the water quality parameters were put into the veliger logistic regression model, alkalinity, DOC, and COD were important variables, but hardness was not a significant factor in the model. Water quality was an important factor in determining the toxicity of EarthTec QZ to veligers. Lake Piru water quality was different from Lake Mathews water, especially the alkalinity and DOC measurements.

Table 5-2. Raw water quality

Readings from each sample location at the time of veliger testing.

Parameter		Total Copper	Free Copper	Total Chlorine	Oxidative Reduction Potential	Dissolved Oxygen	Conductivity	Н	Alkalinity	Hardness	Dissolved Organic Carbon	Chemical Oxygen Demand			
Location	Year	Temperature Condition	mg/L	mg/L	mg/L	mV	mg/L	μS/ cm	рН unit		L as CO3	mg/L	mg/L		
	Raw Water Quality														
Lake Piru	2019	15⁰C Tests	0.15	0.14	0.08	210.4	10.45	927	8.43	187	314	5.33	10.00		
	2019	20°C Tests*	0.16	0.16	0.12	191.9	8.88	913	8.25	154	316	5.05	5.65		
	Raw Water Quality														
l eles	2020	15°C Tests	0.02	0.02	0.02	212.5	7.57	946	8.18	115	138	3.01	4.67		
Lake Mathews		19ºC Tests	0.01	0.01	0.02	245	8.08	937	8.20	115	142	2.95	5.69		
	2021	15°C Tests	0.00	0.00	0.01	185.6	8.46	950	8.24	138	281	2.98	4.65		
	2021	20°C Tests	0.00	0.00	0.00	208.2	8.34	957	8.29	135	178	2.91	3.30		
	Raw W	ater Quality													
		15⁰C Tests	0.01	0.01	0.04	214	8.27	944	8.02	119	150	4.09	8.50		
Weymouth	2020	20ºC Tests	0.00	0.00	0.07	223.5	8.14	941	8.13	121	139	4.19	8.24		
WTP		Additional Sampling	0.02	0.02	0.05	211	8.19	955	8.12	119	145	4.05	7.88		
	2021	15⁰C Tests	0.02	0.03	0.10	195.6	8.69	969	8.18	137	275	3.01	4.46		
	2021	20°C Tests	0.00	0.00	0.02	218.2	8.34	961	8.28	135	186	3.12	4.86		

*Some parameters may be different from normal as it was raining during the sampling and testing period.

** Re-sample of Weymouth WTP influent for acute toxicity testing with 3 µL/L EarthTec QZ. This water was not used for veliger testing.

While working with the samples, we observed that the larger sized veligers were taking longer to succumb to the toxic effects of copper and many of these larger sized veligers were still alive during the final readings. Each sample collection was evaluated to determine the proportion of the four veliger size classes (i.e., D-shaped, small umbonal, large umbonal, and pediveliger) present, as indicated in Table 5-3. Samples taken during the same week from a given location were combined. The size distributions from all of the sample collections were then ranked by size class to compare the overall veliger sizes among the different sample collections. The ranking system assigned lower numerical values to a sample collection with higher proportions of larger sized veligers. The two larger size classes (i.e., pediveliger and large umbonal) were ranked from the location where they were most abundant to least (1 to 8). The opposite approach was used for the smaller two size classes (i.e., small umbonal and D-shaped), where the ranking values indicated least abundance to most (1 to 8). The scores for each sample collection were added and then ranked from A (lowest value) to H (highest value). This showed which samples had a relatively higher proportion of large veligers compared to those containing small veligers (Table 5-3).

Sample Site	D-shaped (50-150 μm)	Small umbonal (150-250 μm)	Large umbonal (200-350 µm)	Pediveliger (350-500 μm)	Rank (score wt)
2021 Lake Mathews (20°C)	32%	18%	38%	11%	A (8)
Lake Piru (15 & 20°C)	45%	15%	20%	20%	B (9)
2021 Lake Mathews (15°C)	52%	22%	23%	3%	C (16)
2021 Weymouth WTP (15°C)	74%	8%	17%	2%	D (17)
2020 Lake Mathews (20°C)	50%	30%	15%	5%	E (20)
2021 Weymouth WTP (20°C)	53%	25%	22%	1%	F (22)
2020 Weymouth WTP (15 & 20°C)	80%	15%	3%	2%	G (23)
2020 Lake Mathews (15°C)	75%	20%	4%	1%	H (26)

Table 5-3. Size class distribution of veligers used in testing Each sample site was ranked by density of large veligers to small veligers.

Veligers in Lake Mathews during the 2021 sampling event for the 20°C test conditions had the most abundant amount of the largest size classes and had a very similar veliger size class distribution to Lake Piru. The veliger mortality for this sampling event was lower than the other Lake Mathews events, and more consistent with the low mortality achieved in the Lake Piru testing (Figure 5-6). This trend was also observed with the

test sites containing mostly small veligers, where the smallest veligers utilized during testing were from the 2020 Lake Mathews sampling event for the 15°C test conditions and the mortality was similar to the Weymouth WTP results (Figure 5-6).

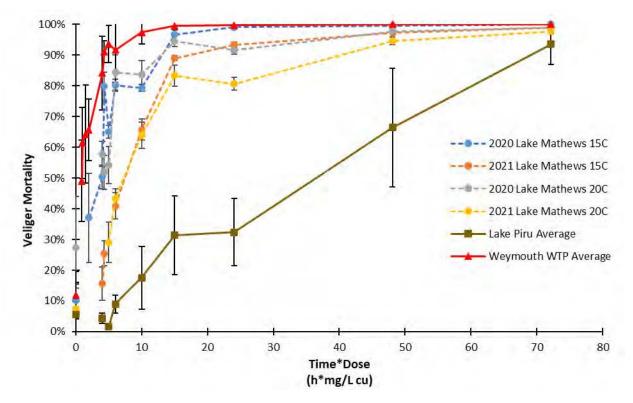


Figure 5-6. Veliger mortality with exposure to EarthTec QZ Standard deviation bars combine all temperatures and years tested for Lake Piru and Weymouth WTP. Lake Mathews veliger mortality with standard deviation bars was not combined by temperature or sampling year.

The simplest and best fitting model showed that mortality was a function of location, concentration, and exposure duration. The location variable could be replaced with the alkalinity and DOC. Additionally, adding in veliger size class helped explain some of the variation in the model, but increased the complexity of the model.

5.4 Study goals and objectives

The study goals and objectives were to evaluate the effectiveness of EarthTec QZ, an EPA–registered molluscicide for prevention and control of quagga and zebra mussels, in Southern California water.

EarthTec QZ was effective in reducing the number of live veligers in all systems treated. Veliger mortality increased with increased concentration of EarthTec QZ and with increased duration of exposure. The water that had the highest mortality was the chlorinated Lake Mathews water sampled at Weymouth WTP. The lowest mortality per concentration and duration was observed in veligers from Lake Piru. Alkalinity and

dissolved organic carbon were significant water quality factors in influencing the toxicity of EarthTec QZ in the hard waters of Southern California.

5.5 Major problems in achieving study goals and objectives

There were two major problems that were encountered while conducting this study. The first was the impact of Covid-19 on the sampling schedule and the second was obtaining enough veligers at Lake Mathews in 2020.

Covid-19 stay at home orders and associated restrictions delayed sampling events at Lake Mathews, Weymouth WTP, and OCWD's OC-28 turnout (original location) from May or June 2020 to September 2020. Testing was completed at the original study testing locations, with the exception of OC-28 turnout. The study was designed with the intention of correlating the dose-response efficacy of EarthTec QZ at Lake Mathews with that of two downstream locations. Water from Lake Mathews is chlorinated prior to entering pipelines supplying both OC-28 and Weymouth WTP. Considering the connection of these water supplies, the Study aimed to correlate testing from Lake Mathews with the two downstream locations – OC-28 turnout and Weymouth WTP influent. Testing these three locations in a series would have allowed for comparison of the effects of EarthTec QZ with and without chlorine exposure. However, due to prior budgeting, OCWD only had access to Lake Mathews water at the OC-28 turnout through June 2020, and not during the 2021 fiscal year (July 2020 – June 2021). Given the similarity in travel time from Lake Matthews to Weymouth WTP and Lake Mathews to OC-28, the Weymouth WTP results would be expected to be the same at OC-28.

Samples of quagga veligers were initially collected at Lake Mathews on September 3, 2020 for the 20°C dose-response testing with EarthTec QZ. However, veliger densities were too low to provide greater than 50 veligers per testing replicate and the control mortality was greater than 50% for all exposure durations. An additional sampling and subsequent testing event was conducted on September 18, 2020 at deeper depths which yielded a higher veliger density acceptable for dose-response testing. These results were originally labeled as 19°C to avoid confusion with the initial 20°C results that had high mortality in the control group. In the summary of the data, the initial 20°C results were removed from the analysis and discussion; the complete results are available in TM1 in Appendix A.

5.6 Application of study to other areas of the region

EarthTec QZ was effective in reducing the number of live veligers in all systems treated. This copper treatment was most effective after the veligers had been exposed to chlorine between Lake Mathews and Weymouth WTP. EarthTec QZ treatments were less effective on veligers collected in Lake Piru, which had higher alkalinity and DOC measurements, and a large variety of veliger size classes present.



These results can be applied to other waterbodies within Southern California that have high hardness values and similar alkalinity and DOC levels, but site-specific testing would be required to assess the appropriate dose and exposure time to achieve the desired mortality. Some deviations from the results are expected if applied in other waterbodies because copper toxicity is influenced by high alkalinity levels and dissolved organic carbon levels. These parameters also change with seasons, as we observed different values among different sampling events at the same location with seasonally variable mortality curves. Though we did see seasonal variation in mortality results, the variability was only about 15%.

This Study evaluated veliger toxicity at a bench-scale level that has its own limitations when comparing it to a field application. Veligers collected from each study location were filtered to remove large non-target organisms and represent a size range of 50-500 micrometers. Likewise, the sample waters used for the beaker tests were filtered to remove particles above 10 micrometers. If the organisms that were between 10 and 40 micrometers or larger than 500 micrometers were present, then the efficacy of the EarthTec QZ on the veligers may be lower because these organisms could uptake copper, making it less bioavailable. This would be monitored by measuring and comparing the residual copper at the end of the exposure duration, which if true would be less than found in these study results. As discussed in conjunction with the results from the control conditions, natural veliger mortality increased with residence time in the test beakers, which will obscure the results for test conditions after approximately 48 hours. Utilizing a mesocosm set up or a flow-through apparatus to test site-specific conditions (dose and exposure time) is recommended to optimize the potential use of EarthTec QZ for controlling veligers at each candidate location.

Copper is regulated by the State Water Resources Control Board Division of Drinking Water in California and has a secondary maximum containment level of 1.0 mg/L (State of California 2018). This will regulate the maximum dose of copper to be used in treatments of imported water supplies. If locations around Southern California were to use EarthTec QZ, they could expect similar results to this study (Table 5-4). For example, if EarthTec QZ was applied to the water at OC-28 at a dosage of 16.7 µL/L EarthTec QZ dosage (1.0 mg/L as Cu), then we would expect mortality results similar to what we observed in the Weymouth WTP testing. This would be applicable when OC-28 is receiving MWD's CRA water.

Location	Exposure Duration (hours)			
	2	5	24	
Lake Piru	Not Assessed	1.7 (±0.6)%	32.4(±10.9)%	
Lake Mathews	37.0(±14.5)%	49.4(±16.0)%	91.2(±6.8)%	
Weymouth WTP	65.6(±10.0)%	93.6(±6.0)%	99.8(±0.5)%	

Table 5-4. Average percent veliger mortality observed at each location Data presented for 16.7 μ L/L EarthTec QZ dosage (1.0 mg/L as Cu) with standard deviation.

6 Conclusion

EarthTec QZ is an effective tool to use in Southern California waters to achieve high mortality of quagga mussel veligers. EarthTec QZ effectiveness is driven by bioavailable copper ions in the water which is affected by hardness, alkalinity, and DOC. EarthTec QZ was more toxic to veligers in water that had previously been exposed to a chlorine treatment. EarthTec QZ is also toxic to non-target species, including water fleas and rainbow trout. This study showed that fathead minnows are impacted less by the toxicity of EarthTec QZ.

The design of this Study allowed for comparison of multiple variables expected to potentially influence the toxicity of EarthTec QZ. Temperature was not an explanatory factor in determining mortality, however, using a broader range of temperatures could be considered if a treatment were to be applied at temperatures outside of the range included in the study, such as at 25 to 30°C. COD did not correlate to mortality of veligers and was not found to be a parameter of interest. The size distribution of the veligers correlated with mortality differences for an individual sampling location (Lake Mathews). Small veligers succumbed quickly to the toxic effects of EarthTec QZ, but the larger veligers (pediveligers) were still alive at the end of both the treatment duration and the recovery period.

6.1 Lessons Learned

We found that it was important to add in a recovery period after the exposure duration to determine final mortality. During the Study, we observed veligers that were moving slowly and bloated, but were not stained green with the Fast Green dye used to determine veliger mortality. With the additional 24 hours of exposure to clean water, the veligers succumbed to the toxicity and were confirmed dead.

An example of how a recovery period would work in a field application would be as follows. OC-28 could be treated with EarthTec QZ at the inlet area for a 5-hour exposure duration, and then the treated water could be mixed with either reclaimed water or Santa Ana River water (which is veliger and copper free water), and the

expected mortality of veliger would be around 94% (Table 5-4) instead of 58% mortality without a recovery period. This post-treatment dilution is also expected to be beneficial for reducing the impact of EarthTec QZ on non-target aquatic species present in natural systems (e.g., Santa Ana River) and reducing the residual copper concentration.

One of the initial EarthTec QZ studies found that 100% veliger mortality occurred in 30 min at 3 μ L/L EarthTec QZ (Watters et al. 2013). This Study did not achieve these results in any of the waters tested. The water used in the Watters study was Colorado River water at Lake Mead fish hatchery. Lake Mathews receives the same water downstream of this location. Our results did not obtain 100% mortality with a dosage of 3 μ L/L EarthTec QZ even after a 24-hour exposure duration (Figure 6-1). Additionally, no tested concentration of EarthTec QZ achieved 100% morality with an exposure duration of 30 min (Figure 5-2).

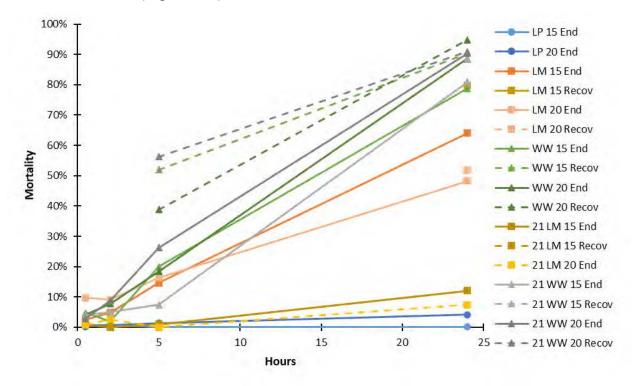


Figure 6-1. Mortality of quagga mussel veligers for 3 µL/L EarthTec QZ. Data presented for mortality measured at the end (End) of each exposure time and after a 24-hour recovery (Recov) period with no additional exposure to EarthTec QZ.

6.2 Next Steps of the Study

The data from this Study can be used as a baseline to conduct full scale field treatments, but site-specific assessments would be required to assess the appropriate dose and exposure time to achieve the desired mortality for each particular site. Utilizing a mesocosm set-up or a flow-through apparatus to test site-specific conditions to determine dose and exposure time is recommended to optimize the potential use of EarthTec QZ for controlling veligers at each candidate location. Site-specific testing should also evaluate potential effects on non-target organisms related to full-scale treatment, in coordination with CDFW and other regulators. During field treatment, veliger mortality should be monitored along with relevant water quality parameters – hardness, alkalinity, dissolved organic carbon, pH, dissolved oxygen, temperature, and ions. Data from a field study will be useful for more broadly assessing full-scale implementation of a chemical control method for quagga, such as EarthTec QZ.

Since this Study did not include all the organisms present in the water from each test location, site-specific testing prior to large scale testing is recommended. In this study the organisms between 10 and 50 micrometers and those larger than 500 micrometers were excluded in the veliger testing. Additionally, the acute toxicity data did not show the full impact of an EarthTec QZ treatment because testing water was filtered and represented only organisms less than 10 micrometers, in addition to the indicator species. Moreover, the treatment duration was 96 hours at full copper dosage. As such the results may not be representative of full-scale field treatment for these locations. The organisms that were not present in our study could have the potential of reducing the bioavailability of copper and decreasing the effectiveness of EarthTec QZ; and to make it as effective as our Study results, longer exposure durations or higher concentrations at the point of dosing may be required.

Additional studies that evaluate the extent of copper decay with a wide range of organisms present and/or similar to prospective treatment locations is recommended to fully understand EarthTec QZ's effect in the environment. This data would then be used to determine what type of remediation could be needed after EarthTec QZ treatment in locations with short exposure durations. If there are organisms that reduce the bioavailability of copper in the environment, then a high dose, short duration use of EarthTec QZ could be considered and not be toxic to other more sensitive organisms. For example, dosing EarthTec QZ in an aqueduct or pipeline may be acceptable, as long as the residual copper and toxicity to sensitive aquatic species no longer remains once the water is discharged into a downstream lake or river.

In a site-specific study, the toxicity to non-target aquatic organisms of concern would need to be evaluated. Part of the evaluation should include consideration of the size class of non-target organisms, as the small size classes are used in acute toxicity testing and are the most susceptible to a toxicant. In Hammond and Ferris (2019) no non-target mortality was observed, and zooplankton densities returned to high densities after treatment.

Finally, the data showed that low doses of EarthTec QZ work as well as higher doses, but longer exposure times are needed to obtain the same mortality. The field results and current practices of using EarthTec QZ in the Midwest show that low doses of 0.5 mg/L as Cu are effective at reducing and removing quagga mussels in lotic systems, but the treatment duration is weeks to a month (Hammond and Ferris 2019). Further site-

specific evaluation of the use of lower EarthTec QZ is recommended, with correlation of water quality.

Acknowledgements

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Appendix A. Technical Memorandum 1 Evaluation of EarthTec QZ Veliger Treatment



TECHNICAL MEMORANDUM #1



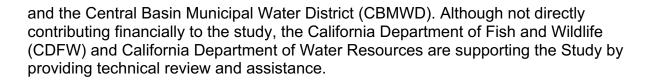
Evaluation of EarthTec QZ Veliger Treatment

Fina Date: Draft Date:	December 20, 2021 September 29, 2021
Prepared for:	Metropolitan Water District of Southern California City of Santa Ana Orange County Water District
Copies to:	Water Replenishment District of Southern California United Water Conservation District Main San Gabriel Basin Watermaster Central Basin Municipal Water District California Department of Fish and Wildlife California Department of Water Resources
Authors:	Kelly Stockton-Fiti, KASF Consulting Emily L. Owens-Bennett, P.E., Trussell Liana Olivas, Trussell
Reviewers:	David Hokanson, Ph.D., P.E., BCEE, Trussell Adam Hutchinson, PG, CHG, OCWD Christine Pham, OCWD Tessa Lenz, UWCD
Subject:	Technical Memorandum 1

1 Introduction

1.1 Background

Since their discovery in the Colorado River system in January 2007, Quagga mussels (*Dreissena bugensis*) have rapidly spread through the Metropolitan Water District of Southern California's (MWD's) Colorado River Aqueduct (CRA) and have been detected at many sites in California. The presence of this invasive species presents a barrier to the use of imported water and storm water for groundwater replenishment. Considering these challenges, the City of Santa Ana proposed a study entitled "Restoration of Local Recharge Sources from Invasive Dreissenid Mussels" to MWD's Future Supply Actions Funding Program. The Study was conducted by Trussell Technologies (Trussell), KASF Consulting, and Orange County Water District (OCWD), with support from project partners including the Water Replenishment District of Southern California (WRD), the United Water Conservation District (UWCD), the Main San Gabriel Basin Watermaster,



1.2 Study Description

The purpose of the Study was to evaluate a potential treatment method, other than desiccation, for use in eradicating quagga mussel infestations as well as preventing the spread of this invasive species.

Trussell led the Study in partnership with KASF Consulting, a firm specializing in quagga mussel sampling, identification, and testing. The Study evaluated the effectiveness of EarthTec QZ^{TM1} for control of quagga mussel veligers (the mussel's final larval stage). A fourth location, OCWD's OC-28 turnout at Anaheim Lake, was originally planned but later eliminated based on scheduling issues and identification of a surrogate location. The Study included testing with samples collected from multiple locations, to allow the project team to evaluate the impact of site-specific water quality on the performance of EarthTec QZ.

The following objectives were evaluated at each testing location:

- 1. Quagga veliger dose-response testing with EarthTec QZ
- 2. Toxicity assessment of EarthTec QZ with non-target species

The purpose of this technical memorandum $^{\text{TM}}$ is to describe the results of **Objective** #1.

2 Schedule Summary

The status of veliger dose-response tests completed at each testing location is summarized in Table 2.1.

¹ EarthTec QZ® is registered with the United States Environmental Protection Agency (USEPA) as a molluscicide for the control of quagga and zebra mussels. It is also registered with the California Department of Pesticide Regulation as a molluscicide for use in lakes, streams, rivers, waterways, canals, ponds, reservoirs, irrigation systems, and catch basins.

Location	Study Status	Testing Date			
Lake Piru	Completed	December 2 – 6, 2019			
Lake Mathews	Completed	September 9 – 11, 2020			
Lake Mathews	Completed	September 18 – 20, 2020			
Weymouth WTP Influent	Completed	September 14 – 18, 2020			
OC-28 Turnout	N/A ²				
Weymouth WTP Influent	Completed	June 28 – 30, 2021			
2021	Completed	July 12 – 14, 2021			
Lake Mathews 2021	Completed	June 30 – July 2, 2021			
	Completed	July 14 – 16, 2021			

	Table 2.1.	Study status	at each s	ampling I	ocation
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Testing was completed for each of the study testing locations (Table 2.1), with the exception of the OC-28 turnout. The study was designed with the intention of correlating the dose-response efficacy of EarthTec QZ at Lake Mathews with that of two downstream locations. Water delivered from Lake Mathews is chlorinated prior to entering transmission pipelines supplying both OC-28 and Weymouth WTP. Considering the connection of these water supplies, the Study aimed to correlate testing from Lake Mathews with the two downstream locations – OC-28 turnout and Weymouth WTP influent. Testing these three locations in a series would allow for comparison of the effects of EarthTec QZ with and without chlorine exposure. However, due to prior budgeting, OCWD only had access to Lake Mathews water at the OC-28 turnout through June 2020, and not during the 2021 fiscal year (July 2020 – June 2021). Covid-19 restrictions precluded the project team from sampling at Lake Mathews until September 2020. For these reasons, it was not possible to complete sampling from the OC-28 turnout in conjunction with the sampling and testing at Lake Mathews and Weymouth WTP influent.

The project team met with MWD staff in August 2020 to discuss alternative sampling locations for the OC-28 turnout. Although already included as a sampling location for the Study, Weymouth WTP was identified as the most appropriate surrogate monitoring location for the OC-28 turnout, as both sites can receive water from Lake Mathews that is chlorinated and transmitted within a pipeline for a similar travel time and therefore, similar exposure time to chlorine. For this reason, sampling at OC-28 is no longer being considered for this Project. The project team proceeded with testing at Lake Mathews and Weymouth WTP during September 2020 and completed follow up testing at both of these locations in 2021, as well.

3 Study Results

Objective #1 of the Study, to conduct quagga veliger dose-response tests with EarthTec QZ, was completed at three locations: (1) Lake Piru, (2) Lake Mathews and (3) MWD's

² Sampling at OC-28 is no longer applicable given the similarity of this location with that of Weymouth WTP, as is later discussed.



Weymouth WTP influent. The Project Team developed a Test Plan for the study, providing details for the expected methods, materials, and test conditions related to collecting quagga mussel veligers and establishing a dose-response relationship to EarthTec QZ (Trussell 2019b).

The results from the completed three testing locations are presented in the following subsections. As discussed in **Section 2**, it was not possible to complete testing with samples collected from the OC-28 turnout due to restrictions from COVID-19, as well as water purchasing agreements between OCWD and MWD. The project team met with MWD staff in August 2020 to discuss alternative sampling locations for the OC-28 turnout. Although already included as a sampling location for the Study, Weymouth WTP was identified as the most appropriate surrogate monitoring location for the OC-28 turnout, as both sites can receive water from Lake Mathews that is chlorinated and transmitted within a pipeline for a similar travel time and therefore, similar contact time with chlorine. Thus, sampling at OC-28 was eliminated as a sampling location for the Study. The project team proceeded with testing at Lake Mathews and Weymouth WTP during September 2020 and completed follow up testing at both of these locations in 2021, as well.

Trussell worked with KASF Consulting to complete and submit an application for a Specific Use Scientific Collecting Permit to CDFW (Trussell 2019a). The permit was approved on November 6, 2019.

Live veligers were collected from each location, and subsets of the collected veligers were tested at two different temperatures (15°C and 20°C). Each temperature condition included veliger exposure to five concentrations of EarthTec QZ (ET) doses (0, 3.0, 16.7, 33.4, 50.1 μ L/L). Copper is the active ingredient in EarthTec QZ molluscicide, thus the equivalent copper doses are also provided (0, 0.18, 1.0, 2.0, and 3.0 mg/L as Cu). Veliger mortality was evaluated at the end of each exposure time. Directly following this count at the end of the exposure time, the veligers were placed in a beaker and exposed to raw sample water (without the addition of EarthTec QZ) for a 24-hour recovery period. A final mortality assessment was made at the end of the recovery time to allow for analysis of delayed mortality.

The raw water quality of the sample water for each round of testing was measured during each round of testing, and can be found in **Appendix A**.

3.1 Lake Piru

The first round of dose-response quagga veliger testing was completed at UWCD's Lake Piru. This reservoir, located in Ventura County, CA, impounds storm flows from the Piru Creek watershed and supplemental imported State Project Water supplied by the Department of Water Resources (DWR) via Pyramid Lake. It is used both for recreation and storage of water used to recharge downstream groundwater basins between Lake Piru and the coastal Oxnard Plain. Quagga mussel infestation of Lake Piru was first discovered in late 2014.





Veligers and water samples were collected on December 2nd and 4th, 2019 for doseresponse testing from December 2nd through the 6th, 2019. KASF Consulting led the quagga veliger collection and testing efforts, while Trussell supported veliger collection, dose-response testing, and provided water quality assessment. UWCD staff supported veliger collection efforts with plankton tow nets from a research-use boat. Veligers were collected on the first and third day of testing; both days resulted in a sufficient count of quagga mussel veligers for testing.

The veliger mortality results for Lake Piru are summarized in **Table 3.1** and plotted for each temperature condition in **Appendix B**.

Table 3.1. Average mortality with standard deviation (n=3) of veligers at Lake Piru as a function of EarthTec QZ dose, temperature, and exposure time

]	0.5 hr.	2 hr.	5 hr.	24 hr.			
			Control		•			
15º C	End*	0.8±0.5%	0.2±0.3%	0.3±0.3%	0.2±0.4%			
15° C	Recovery**	NA	3.0±2.7%	0.7±0.6%	0.6±0.7%			
20° C	End	0.0±0.0%	0.5±0.6%	1.2±0.2%	2.9±2.8%			
20° C	Recovery	NA	2.2±0.4%	1.5±1.3%	33.4±13.2%			
3 μL/L as EarthTec (0.18 mg/L as Cu)								
15° C	End	0.7±0.2%	0.7±0.7%	0.0±0.0%	0.1±0.2%			
20° C	End	0.2±0.3%	0.7±0.4%	1.4±1.2%	4.1±3.2%			
		16.7 μL/	L as EarthTec (1.0	mg/L as Cu)				
15º C	End	1.0±0.9%	1.3±0.7%	2.1±2.1%	42.4±3.0%			
15° C	Recovery	NA	NA	1.7±0.7%	41. 9±1.3%			
20° C	End	6.0±5.9%	2.1±1.3%	7.9±6.3%	23.5±12.3%			
20° C	Recovery	NA	NA	NA	22.9±9.2%			
		33.4 μL/	L as EarthTec (2.0	mg/L as Cu)				
15º C	End	2.1±1.8%	4.7±0.3%	19.3±2.8%	74.2±4.4%			
15° C	Recovery	NA	4.3±2.0%	11.2±2.1%	79.9±5.8%			
20° C	End	2.6±0.8%	8.6±2.1%	28.0±4.3%	51.0±17.0%			
20° C	Recovery	NA	NA	23.8±13.7%	53.0±23.3%			
		50.1 μL/	L as EarthTec (3.0	mg/L as Cu)				
15º C	End	1.8±1.1%	5.1±0.2%	37.4±10.0%	99.0±0.8%			
15° C	Recovery	NA	7.5±3.6%	19.9±5.4%	NA			
20° C	End	NA	NA	NA	97.7±1.8%			
20° C	Recovery	3.6±0.9%	15.9±4.7%	41.8±4.1%	85.0±4.3%			

* End is the end of the exposure period

** Recovery is at the end of the 24-hour recovery period following the exposure period.

NA=Not Assessed

As shown in **Table 3.1**, veliger mortality occurred at 16.7(1.0), 33.4(2.0), and 50.1(3.0) μ L/L as EarthTec QZ (as Cu in mg/L) at both temperatures. Mortality of the veligers at 16.7 μ L/L EarthTec QZ was similar to the control. At 5 hours of exposure, the veligers exposed to the two highest concentrations (33.4 and 50.1 μ L/L EarthTec QZ) began to demonstrate mortality. It took 24 hours for the veligers exposed to 50.1 μ L/L EarthTec QZ to reach mortality of 85% or greater. Higher veliger mortality was observed at the lower temperature of 15°C, compared with the 20°C test conditions; however, using linear regression modeling temperature was not a significant variable in predicting mortality.

The recovery procedure did not show a significant difference statistically or observationally in mortality results compared with the mortality measured at the end of the exposure period. The main exception to this trend was observed in the 20°C control after the recovery period, with mortality greater than 33% compared to approximately 3% mortality measured at the end of the 24-hour exposure. Natural mortality was



observed when veligers were held in static conditions; mortality was increased with time and was amplified by higher temperatures.

Water quality parameters that were measured throughout testing included temperature, dissolved oxygen, pH, specific conductance, free copper, and total copper. The average temperatures of the 15°C and 20°C test conditions were 15.1°C and 19.7°C, respectively. Varying the dose of EarthTec QZ did not produce notable changes in either the dissolved oxygen or the specific conductance in any of the test conditions. A decrease in pH was observed with increasing EarthTec QZ concentrations, however the pH for each individual test condition remained mostly consistent over time. The full range of tested conditions resulted in pH values that were consistent with those under which veligers can thrive. Free and total copper readings were very similar for each tested condition. Over time the copper concentrations decreased slightly but was not significantly different for a given dose of EarthTec QZ. After 24 hours of exposure, the measured copper concentration was similar to the original treatment concentration. Copper concentrations in the recovery were near zero. A table of detailed water quality measurements from Round 1 Lake Piru testing are included in **Appendix C**.

3.2 Lake Mathews 2020

The second round of dose-response veliger testing was completed at Lake Mathews, a reservoir located in Riverside County, CA that is owned and operated by MWD. Lake Mathews is primarily used to store CRA water. Water from Lake Mathews is delivered into raw water pipelines that are dosed with chlorine for quagga control.

Samples of quagga veligers were initially collected at Lake Mathews on September 3rd, 2020 for the 20°C dose-response testing with EarthTec QZ. However, veliger densities were too low to provide greater than 50 veligers per testing replicate and the control mortality was greater than 50% for all exposure durations. The low veliger counts can be attributed to an insufficient depth at which the veligers were collected. During additional sampling at Lake Mathews, the towing depth was increased from 50 feet to 100 feet from the top of the intake tower. This increase in collection depth yielded a higher veliger density acceptable for dose-response testing.

Additional veligers were collected on September 18th, 2020 to repeat the testing of the 20°C conditions (September 18-20); these results are recorded in Table 3 as 19°C to avoid confusion with the initial 20°C results that had high mortality in the control group. Testing at 15°C was completed September 9th through 11th, 2020 using veligers and water samples collected from Lake Mathews on September 9th. KASF Consulting led the quagga veliger collection and testing efforts while Trussell and OCWD supported veliger collection, dose-response testing, and water facility and towing/collection locations.

The veliger mortality results for the 2020 Lake Mathews are summarized in **Table 3.2** and graphed by temperature condition in **Appendix D**.

Table 3.2. Average mortality and standard deviation (n=3) of veligers from Lake Mathews in 2020 as a function of EarthTec QZ dose, temperature, and exposure time (results labeled as 20°C are not considered representative due to low veliger counts in the sample collection and high mortality of the control; these test conditions were repeated and labeled as 19°C)

		0.5 hr.	2 hr.	5 hr.	24 hr.
			Control		
15°C	End*	3.4±0.8%	5.7±1.7%	4.1±1.6%	3.8±2.3%
15.0	Recovery**	NA	7.5±2.9%	7.8±2.2%	15.5±5.0%
19°C	End	5.5±0.7%	5.2±3.1%	8.2±1.3%	19.6±9.0%
19 C	Recovery	NA	12.9±2.2%	18.6±3.0%	50.3±1.3%
2000	End	50.7±9.6%	63.1±4.0%	60.9±3.7%	60.5±8.6%
20°C	Recovery	NA	66.4±2.6%	87.1±3.8%	72.9±4.2%
		3 μL/L as Eart	hTec (0.18 mg/L as	s Cu)	
45%0	End	2.4±1.1%	4.9±0.7%	14.7±2.5%	64.1±7.7%
15°C	Recovery	NA	NA	NA	79.8±4.6%
10%0	End	9.7±1.2%	9.1±2.9%	16.3±0.6%	48.3±6.7%
19°C	Recovery	NA	NA	NA	51.8±5.6%
2000	End	65.0±9.6%	64.6±10.3%	67.4±5.4%	68.0±8.4%
20°C	Recovery	NA	NA	NA	NA
		16.7 µL/L as Ea	arthTec (1.0 mg/L a	is Cu)	•
45%	End	6.8±3.2%	32.0±9.9%	37.7±9.4%	95.6±1.7%
15°C Recovery 19°C End	NA	37.0±14.5%	65.1±2.0%	99.1±0.7%	
10%0	End	8.5±3.3%	16.9±4.2%	23.8±6.8%	90.2±3.4%
19.0	Recovery	NA	NA	54.2±6.0%	91.6±1.3%
2000	End	53.7±15.0%	64.2±8.8%	52.3±7.0%	97.8±1.8%
20°C	Recovery	NA	NA	NA	98.2±1.6%
		33.4 µL/L as Ea	arthTec (2.0 mg/L a	is Cu)	
45%	End	7.2±1.4%	55.7±15.8%	60.1±7.8%	99.0±0.8%
15°C	Recovery	NA	50.4±3.9%	79.3±1.2%	99.5±0.4%
10%0	End	11.5±4.9%	22.7±3.4%	40.5±0.6%	97.9±1.3%
19.0	Recovery	NA	57.8±4.1%	83.6±4.6%	97.8±1.0%
2000	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	100±0.0%			
20°C	Recovery	NA	NA	100±0.0%	NA
		50.1 µL/L as Ea	arthTec (3.0 mg/L a	is Cu)	
45%	End	7.9±2.7%	60.5±6.1%	66.6±8.2%	100.0±0.0%
15°C	Recovery	NA	80.2±2.0%	96.7±2.1%	NA
40%0	End	18.2±1.5%	25.3±3.6%	43.9±2.0%	98.4±0.4%
19°C	Recovery	NA	84.4±5.7%	94.5±1.7%	98.9±0.8%
2000	End	66.4±3.7%	89.6±7.5%	77.5±29.6%	100±0.0%
20°C	Recovery	NA	98.5±1.2%	98.2±2.5%	NA

* End is the end of the exposure period.

** Recovery is at the end of the 24-hour recovery period following the exposure period.

NA=Not Assessed



In the Lake Mathews samples, significant quagga veliger mortality was observed initially with the 16.7(1.0), 33.4(2.0), and 50.1(3.0) μ L/L as EarthTec QZ (mg/L as Cu) test conditions at both temperatures after 24 hours of exposure. Mortality of the 3 μ L/L EarthTec QZ was greater than the control at 15 and 19°C, and mortality at 3 μ L/L EarthTec QZ after 24 h was around 50%. At 5 hours of exposure, the veligers exposed to the two highest concentrations (33.4 and 50.1 μ L/L EarthTec QZ) began to demonstrate mortality greater than 50% mortality. It took 24 hours for the veligers exposed to 16.7, 33.4 and 50.1 mg/L μ L/L EarthTec QZ to reach mortality of 85% or greater. Higher veliger mortality was observed at the lower temperature of 15°C, compared with the 19°C test conditions. Temperature was not a significant variable in the linear regression model.

Only the end mortality results greater than 20% were checked for additional recovery mortality after 24 hours. The recovery procedure did show a significant increase in mortality results both observationally and was statistically significant. Increased mortality in the recovery was due to veligers showing signs of stress at the initial reading but were not quite dead enough to be stained by the fast green and counted as dead. With the additional recovery time, the stressed veligers were dead and stained. The recovery mortality was high with greater than 90% mortality being achieved in the three highest concentrations. Interestingly, the 2 h 50.1 μ L/L EarthTec QZ reached high mortality (greater than 80%). At the 24-hour exposure in the 19°C study, the control mortality was over 50%. Natural mortality was observed when veligers were held in static conditions; mortality increased with time and was amplified by higher temperatures. Laboratory conditions in the OCWD laboratory were hotter than at the Lake Piru laboratory, which could have contributed to additional stress on the veligers. Steps were minimized to limit the time veligers were out of the water bath.

Water quality parameters that were measured throughout testing included temperature, dissolved oxygen, pH, specific conductance, free and total copper, and chlorine. The average temperatures recorded for the 15°C and 19°C test conditions were 14.8°C and 21.3°C, respectively. Varying the dose of EarthTec QZ did not produce notable changes in either the dissolved oxygen or the specific conductance in any of the test conditions. The pH decreased with increased concentration and each concentrations pH was significantly different from each other during testing. The pH for each individual test condition remained mostly consistent over time. The full range of tested conditions resulted in pH values that are consistent with those under which veligers can thrive. Free and total copper readings were very similar for each tested condition. Over time the copper concentrations decreased slightly for a given dose of EarthTec QZ, but after 24 hours of exposure, the measured copper concentration was not significantly different from the original treatment concentration. Copper concentrations in the recovery were near zero. The measured chlorine concentrations were negligible. A table of detailed water quality measurements from the 2020 Lake Mathews testing is included in Appendix E.



3.3 Weymouth Water Treatment Plant Influent 2020

The Weymouth WTP receives untreated water from two sources: Colorado River water from Lake Mathews via the Upper Feeder and State Project Water (SWP) from the East Branch of the SWP via the Rialto Pipeline or from the Upper Feeder via the Etiwanda Pipeline from the Rialto Pipeline. The WRD historically had access to this same source water through the Upper Feeder pipeline at CenB-28 for use in groundwater recharge via spreading. Detections of quagga in the nearby San Gabriel River in October 2017 were linked to deliveries of imported water. Since these detections, imported water has not been approved for use in groundwater recharge, due to the potential for quagga mussel infestations.

For the purpose of this study, the influent water sampling location at Weymouth WTP provides an access point for understanding the condition of the guagga veligers present in the pipeline downstream of Lake Mathews, following exposure to chlorine, and the cumulative impacts of exposure to both chlorine and EarthTec QZ. This location is of interest to the study when MWD is supplying only imported water from CRA via Lake Mathews. Water from Lake Mathews is dosed with chlorine as it enters the downstream water supply pipelines, as a control measure for guagga. The pipeline travel time from Lake Mathews to the Weymouth WTP is approximately 8 hours via the Upper Feeder. Another branch of pipeline downstream of the chlorine dosing station supplies raw water from Lake Mathews to the OC-28 turnout and MWD's Diemer WTP. The travel time from Lake Mathews to the Diemer WTP is approximately 11 hours, with the OC-28 turnout located upstream, but nearby the Diemer WTP. The approximate pipeline travel times were provided per personal communication with project partner Paul Rochelle of MWD. As such, the study aimed to complete parallel dose-response EarthTec QZ testing with guagga veligers collected from both Lake Mathews (no chlorine exposure) and Weymouth WTP (exposed to chlorine through pipeline) as a surrogate location for expected veliger populations at WRD's CenB-28 (Upper Feeder) or OCWD's OC-28 turnout. The Upper Feeder pipeline supply in late 2019 was from SWP, but changed to CRA via Lake Mathews in 2020.

The third round of dose-response veliger testing was completed from September 14th through 18th, 2020 using veligers and raw water collected from the influent water to MWD's Weymouth WTP. Collection of veligers and water samples were taken September 14th and 16th, 2020; both days resulted in a sufficient count of quagga mussel veligers for testing. KASF Consulting led the quagga veliger collection and testing efforts while Trussell and OCWD supported veliger collection, dose-response testing, and water quality assessment. MWD staff supported veliger collection efforts with access to the facility and towing/collection locations.

The veliger mortality results for the 2020 Weymouth WTP influent are summarized in **Table 3.3** and presented graphically by temperature condition in **Appendix F.**

Table 3.3. Average mortality with standard deviation (n=3) of veligers from Weymouth
Water Treatment Plant in 2020 as a function of EarthTec QZ dose, temperature, and
exposure time

		0.5 hr.	2 hr.	5 hr.	24 hr.	
		Cont	trol			
15°C	End*	2.2±1.6%	1.2±1.7%	6.1±5.1%	2.7±2.0%	
15 C	Recovery**	13.7±9.7%	18.6±4.0%	16.2±13.0%	14.3±2.0%	
20°C	End	3.4±2.4%	1.9±1.4%	4.3±1.7%	0.8±1.2%	
20 C	Recovery	3.1±1.3%	13.2±2.4%	11.8±6.9%	0.9±1.2%	
	3 µ	L/L as EarthTec	(0.18 mg/L as C	u)		
15°C	End	4.7±3.5%	2.0±0.5%	20.0±3.6%	78.8±9.6%	
15 0	Recovery	NA	NA	52±14.7%	90.4±4.7%	
20°C	End	4.3±2.4%	7.8±2.4%	18.4±1.9%	88.7±1.3%	
20 C	Recovery	NA	NA	38.8±8.0%	94.8±1.4%	
	16.7	µL/L as EarthTe	c (1.0 mg/L as 0	Cu)		
15°C	End	3.1±2.2%	27.4±10.9%	39.7±3.2%	100±0.0%	
15 0	Recovery	NA	62.0±12.6%	87.5±9.1%	NA	
20°C	End	4.1±2.9%	22.5±2.8%	36.1±4.4%	100±0.0%	
20 C	Recovery	NA	56.1±3.0%	95±1.8%	NA	
	33.4	µL/L as EarthTe	c (2.0 mg/L as 0	Cu)		
15°C	End	27.9±9.4%	27.9±0.7%	68.6±10.2%	100±0.0%	
15 0	Recovery	53.5±9.2%	77.1±8.1%	93.1±5.2%	NA	
20°C	End	20.1±7.7%	44.7±7.4%	57.6±10.1%	100±0.0%	
20 0	Recovery	61.1±11.1%	71.3±3.1%	97.6±1.7%	NA	
	50.1	μL/L as EarthTe	c (3.0 mg/L as 0	Cu)		
15°C	End	15.4±8.4%	38.1±9.5%	59.7±4.5%	100.0±0.0%	
15 0	Recovery	47.7±5.2%	80.8±12.1%	98.3±2.4%	NA	
20°C	End	18.3±6.8%	34.7±8.7%	75.9±0.6%	99.7±0.5%	
20 0	Recovery	60.7±3.7%	96.1±1.7%	99.8±0.3%	99.9±0.1%	

* End is the end of the exposure period.

** Recovery is at the end of the 24-hour recovery period following the exposure period. NA=Not Assessed

In the Weymouth WTP influent samples, significant veliger mortality was observed at 3 (0.18), 16.7(1.0), 33.4(2.0), and 50.1(3.0) μ L/L as EarthTec QZ (mg/L as Cu) at both temperatures, following 24 hours of exposure time. Mortality of the 3 μ L/L EarthTec QZ was much higher than control at 5 and 24 hours of exposure. At 5 hours of exposure, the veligers exposed to all concentrations tested (3, 16.7, 33.4 and 50.1 μ L/L EarthTec QZ) began to demonstrate mortality greater than the control mortality. It took 24 hours for the veligers exposed to 16.7, 33.4 and 50.1 μ L/L EarthTec QZ to reach mortality of 100%. Higher veliger mortality was observed at the lower temperature of 15°C, compared with the 20°C test conditions; however, temperature was not a significant variable in the probit regression model to predict mortality.



End mortality results greater than 15% were checked for additional recovery mortality. The recovery procedure did show a significant increase in mortality results, both observationally and statistically.

Increased mortality in the recovery was due to veligers that showed signs of stress at the initial reading but were not quite dead enough to be stained by the fast green and counted as dead. With the additional recovery time, the stressed veligers were dead and stained. With this set of test subjects, the control mortality was less than 20% for all exposure durations and temperatures. The recovery mortality was generally higher than the initial end mortality. After the recovery period in the 5-hour treatments greater than 90% mortality was achieved in the three highest doses (16.7, 33.4, and 50.1 μ L/L EarthTec QZ). The 2-hour treatments reached greater than 70% mortality in the two highest concentrations (33.4 and 50.1 μ L/L EarthTec QZ).

Water quality parameters that were measured throughout testing included temperature, dissolved oxygen, pH, specific conductance, free and total copper, and chlorine. The average temperatures measured for the 15°C and 20°C test conditions were 15.3°C and 20.3°C, respectively. Varying the dose of EarthTec QZ did not produce notable changes in either the dissolved oxygen or the specific conductance in any of the test conditions. A statistically significant decrease in pH was observed with increasing EarthTec QZ concentrations, however the pH for each individual test condition remained mostly consistent over time. The full range of tested conditions resulted in pH values that were consistent with those under which veligers can thrive. Consistent with the findings from Lake Piru and Lake Mathews, free and total copper readings were very similar for each tested condition. As with the other test locations, the copper concentrations decreased slightly over time for a given dose of EarthTec QZ, but after 24 hours of exposure, the measured copper concentration was not significantly different from the original treatment concentration. Copper concentrations in the recovery were near zero. The measured chlorine concentrations were negligible. A table of detailed water quality measurements from the 2020 Weymouth WTP testing is included in Appendix G.

3.4 Lake Mathews 2021

For the fourth round of dose-response veliger testing was completed at Lake Mathews, a reservoir located in Riverside County, CA that is owned and operated by MWD. Samples of quagga veligers were collected at Lake Mathews on June 30, 2021 for the 15°C dose-response testing with EarthTec QZ with testing occurring June 30 to July 2. The 20°C dose-response testing with EarthTec QZ occurred July 14 to 16 with veligers and raw water collection occurring on the morning of July 14. Both sampling events resulted in a sufficient count of quagga mussel veligers for testing. KASF Consulting led the quagga veliger collection and testing efforts while Trussell and OCWD supported veliger collection, dose-response testing, and water quality assessment. MWD staff supported veliger collection efforts with access to the facility and towing/collection locations.

The veliger mortality results for the 2021 Lake Mathews testing are summarized in **Table 3.4** and graphed by temperature condition in **Appendix H**.

		0.5 hr.	2 hr.	5 hr.	24 hr.
			Control		
15°C	End*	0.0±0.0%	0.5±0.7%	0.0±0.0%	0.7±1.0%
15 C	Recovery**	NA	4.7±4.1%	12.3±10.9%	1.2±1.2%
20°C	End	1.8±0.9%	0.0±0.0%	1.0±0.8%	
20 C	Recovery	NA	2.3±1.4%	2.2±0.3%	18.1±5.3%
		3 μL/L as Earth	nTec (0.18 mg/L as	s Cu)	
15°C	End	0.8±0.6%	0.0±0.0%	0.9±1.0%	12.1±3.3%
15 C	End* 0.0±0.0 Recovery** NA End 1.8±0.9 Recovery NA End 1.8±0.9 Recovery NA End 0.8±0.9 Recovery NA End 0.8±0.9 Recovery NA End 0.8±0.9 Recovery NA End 0.8±0.9 Recovery NA End 0.8±0.2 Recovery NA End 0.8±0.2 Recovery NA End 1.2±0.0 Recovery NA End 1.2±0.0 Recovery NA End 1.3±1.0 Recovery NA End 5.3±2.0 Recovery NA End 1.9±0.7 Recovery NA	NA	NA	NA	25.5±4.1%
20°C	End	0.8±0.6%	2.6±0.9%	0.0±0.0%	7.4±0.9%
20 C	Recovery	NA	NA	NA	NA
		16.7 µL/L as Ea	rthTec (1.0 mg/L a	ns Cu)	
15°C	End	0.8±0.2%	2.4±1.7%	8.7±3.0%	85.6±1.0%
15 0	Recovery	NA	NA	NA	93.3±0.8%
20°C	End 1.2±0.6%		0.3±0.4%	19.5±8.3%	68.5±2.1%
20 C	Recovery	NA	NA	29.1±6.6%	80.7±2.1%
		33.4 µL/L as Ea	rthTec (2.0 mg/L a	as Cu)	
15°C	End	1.3±1.0%	3.3±2.4%	31.5±8.9%	96.7±1.0%
15 0	Recovery	NA	15.6±5.5%	65.8±3.5%	97.2±1.4%
20°C	End	5.3±2.0%	11.2±6.2%	48.5±3.6%	87.3±8.6%
20 C	Recovery	NA	NA	64.0±4.3%	94.7±1.2%
		50.1 µL/L as Ea	rthTec (3.0 mg/L a	as Cu)	
15°C	End	1.9±0.7%	1.8±0.6%	40.0±9.2%	99.5±0.7%
15 0	Recovery	NA	40.9±4.3%	89.0±0.8%	98.9±0.8%
20°C	End	7.3±1.0%	20.7±5.6%	48.0±2.0%	94.4±0.8%
20 0	Recovery	NA	43.4±3.1%	83.3±3.5%	97.8±0.8%

Table 3.4. Average mortality and standard deviation (n=3) of veligers from Lake Mathews in 2021 as a function of EarthTec QZ dose, temperature, and exposure time

* End is the end of the exposure period.

** Recovery is at the end of the 24-hour recovery period following the exposure period. NA=Not Assessed

In the Lake Mathews samples, significant quagga veliger mortality was observed with the 16.7(1.0), 33.4(2.0), and 50.1(3.0) μ L/L as EarthTec QZ (mg/L as Cu) test conditions at both temperatures after 24 hours of exposure. Mortality of the 3 μ L/L EarthTec QZ was greater than the control at 15 and 20°C, but was not greater than 20%. At 5 hours of exposure, the veligers exposed to the two highest concentrations (33.4 and 50.1 μ L/L EarthTec QZ) began to demonstrate mortality greater than 30%, but 50% mortality was not achieved. It took 24 hours for the veligers exposed to 16.7, 33.4 and 50.1 mg/L μ L/L EarthTec QZ to reach mortality of 85% or greater, except in the 24 h 16.7 μ L/L EarthTec QZ tests. Higher veliger mortality was observed at the lower temperature of 15°C, compared with the 19°C test conditions. Temperature was not a significant variable in the probit regression model.



Only the end mortality results greater than 12% were checked for additional recovery mortality after 24 hours. Additionally, there were two testing concentrations at 2 hours (33.4 and 50.1 μ L/L EarthTec QZ) that had low initial mortality that were checked for additional mortality to ensure that the results were less than 50%. These two concentrations at 15°C resulted in increased mortality but was less than 50%. The recovery procedure did show a significant increase in mortality results both observationally and was statistically significant. Increased mortality in the recovery was due to veligers showing signs of stress at the initial reading but were not quite dead enough to be stained by the fast green and counted as dead. With the additional recovery time, the stressed veligers were dead and stained. The recovery mortality was high with greater than 80% mortality being achieved in the three highest concentrations. The 5 h 50.1 μ L/L EarthTec QZ reached high mortality (greater than 80%).

Water quality parameters that were measured throughout testing included temperature, dissolved oxygen, pH, specific conductance, free and total copper, and chlorine. The average temperatures recorded for the 15°C and 20°C test conditions were 15.0°C and 20.9°C, respectively. Varying the dose of EarthTec QZ did not produce notable changes in either the dissolved oxygen or the specific conductance in any of the test conditions. The pH decreased with increased concentration and each concentrations pH was significantly different from each other during testing. The pH for each individual test condition remained mostly consistent over time. The full range of tested conditions resulted in pH values that were consistent with those under which veligers can thrive. Free and total copper readings were very similar for each tested condition. Over time the copper concentrations decreased slightly for a given dose of EarthTec QZ, but after 24 hours of exposure, the measured copper concentration was not significantly different from the original treatment concentration. Copper concentrations in the recovery were near zero. The measured chlorine concentrations were negligible. A table of detailed water quality measurements from the 2021 Lake Mathews testing is included in Appendix I.

3.5 Weymouth Water Treatment Plant Influent 2021

The fifth round of dose-response veliger testing was completed on June 28th through 30th, 2021 and July 12th through 14th, 2021 using veligers and raw water collected from the influent water to MWD's Weymouth WTP. Collection of veligers and water samples were taken June 30th and July 12th, 2021; both days resulted in a sufficient count of quagga mussel veligers for testing. KASF Consulting led the quagga veliger collection and testing efforts while Trussell and OCWD supported veliger collection, dose-response testing, and water quality assessment. MWD staff supported veliger collection efforts with access to the facility and towing/collection locations.

The veliger mortality results for the Weymouth WTP influent are summarized in **Table 3.5** and presented graphically by temperature condition in **Appendix J.**

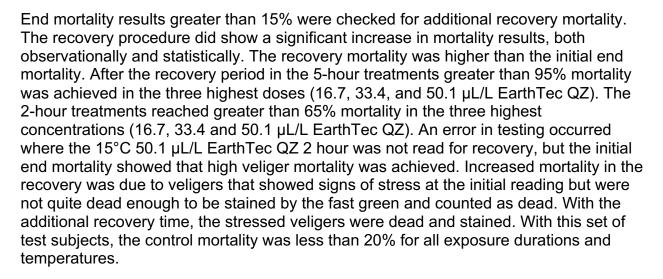
Table 3.5. Average mortality with standard deviation (n=3) of veligers from Weymouth
Water Treatment Plant in 2021 as a function of EarthTec QZ dose, temperature, and
exposure time

		0.5 hr.	2 hr.	5 hr.	24 hr.					
		Cont	trol							
15°C	End*	1.8±0.8%	3.4±1.2%	4.3±0.4%	5.2±5.8%					
15°C	Recovery**	NA	6.7±1.8%	13.4±2.3%	11.3±7.8%					
20°C	End	2.5±0.3%	5.0±1.7%	4.2±2.6%	5.6±2.3%					
20 C	Recovery	18.9±2.2%	13.5±4.0%	17.0±4.3%	5.5±1.5%					
3 μL/L as EarthTec (0.18 mg/L as Cu)										
15°C	End	4.0±1.8%	5.0±1.3%	7.4±2.5%	81.0±7.0%					
15 C	Recovery	NA	NA	NA	88.4±1.4%					
20°C	End	2.9±0.9%	8.8±0.9%	26.2±4.8%	90.4±3.8%					
20 C	Recovery	NA	NA	56.3±8.9%	91.0±1.5%					
	16.7	µL/L as EarthTe	ec (1.0 mg/L as C	Cu)						
15°C	End	4.7±0.3%	32.7±10.1%	77.4±10.5%	98.8±0.9%					
15 0	Recovery	NA	68.6±4.0%	96.7±1.0%	99.2±0.6%					
20°C	End	11.1±1.9%	43.2±3.5%	79.4±2.5%	99.8±0.3%					
20 C	Recovery	NA	75.7±1.7%	95.4±1.8%	100±0.0%					
	33.4	μL/L as EarthTe	ec (2.0 mg/L as C	Cu)						
15°C	End	11.5±4.5%	66.1±9.4%	96.9±2.6%	100±0.0%					
15 0	Recovery	NA	90.0±7.2%	100±0.0%	NA					
20°C	End	17.7±1.4%	53.2±12.1%	94.3±2.1%	99.7±0.4%					
20 C	Recovery	69.7±8.0%	98.2±0.7%	99.0±0.8%	100±0.0%					
	50.1	µL/L as EarthTe	c (3.0 mg/L as C	Cu)						
15°C	End	12.3±5.6%	94.2±1.8%	98.4±2.2%	100.0±0.0%					
15 0	Recovery	NA	NA	100±0.0%	NA					
20°C	End	36.0±14.1%	57.2±9.0%	97.7±1.0%	100±0.0%					
20 0	Recovery	84.6±4.0%	98.2±0.3%	100±0.0%	NA					

* End is the end of the exposure period.

** Recovery is at the end of the 24-hour recovery period following the exposure period. NA=Not Assessed

In the 2021 Weymouth WTP influent samples, significant veliger mortality was observed at 3 (0.18), 16.7(1.0), 33.4(2.0), and 50.1(3.0) μ L/L as EarthTec QZ (mg/L as Cu) at both temperatures, following 24 hours of exposure time. Mortality of the 3 μ L/L EarthTec QZ was much higher than control at 5 (20 °C) and 24 hours of exposure. At 5 hours of exposure, the veligers exposed to all concentrations tested (3, 16.7, 33.4 and 50.1 μ L/L EarthTec QZ) began to demonstrate mortality greater than the control mortality. It took 24 hours for the veligers exposed to 50.1 μ L/L EarthTec QZ to reach mortality of 100%. Higher veliger mortality was observed at the lower temperature of 15°C, compared with the 20°C test conditions; however, temperature was not a significant variable in the probit regression model to predict mortality.



Water quality parameters that were measured throughout testing included temperature, dissolved oxygen, pH, specific conductance, free and total copper, and chlorine. The average temperatures measured for the 15°C and 20°C test conditions were 14.2°C and 20.9°C, respectively. Varying the dose of EarthTec QZ did not produce notable changes in either the dissolved oxygen or the specific conductance in any of the test conditions. A statistically significant decrease in pH was observed with increasing EarthTec QZ concentrations, however the pH for each individual test condition remained mostly consistent over time. The full range of tested conditions resulted in pH values that were consistent with those under which veligers can thrive. Consistent with the findings from Lake Piru and Lake Mathews, free and total copper readings were very similar for each tested condition. As with the other test locations, the copper concentrations decreased slightly over time for a given dose of EarthTec QZ, but after 24 hours of exposure, the measured copper concentration was not significantly different from the original treatment concentration. Copper concentrations in the recovery were near zero. The measured chlorine concentrations were negligible. A table of detailed water quality measurements from Weymouth WTP testing is included in Appendix K.

4 Analysis

The following is a high-level analysis of the results shown in **Section 3**. Further discussion, correlations, statistical analysis, integrated analyses and recommendations will be provided in the Final Report.

To begin comparing dose-response results at the three sites, veliger mortality of all tested locations were grouped by EarthTec QZ concentration in **Appendix L**. As previously mentioned, a more comprehensive analysis of these results will be included in the Final Report.

Mortality of veligers was achieved using EarthTec QZ at the three sample locations over the three years. Weymouth WTP veligers in both 2020 and 2021 had the highest mortality (>75% mortality) using the lowest dose of EarthTec QZ (3 µL/L EarthTec QZ)



after 24 hours exposure time. The higher concentrations tested on Weymouth WTP veligers resulted in 100% mortality at both temperatures. Mortality of veligers from the 2020 Lake Mathews testing was greater than 90% at 16.7, 33.4, and 50.1 μ L/L EarthTec QZ for both temperatures tested at 24 hours of exposure time, but mortality in 2021 was lower for 16.7 μ L/L EarthTec QZ achieving 86 and 69% mortality for the 15 and 20°C tests. Veligers from Lake Piru had the lowest mortality after 24 hours of exposure, but >85% mortality was achieved at the highest concentration tested (50.1 μ L/L EarthTec QZ). In all test locations, the 15°C tests had higher mortality than the 20°C tests.

This study design used the fast green stain method to quickly analyze the health status of the veligers. In the Lake Piru samples, the end mortality was similar to the recovery mortality. The stain easily identified the veligers that were dead and additional mortality was not observed. In both the Lake Piru and Weymouth WTP samples, the recovery mortality was much higher than the end mortality, indicating that there was additional mortality after being evaluated with the fast green stain. Mortality in the 2- and 5-hour exposure times in the Weymouth WTP and Lake Mathews water increased at least 30% with the additional recovery time. Control mortality for the same exposure time increased about 10%. The fast green stain was working well, but stressed individuals did not stain. Their tissue did look abnormal and swollen, but there was still movement in some individuals with this condition. With the additional time of recovery, the fast green stain is used and veligers are observed with abnormal and swollen tissue, the use of a recovery period is recommended.

The water quality parameters measured during testing did not show any variances around the potential differences in mortalities seen. The temperature, dissolved oxygen, pH, and conductivity were within ranges that veligers survive and flourish. Chlorine concentrations were low, showing that the test results were not confounded by the presence of chlorine. The free and total copper concentrations were consistently similar, indicating that the free copper ion (i.e., Cu²⁺) was dominant, rather than copper in the particulate or complexed form. In the recovery step, the copper concentrations were minimal in all testing water, suggesting that any copper absorption by the veligers with exposure to EarthTec QZ was not released once the veligers were returned to source water without EarthTec QZ.

Differences in source water quality were observed (**Appendix A**), which likely factored into the efficacy of EarthTec QZ on the veligers. Lake Piru is a reservoir that is filled mainly with local runoff with some SWP, whereas Lake Mathews is supplied by the CRA system. The Weymouth WTP influent at the time of the sampling was supplied from Lake Mathews, but is chlorinated as it enters the pipeline. The differences in water quality include the following:

 Alkalinity and hardness were significantly higher at Lake Piru compared with the other locations; average values of 171 and 315 mg/L as CaCO₃, respectively, were measured at Lake Piru. The alkalinity and hardness of the 2020 Lake Mathews testing waters were the same as Weymouth WTP



influent samples (average values of 118 and 142 mg/L as CaCO₃, respectively. The 2021 alkalinity for Lake Mathews and Weymouth WTP (average 136 mg/L as CaCO₃) were similar to each other and higher than the 2020 levels. Hardness for 2021 did vary significantly between the two sampling events, but Lake Mathews and Weymouth WTP values were similar. During the first week of testing at 15°C the hardness mean value was 275 mg/L as CaCO₃ and the second week of testing at 20 °C the hardness mean value was 182 mg/L as CaCO₃.

- Water temperatures at Lake Piru (average 13.4°C) were significantly lower compared to those measured from samples collected from Lake Mathews (average 23°C) or Weymouth WTP influent (average 26.5°C). These temperature differences account for seasonal changes in the surface water. Lake Piru testing was completed in December 2019, whereas the testing associated with the Lake Mathews and Weymouth WTP influent samples were completed in September 2020 and July 2021. The higher water temperatures in September 2020 and July 2021 at Lake Mathews and post-pipeline at the downstream Weymouth WTP influent increases veliger metabolism, which could contribute to the sensitivity to EarthTec QZ.
- Lake Piru had a slightly higher average pH (8.34) compared to that of the 2020 Lake Mathews and Weymouth WTP influent (8.19 and 8.08, respectively). The 2021 pH of Lake Mathews and Weymouth WTP influent (8.27 and 8.23, respectively) were higher than 2020, but still lower than Lake Piru.
- The turbidity values at Lake Piru (average 7.94 NTU) were also elevated, compared to the 2020 and 2021 Lake Mathews and Weymouth WTP influent (0.74 and 0.67 NTU, respectively).

The size distribution of the veligers collected from Lake Piru had a large number of each size class present (**Table 4.1**). The veligers from the 2020 Lake Mathews and Weymouth WTP were mostly comprised of the smaller size class of D-shaped veligers. In the 2021 Lake Mathews samples the veligers were larger with less D-shaped veligers present. The 2021 Weymouth WTP had many small veligers present and only a few larger veligers, but the distribution of larger veligers increased in the 20°C tests. The veligers that were observed to survive EarthTec QZ addition tended to be pediveliger to large umbonal in size in all treatment waters. Therefore, the toxicity of EarthTec QZ for larger sized veligers may be lower in these two locations. Collection of veligers was completed within 2 days for the Lake Piru and 2020 Weymouth WTP testing and resulted in the same distribution of size classes. The 2020 and 2021 Lake Mathews and 2021 Weymouth WTP collections were taken 2 weeks apart and the distribution of size class was different with the later sampling event (20°C) having larger veligers, as reflected in **Table 4.1**.

		Size	Class	
Sample Site	D-shaped (50-150 µm)	Small umbonal (150-250 μm)	Large umbonal (200-350 µm)	Pediveliger (350-500 µm)
Lake Piru (15 & 20°C)	45%	15%	20%	20%
2020 Lake Mathews (15°C)	75%	20%	4%	1%
2020 Lake Mathews (19°C)	50%	30%	15%	5%
2020 Weymouth WTP (15 & 20°C)	80%	15%	3%	2%
2021 Lake Mathews (15°C)	52%	22%	23%	3%
2021 Lake Mathews (20°C)	32%	18%	38%	11%
2021 Weymouth WTP (15°C)	74%	8%	17%	2%
2021 Weymouth WTP (20°C)	53%	25%	22%	1%

Table 4.1. Size class distribution of veligers used in testing at each sample site

5 References

- Trussell Technologies (2019a). "Scientific Collection Permit, Specific Use Application." Application for *California Department of Fish and Wildlife*. November 6.
- Trussell Technologies (2019b). "Test Plan Evaluation of EarthTec QZ® for Use in the Restoration of Local Recharge Sources from Invasive Dreissenid Mussels." Report for *Orange County Water District*. November 15.

Appendix List

Appendix A: Raw Water Quality of Lake Piru, Lake Mathews and Weymouth WTP Influent

Appendix B: Lake Piru Veliger Dose-Response Figures

Appendix C: Lake Piru Dose-Response Veliger Testing - Water Quality Data

Appendix D: 2020 Lake Mathews Veliger Dose-Response Figures

Appendix E: 2020 Lake Mathews Dose-Response Veliger Testing – Water Quality Data



Appendix F: 2020 Weymouth Water Treatment Plant Influent Veliger Dose-Response Figures

Appendix G: 2020 Weymouth WTP Dose-Response Veliger Testing – Water Quality Data

Appendix H: 2021 Lake Mathews Veliger Dose-Response Figures

Appendix I: 2021 Lake Mathews Dose-Response Veliger Testing – Water Quality Data

Appendix J: 2021 Weymouth Water Treatment Plant Influent Veliger Dose-Response Figures

Appendix K: 2021 Weymouth WTP Dose-Response Veliger Testing – Water Quality Data

Appendix L: Veliger Mortality at All Sites Grouped by EarthTec QZ Concentration

Appendix A

Raw Water Quality of Lake Piru, Lake Mathews and Weymouth WTP Influent

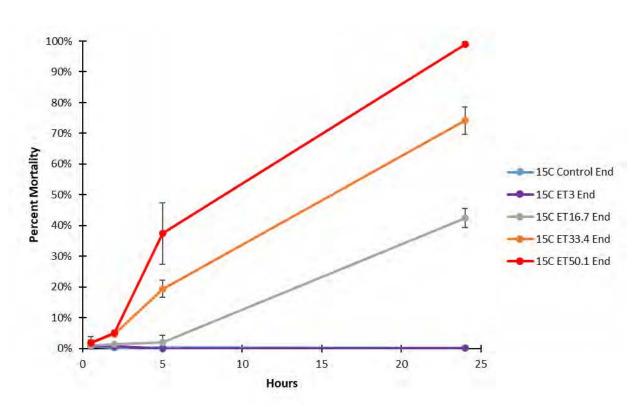
Table A1. Individual raw water quality measurements for Lake Piru, Lake Mathews, and Weymouth WTP

		Parameter	Total Copper	Free Copper	Total Chlorine	Oxidation Reduction Potential	Dissolved Oxygen	Conductivity	Hd	Temperature	Alkalinity	Hardness	Turbidity	Dissolved Organic Carbon	Chemical Oxygen Demand
Location			mg/L	mg/L	mg/L	mV	mg/L	μS/ cm	pH unit	°C	mg/ CaC	L as CO3	NTU	mg/L	mg/L
	Raw V	Vater Quality													
Lake Piru	2019	15°C Tests	0.15	0.14	0.08	210.4	10.45	927	8.43	12.0	187	314	9.29	5.33	10.00
	2019	20°C Tests	0.16	0.16	0.12	191.9	8.88	913	8.25	14.8	154	316	6.59	5.05	5.65
	Raw V	Vater Quality													
		15°C Tests	0.02	0.02	0.02	212.5	7.57	946	8.18	25.1	115	138	0.61	3.01	4.67
	2020	19°C Tests	0.01	0.01	0.02	245	8.08	937	8.20	18.9	115	142	0.89	2.95	5.69
Lake Mathews		20°C Tests *	0.02	0.02	0.10	244.3	7.86	948	8.21	25.8	116	144	0.92	2.91	7.83
	2021	15°C Tests	0.00	0.00	0.01	185.6	8.46	950	8.24	24.6	138	281	0.56	2.98	4.65
	2021	20°C Tests	0.00	0.00	0.00	208.2	8.34	957	8.29	23.5	135	178	0.92	2.91	3.30
	Raw V	Vater Quality													
		15°C Tests	0.01	0.01	0.04	214	8.27	944	8.02	25.6	119	150	0.76	4.09	8.50
Weymouth WTP	2020	20°C Tests	0.00	0.00	0.07	223.5	8.14	941	8.13	27.1	121	139	0.69	4.19	8.24
		Additional Sampling **	0.02	0.02	0.05	211	8.19	955	8.12	26.8	119	145	0.64	4.05	7.88
	2021	15°C Tests	0.02	0.03	0.10	195.6	8.69	969	8.18	21.9	137	275	0.61	3.01	4.46
	2021	20°C Tests	0.00	0.00	0.02	218.2	8.34	961	8.28	23.9	135	186	0.61	3.12	4.86

* During Round #2 testing, the Lake Mathews 20°C sample water was recollected due to insufficient veliger counts in the original collection. The Lake Mathews 19°C sample water represents the recollected sample water used for successful veliger testing.

** Re-sample of Weymouth Water Treatment Plant influent during Round #2 of testing for additional acute toxicity testing. This water was NOT used for veliger testing.





Appendix B Lake Piru Veliger Dose Response Figures

Figure B1. Veliger mortality with standard deviation bars (n=3) at the end of each exposure period at 15°C for Lake Piru trials

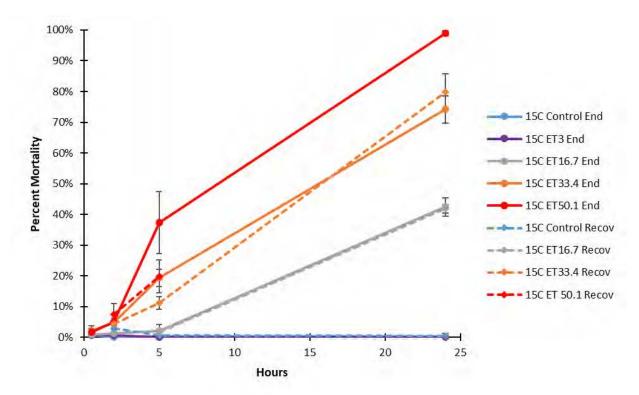


Figure B2. Veliger mortality with standard deviation bars (n=3) at the end of each exposure and recovery period at 15°C for Lake Piru trials

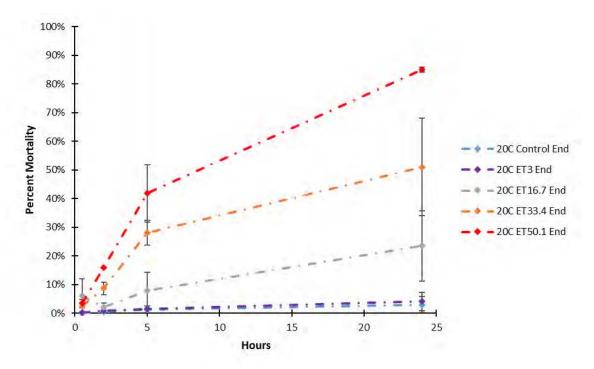


Figure B3. Veliger mortality with standard deviation bars (n=3) at the end of each exposure period at 20°C for Lake Piru trials



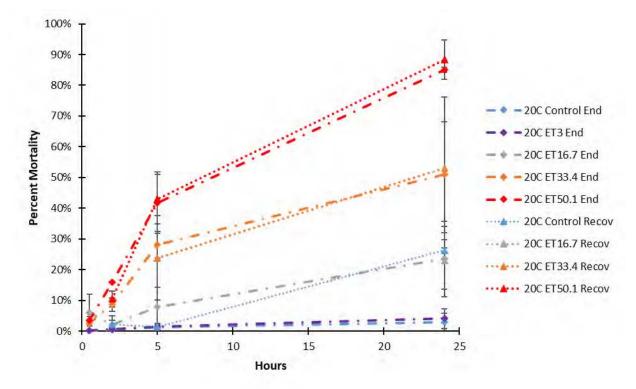


Figure B4. Veliger mortality with standard deviation bars (n=3) at the end of each exposure and recovery period at 20°C for Lake Piru trials



Appendix C Lake Piru Dose-Response Veliger Testing – Water Quality Data

Table C1. Average with standard deviation of water quality data for each Lake Piru dose-response test condition

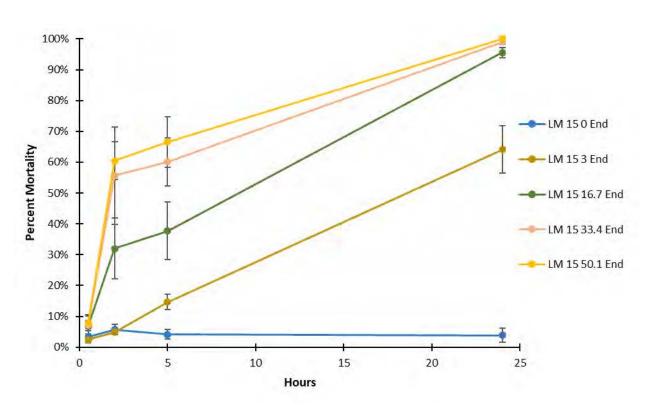
				15°C Tes	st Condit	ions				20°C Tes	st Condit	ions	
	Earth Tec QZ (µL/L)	0 h	0.5 h	2 h	5 h	24 h	Reco very	0 h	0.5 h	2 h	5 h	24 h	Reco very
	0.0	14.3 ±0.5	14.9 ±0.0	15.2 ±0.0	15.3 ±0.0	15.1 ±0.0	14.8 ±0.3	17.2 ±1.4	20.7 ±0.1	20.1 ±0.0	20.4 ±0.0	20.3 ±0.0	20.0 ±0.3
	3.0	14.5	14.9	15.4	15.4	15.1	14.8	16.7	21.1	20.0	20.3	20.3	<u>10.5</u> NM
Temp. (°C)		±0.4 14.5	±0.0 16.1	±0.2 15.7	±0.0 15.5	±0.0 15.0	±0.2 14.8	±1.4 17.4	±0.0 20.4	±0.0 20.6	±0.0 19.8	±0.0 20.2	20.1
	16.7	±0.6	±0.0	±0.0	±0.0	±0.0	±0.4	±1.4	±0.0	±0.0	±0.0	±0.0	± 0.0
	33.4	14.9	15.9	15.5	15.5	15.0	14.8	17.5	20.6	20.6	19.9	20.2	19.9
	33.4	±0.6	±0.0	±0.0	±0.0	±0.0	±0.2	±1.4	±0.0	±0.0	±0.0	±0.0	±0.3
	50.1	14.6	15.9	15.5	15.6	15.2	15.1	17.1	20.7	20.3	20.1	20.0	20.2
	••••	±0.6	±0.0	±0.0	±0.0	±0.0	±0.1	±1.5	±0.0	±0.0	±0.0	±0.0	±0.3
	0.0	9.07 ±0.03	8.96 ±0.03	8.80 ±0.04	8.56 ±0.04	9.21 ±0.11	9.07 ±0.25	9.40 ±0.13	9.13 ±0.05	9.16 ±0.52	8.20 ±0.19	5.65 ±0.45	7.11 ±0.44
		<u>+0.03</u> 9.05	<u>+0.03</u> 8.97	±0.04 8.84	<u>+0.04</u> 8.55	<u>+0.11</u> 9.19	<u>10.25</u> 9.14	9.60	<u>+0.05</u> 9.16	9.09	8.28	<u>+0.45</u> 5.15	
	3.0	±0.05	±0.01	±0.03	±0.06	±0.05	±0.13	±0.12	±0.09	±0.04	±0.18	±0.31	NM
DO	40 7	8.96	8.75	8.82	8.58	9.26	9.24	9.47	8.25	9.07	8.37	6.78	7.06
(mg/L)	16.7	±0.08	±0.03	±0.02	±0.01	±0.04	±0.08	±0.16	±0.06	±0.06	±0.26	±0.34	±0.36
,	33.4	8.98	8.77	8.78	8.60	9.26	9.33	9.54	9.12	8.88	8.21	7.61	7.23
	33.4	±0.12	±0.01	±0.02	±0.02	±0.05	±0.07	±0.12	±0.02	±0.09	±0.13	±0.46	±0.66
	50.1	8.69	8.75	8.85	8.62	9.71	9.40	9.53	8.17	8.71	8.26	8.09	7.47
		±0.09	±0.02	±0.10	±0.06	±0.00	±0.10	±0.15	±0.07	±0.19	±0.17	±0.02	±0.35
	0.0	8.50	8.47	8.45	8.49	8.47	8.46	8.31	8.22	8.21	8.15	8.16	8.35
		±0.10	±0.06	±0.03	±0.02	±0.02	±0.05	±0.03	±0.02	±0.03	±0.03	±0.04	±0.07
	3.0	8.53 ±0.05	8.47 ±0.04	8.45 ±0.05	8.46 ±0.03	8.5 ±0.01	8.52 ±0.02	8.33 ±0.01	8.22 ±0.01	8.24 ±0.00	8.02 ±0.15	8.12 ±0.02	NM
		<u>+0.05</u> 8.46	<u>+0.04</u> 8.40	<u>+0.05</u> 8.36	8.32	<u>+0.01</u> 8.46	<u>+0.02</u> 8.51	8.19	8.09	<u>+0.00</u> 8.12	8.06	8.22	8.44
рН	16.7	±0.09	±0.05	±0.04	±0.07	±0.00	±0.03	±0.03	±0.05	±0.02	±0.00	±0.02	±0.04
		8.26	8.35	8.21	8.31	8.40	8.53	8.09	8.02	8.03	7.98	8.24	8.44
	33.4	±0.03	±0.02	±0.03	±0.00	±0.01	±0.02	±0.04	±0.01	±0.01	±0.01	±0.04	±0.07
	50.4	8.20	8.25	8.16	8.24	8.36	8.53	7.99	7.95	7.94	7.92	8.23	8.41
	50.1	±0.40	±0.01	±0.01	±0.01	±0.01	±0.02	±0.03	±0.01	±0.01	±0.01	±0.01	±0.09
	0.0	950	938	936	940	949	946	930	938	944	947	966	965
	0.0	±23	±1	±9	±1	±1	±2	±5	±2	±1	±0	±2	±6
	3.0	936	938	940	940	948	945	940	944	944	947	966	NM
Specific		±1	±1	±1	±1	±1	±2	±2	±1	±1	±1	±1	
Conduct ance	16.7	939 ±3	942 ±1	944 ±3	942 ±1	949 ±1	944 ±3	943 ±2	946 ±0	947 ±1	948 ±1	965 ±1	964 ±2
(µS/cm)		<u>+</u> 3 941	943	±3 944	943	±1 950	±3 944	943	948	±1 949	951	±1 964	±∠ 962
(µS/cm)	33.4	±1	±0	±2	±1	±1	±3	±2	±2	±1	±1	±2	±3
		951	944	946	945	951	947	943	950	950	953	958	958
	50.1	±6	±1	±2	±0	±0	±1	±4	±0	±1	±0	±1	±3
	0.0	0.19	0.21	0.17	0.13	0.13	0.15	0.18	0.23	0.12	0.13	0.18	NM
	0.0	±0.04	±0.03	±0.01	±0.03	±0.01	±0.04	±0.05	±0.02	±0.01	±0.02	±0.04	INIVI
	3.0	0.32	0.29	0.27	0.32	0.25	0.19	0.31	0.29	0.28	0.28	0.33	NM
Free	0.0	±0.04	±0.00	±0.03	±0.06	±0.01	±0.04	±0.04	±0.03	±0.01	±0.00	±0.02	1 4101
Copper	16.7	1.05	1.02	0.89	0.95	1.00	0.21	1.10	1.05	1.06	1.04	1.08	NM
(mg/L)		±0.03	±0.01	±0.04	±0.02	±0.09	±0.04	±0.04	±0.01	±0.05	±0.01	±0.01	
	33.4	1.96 ±0.02	1.93 ±0.03	1.9 ±0.02	1.86 ±0.02	2.13 ±0.20	0.22 ±0.03	2.05 ±0.05	1.98 ±0.01	1.95 ±0.02	1.93 ±0.01	1.91 ±0.02	NM
		±0.02 2.93	±0.03 2.84	±0.02 2.77	±0.02 2.75	±0.20 2.93	±0.03 0.24	±0.05 2.97	±0.01 2.84	±0.02 2.84	±0.01 2.77	±0.02 2.80	
	50.1	±0.09	±0.02	±0.03	±0.04	±0.10	±0.04	±0.09	±0.04	±0.04	±0.01	±0.08	NM
		±0.00	±0.02	20.00	±0.07	-0.10	-0.07	20.00	±0.07	±0.07	-0.01	±0.00	

				15°C Tes	st Condit	ions		20°C Test Conditions						
	Earth Tec QZ (µL/L)	0 h	0.5 h	2 h	5 h	24 h	Reco very	0 h	0.5 h	2 h	5 h	24 h	Reco very	
	0.0	0.19	0.14	0.18	0.13	0.10	0.14	0.13	0.13	0.12	0.12	0.12	NIM	
		±0.00	±0.02	±0.02	±0.02	±0.02	±0.05	±0.02	±0.00	±0.01	±0.01	±0.02	NM	
	3.0	0.29	0.28	0.24	0.29	0.23	0.16	0.32	0.29	0.27	0.30	0.37	NM	
Total		±0.02	±0.00	±0.01	±0.03	±0.00	±0.07	±0.02	±0.02	±0.01	±0.01	±0.02	INIVI	
	467	1.04	1.00	0.98	0.98	1.03	0.17	1.10	1.04	1.07	1.02	1.09	NM	
Copper	16.7	±0.02	±0.02	±0.02	±0.01	±0.07	±0.08	±0.06	±0.03	±0.06	±0.02	±0.02	INIVI	
(mg/L)	22.4	1.96	1.93	1.91	1.88	2.14	0.20	2.05	1.96	1.97	1.93	1.93	NM	
	33.4	±0.01	±0.05	±0.02	±0.03	±0.18	±0.04	±0.04	±0.01	±0.04	±0.01	±0.02	INIVI	
	E0.4	2.91	2.85	2.81	2.78	2.97	0.23	2.96	2.85	2.85	2.80	2.79	N IN 4	
	50.1	±0.07	±0.03	±0.03	±0.05	±0.11	±0.05	±0.09	±0.02	±0.05	±0.00	±0.08	NM	

NM: Not Measured

Recovery: Follow up measurement at the end of the 24 h recovery period following the exposure period.

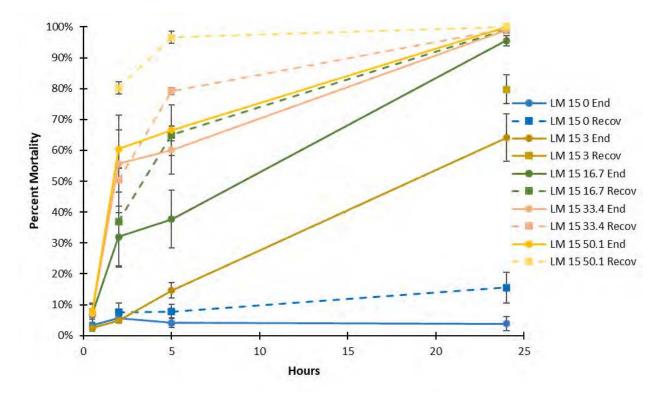


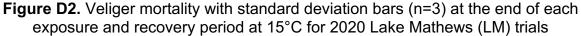


Appendix D 2020 Lake Mathews Veliger Dose-Response Figures

Figure D1. Veliger mortality with standard deviation bars (n=3) at the end of each exposure period at 15°C for 2020 Lake Mathews (LM) trials

TECHNICAL MEMORANDUM 1





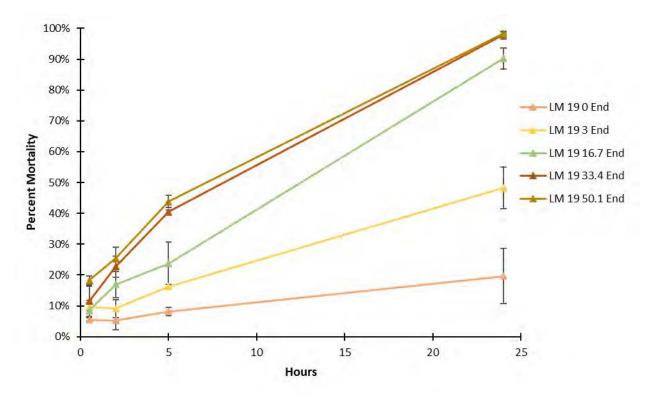


Figure D3. Veliger mortality with standard deviation bars (n=3) at the end of each exposure period at 19°C for 2020 Lake Mathews (LM) trials

TECHNICAL MEMORANDUM 1

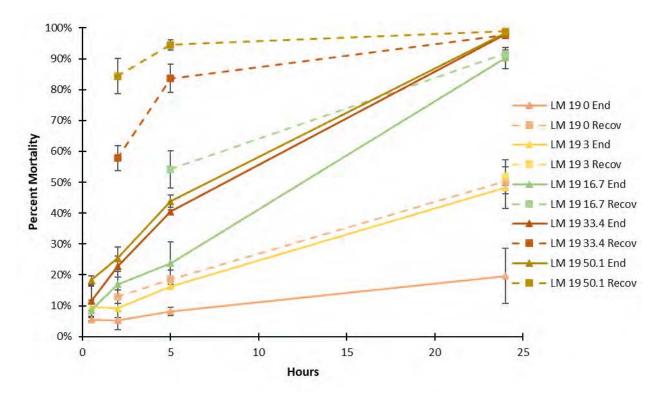


Figure D4. Veliger mortality with standard deviation bars (n=3) at the end of each exposure and recovery period at 19°C for 2020 Lake Mathews (LM) trials



Appendix E 2020 Lake Mathews Dose-Response Veliger Testing – Water Quality Data

 Table E1. Average water quality data for each 2020 Lake Mathews dose-response test
 condition

oonanion			15	°C Test (Conditio	ns	19°C Test Conditions						
	Earth Tec QZ						Reco						Reco
	(µL/L)	0 h	0.5 h	2 h	5 h	24 h	very	0 h	0.5 h	2 h	5 h	24 h	very
		17.3	14.9	14.2	14.2	15.1	14.5	21.2	22.5	21.0	21.2	21.2	21.0
	0.0	±0.1	±0.1	±0.0	±0.1	±0.0	±0.2	±0.6	±0.1	±0.0	±0.1	±0.8	±0.1
		15.0	14.8	14.2	14.2	15.1	14.5	21.5	20.9	20.9	21.2	21.3	21.3
-	3.0	±0.7	±0.0	±0.0	±0.1	±0.0	±0.1	±0.6	±0.1	±0.0	±0.1	±0.0	±0.0
Temp.		16.9	14.5	13.9	14.4	15.1	14.4	21.7	20.6	20.7	21.2	21.3	21.3
(°C)	16.7	±1.2	±0.1	±0.1	±0.0	±0.0	±0.3	±0.5	±0.1	±0.0	±0.0	±0.1	±0.1
	22.4	15.7	13.6	13.5	15.1	15.1	14.4	22.3	20.8	21.0	21.5	21.3	21.3
	33.4	±2.0 15.6	±0.3 13.2	±0.1 13.6	±0.0	±0.0 15.0	±0.3 14.5	±0.5 22.5	±0.1 20.6	±0.0 21.0	±0.0 21.6	±0.0 21.3	±0.1 21.2
	50.1	±2.9	±0.1	±0.0	15.1 ±0.0	±0.0	14.5 ±0.4	22.5 ±0.5	20.8 ±0.0	21.0 ±0.0	21.6 ±0.0	21.3 ±0.1	±0.1
	50.1	<u>±2.9</u> 7.63	8.10	<u>±0.0</u> 7.96	<u>±0.0</u> 7.94	±0.0 8.68	8.84	±0.5 8.01	<u>±0.0</u> 8.11	<u>±0.0</u> 8.09	<u>±0.0</u> 7.93	<u>±0.1</u> 7.58	<u>±0.1</u> 8.01
	0.0	±0.16	±0.21	+0.04	+0.06	±0.10	6.64 ±0.28	±0.07	±0.05	±0.05	±0.01	±0.07	±0.15
	0.0	<u>+0.10</u> 8.31	8.71	<u>+0.04</u> 8.59	<u>+0.00</u> 8.48	8.99	9.11	8.07	<u>+0.03</u> 8.12	<u>+0.03</u> 8.02	8.05	7.61	<u>+0.15</u> 8.09
	3.0	±0.11	±0.03	±0.06	±0.05	±0.04	±0.07	±0.04	±0.02	±0.02	±0.03	±0.09	±0.03
DO	5.0	8.33	<u>10.05</u> 9.02	<u>10.00</u> 8.43	<u>10.05</u> 8.40	<u>+0.04</u> 8.98	<u>10.07</u> 8.90	<u>10.04</u> 8.14	<u>10.02</u> 8.13	<u>10.02</u> 8.01	<u>10.05</u> 8.06	<u>10.05</u> 8.11	<u>10.04</u> 8.13
(mg/L)	16.7	±0.27	±0.04	±0.12	±0.03	±0.03	±0.23	±0.05	±0.02	±0.01	±0.02	±0.06	±0.09
(8.45	<u>+0.0</u> + 9.24	8.41	<u>+0.00</u> 8.35	<u>+0.03</u> 8.92	8.81	<u>-0.00</u> 8.10	8.17	7.96	7.98	8.33	8.22
	33.4	±0.38	±0.03	±0.12	±0.06	±0.07	±0.12	±0.07	±0.06	±0.02	±0.01	±0.09	±0.10
		8.61	9.72	8.44	8.45	9.12	8.73	8.09	8.12	7.99	8.00	8.26	8.49
	50.1	±0.53	±0.02	±0.09	±0.07	±0.06	±0.13	±0.07	±0.04	±0.01	±0.04	±0.04	±0.14
		8.31	8.35	8.34	8.36	8.26	8.26	8.08	8.13	8.13	8.14	8.15	8.24
	0.0	±0.02	±0.00	±0.01	±0.00	±0.01	±0.03	±0.03	±0.00	±0.00	±0.01	±0.03	±0.03
		8.29	8.32	8.32	8.32	8.22	8.27	8.09	8.14	8.11	8.12	8.08	8.25
	3.0	±0.01	±0.01	±0.01	±0.01	±0.00	±0.00	±0.01	±0.00	±0.01	±0.01	±0.01	±0.01
рН		8.20	8.27	8.27	8.23	8.18	8.26	8.06	8.11	8.06	8.09	8.12	8.25
рп	16.7	±0.03	±0.02	±0.02	±0.02	±0.02	±0.04	±0.02	±0.01	±0.01	±0.02	±0.01	±0.01
		8.15	8.19	8.21	8.19	8.12	8.25	7.93	8.05	7.92	7.93	8.09	8.27
	33.4	±0.08	±0.04	±0.06	±0.04	±0.03	±0.05	±0.06	±0.03	±0.03	±0.03	±0.03	±0.01
		8.00	8.08	8.08	8.09	8.08	8.25	8.03	7.90	7.75	7.84	8.00	8.30
	50.1	±0.08	±0.03	±0.02	±0.05	±0.03	±0.05	±0.06	±0.04	±0.03	±0.04	±0.03	±0.02
		939	938	937	936	940	939	947	947	948	948	954	954
	0.0	±1	±2	±1	±1	±0	±4	±3	±1	±1	±1	±1	±1
o	• •	941	938	938	940	943	941	945	946	946	947	955	946
Specific	3.0	±0	±0	±2	±0	±1	±0	±2	±0	±0	±0	±1	±0
Conduct	46.7	942	940	939	941	943	941	951	948	949	949	954	954
ance (µS/cm)	16.7	±3 945	±1 942	±0 944	±0 946	±0 947	±1 941	±1 955	±0 954	±0 952	±0 954	±1 958	±2 952
(µS/cm)	33.4	±6	942 ±0	944 ±0	940 ±0	±0	±1	±3	934 ±2	±0	934 ±0	±0	952 ±1
	55.4	<u>946</u>	<u>10</u> 945	<u>9</u> 43	<u>946</u>	<u>948</u>	<u>-</u> 1 942	<u>9</u> 57	955	<u>9</u> 55	<u>10</u> 957	<u>10</u> 957	953
	50.1	±4	±0	±0	±0	±1	±1	±1	±1	±0	±0	±0	±2
		0.09	0.10	0.08	0.04	0.05	0.05	0.09	0.11	0.10	0.05	0.07	0.04
	0.0	±0.03	±0.02	±0.04	±0.00	±0.01	±0.02	±0.00	±0.00	±0.02	±0.02	±0.01	±0.03
		0.43	0.41	0.41	0.37	0.36	0.07	0.36	0.35	0.34	0.32	0.32	0.05
Ene -	3.0	±0.00	±0.00	±0.01	±0.04	±0.2	±0.02	±0.02	±0.01	±0.02	±0.01	±0.02	±0.00
Free		1.25	1.21	1.20	1.18	1.16	0.09	1.03	1.04	1.00	0.95	0.95	0.10
Copper	16.7	±0.02	±0.01	±0.02	±0.05	±0.00	±0.03	±0.01	±0.01	±0.03	±0.01	±0.01	±0.01
(mg/L)		2.00	2.02	1.96	1.94	1.86	0.11	1.96	1.94	1.90	1.87	1.64	0.18
	33.4	±0.04	±0.02	±0.02	±0.02	±0.01	±0.05	±0.03	±0.01	±0.01	±0.02	±0.05	±0.04
		2.93	2.98	2.90	2.78	2.56	0.13	2.95	2.91	2.83	2.84	2.27	0.36
	50.1	±0.08	±0.04	±0.05	±0.02	±0.02	±0.04	±0.01	±0.05	±0.01	±0.03	±0.04	±0.13

			15	°C Test (19°C Test Conditions								
	Earth Tec QZ (µL/L)	0 h	0.5 h	2 h	5 h	24 h	Reco very	0 h	0.5 h	2 h	5 h	24 h	Reco very
		0.09	0.06	0.07	0.04	0.06	0.05	0.09	0.10	0.09	0.07	0.08	0.04
	0.0	±0.02	±0.01	±0.02	±0.02	±0.01	±0.01	±0.01	±0.00	±0.02	±0.05	±0.01	±0.02
		0.42	0.39	0.40	0.37	0.37	0.07	0.36	0.36	0.33	0.34	0.36	0.05
Total	3.0	±0.02	±0.00	±0.01	±0.03	±0.03	±0.02	±0.01	±0.01	±0.04	±0.03	±0.01	±0.00
Copper		1.25	1.21	1.18	1.19	1.20	0.09	1.04	1.01	0.99	0.94	0.98	0.10
	16.7	±0.03	±0.02	±0.02	±0.06	±0.01	±0.03	±0.02	±0.03	±0.04	±0.01	±0.02	±0.02
(mg/L)		2.00	2.01	1.95	1.91	1.86	0.12	1.94	1.93	1.90	1.88	1.64	0.18
	33.4	±0.05	±0.01	±0.01	±0.02	±0.02	±0.06	±0.03	±0.02	±0.00	±0.00	±0.04	±0.04
		2.94	2.95	2.87	2.77	2.56	0.14	2.95	2.90	2.84	2.85	2.29	0.36
	50.1	±0.06	±0.04	±0.05	±0.02	±0.03	±0.05	±0.01	±0.02	±0.02	±0.02	±0.05	±0.15
	0.0	0.04 ±0.01 0.05	0.04 ±0.01 0.07	0.03 ±0.01 0.03	0.06 ±0.00 0.04	0.04 ±0.01 0.04	NM	0.07 ±0.00 0.06	0.06 ±0.01 0.06	0.06 ±0.01 0.06	0.05 ±0.02 0.07	0.05 ±0.01 0.04	NM
- ()	3.0	±0.01	±0.01	±0.00	±0.01	±0.01	NM	±0.01	±0.00	±0.02	±0.01	±0.00	NM
Total		0.06	0.05	0.05	0.06	0.04		0.08	0.08	0.06	0.06	0.05	
Chlorine	16.7	±0.00	±0.02	±0.00	±0.01	±0.01	NM	±0.01	±0.01	±0.02	±0.00	±0.00	NM
(mg/L)		0.07	0.09	0.07	0.08	0.05		0.07	0.10	0.07	0.10	0.06	
	33.4	±0.02	±0.01	±0.00	±0.02	±0.01	NM	±0.02	±0.01	±0.01	±0.00	±0.00	NM
		0.08	0.11	0.08	0.10	0.09		0.08	0.11	0.09	0.11	0.08	
	50.1	±0.02	±0.01	±0.01	±0.01	±0.00	NM	±0.01	±0.01	±0.02	±0.02	±0.01	NM

NM: Not Measured

Recovery: Follow up measurement at the end of the 24 h recovery period following the exposure period.

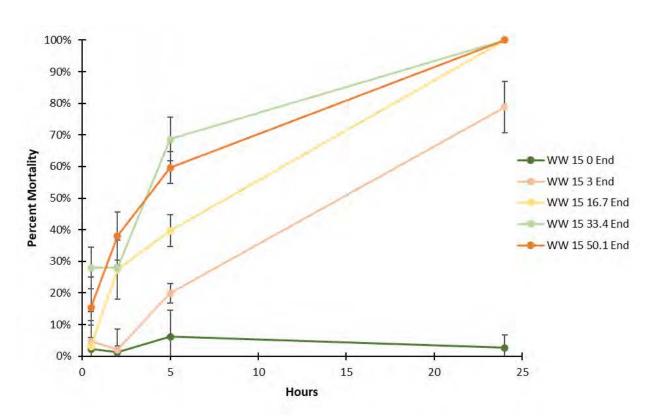




Figure F1. Veliger mortality with standard deviation bars (n=3) at the end of each exposure period at 15°C for the 2020 Weymouth Water Treatment Plant (WW) trials

TECHNICAL MEMORANDUM 1

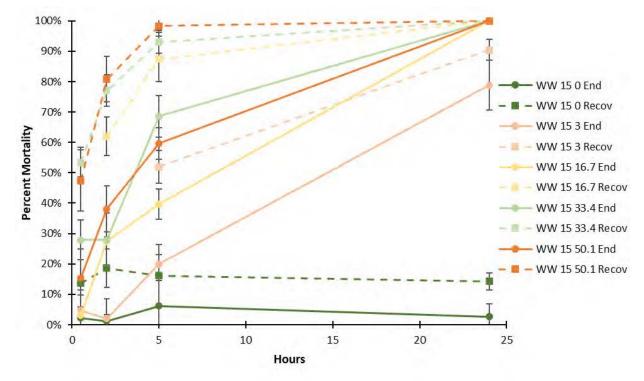


Figure F2. Veliger mortality with standard deviation bars (n=3) at the end of each exposure and recovery period at 15°C for the 2020 Weymouth Water Treatment Plant (WW) trials

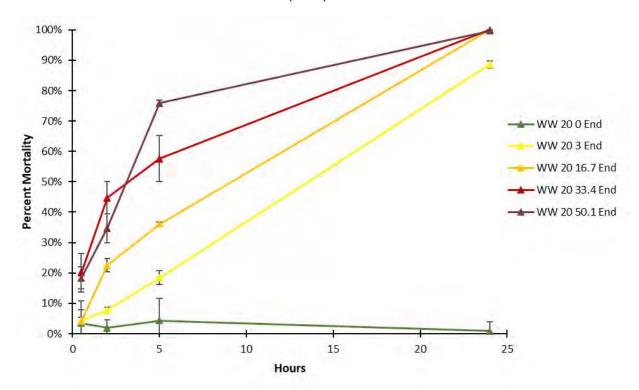


Figure F3. Veliger mortality with standard deviation bars (n=3) at the end of each exposure period at 20°C for the 2020 Weymouth Water Treatment Plant (WW) trials



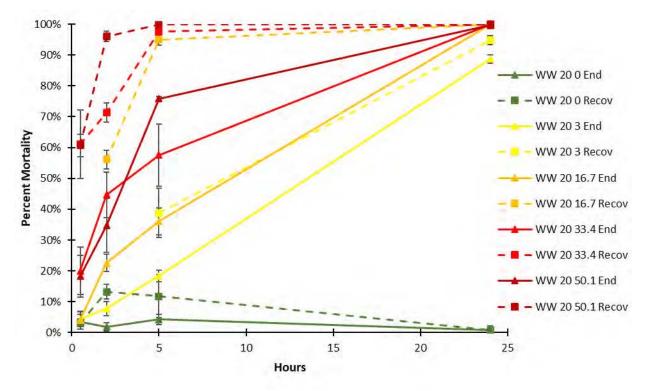


Figure F4. Veliger mortality with standard deviation bars (n=3) at the end of each exposure and recovery period at 20°C for the 2020 Weymouth Water Treatment Plant (WW) trials



Appendix G 2020 Weymouth WTP Dose-Response Veliger Testing – Water Quality Data

Table G1. Average water quality data for each dose-response test condition usingWeymouth WTP influent in 2020

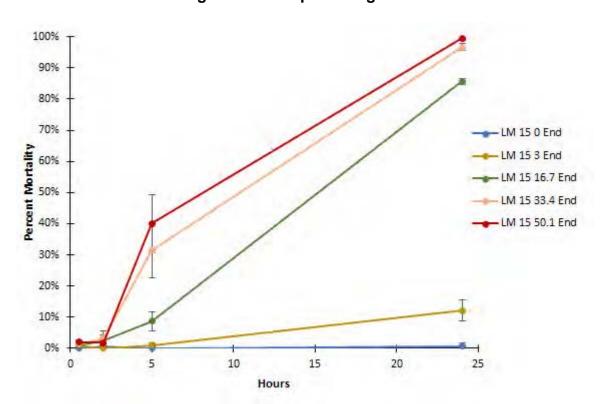
		much		°C Test	Conditic	ons		20°C Test Conditions						
	Earth Tec QZ						Reco						Reco	
	(µL/L)	0 h	0.5 h	2 h	5 h	24 h	very	0 h	0.5 h	2 h	5 h	24 h	very	
	0.0	16.6	15.2	14.8	14.5	15.4	15.4	22.0	20.1	19.7	20.9	19.7	20.0	
	0.0	±0.5	±0.5	±0.5	±0.0	±0.1	±0.3	±0.5	±0.1	±0.1	±0.0	±0.1	±0.3	
	3.0	16.6	14.8	14.4	14.4	15.2	15.5	22.0	19.9	19.6	21.1	19.7	20.0	
_	••••	±0.8	±0.1	±0.1	±0.0	±0.0	±0.3	±0.4	±0.0	±0.1	±0.3	±0.0	±0.3	
Temp.	16.7	16.9	14.6	14.5	14.2	14.9	15.4	22.2	19.7	19.6	20.8	19.7	19.9	
(°C)		±0.8	±0.0	±0.0	±0.1	±0.1	±0.3	±0.4	±0.1	±0.0	±0.0	±0.1	±0.1	
	33.4	16.9	15.8	15.0	15.1	14.5	15.2	22.3	19.9	19.9	19.9	NM	20.0	
		±1.7 16.8	±0.1 15.7	±0.1 15.2	±0.0 15.2	±0.0 14.4	±0.3	±0.6 22.4	±0.1	±0.1	±0.0	20.2	±0.2 20.0	
	50.1	±1.7		15.2 ±0.0		14.4 ±0.1	15.2 ±0.2	22.4 ±0.4	19.8 +0.0	20.0	19.6	20.3		
		±1.7 8.73	<u>+0.0</u> 9.22	±0.0 8.73	<u>+0.1</u> 8.88	9.35	<u>±0.2</u> 9.24	±0.4 8.19	<u>+0.0</u> 8.37	±0.0 8.37	±0.0 8.33	±0.1 8.63	<u>+0.2</u> 8.61	
	0.0	6.73 ±0.20	9.22 ±0.03	0.73 ±0.06	o.oo ±0.02	9.35 ±0.10	9.24 ±0.06	6.19 ±0.04	0.37 ±0.07	6.37 ±0.05	6.33 ±0.02	0.03 ±0.04	0.01 ±0.12	
		±0.20 8.73	±0.03 9.18	±0.08 8.76	±0.02 8.76	±0.10 9.42	£0.08 9.13	±0.04 8.21	±0.07 8.33	±0.05 8.32	±0.02 8.40	±0.04 8.73	±0.12 8.68	
	3.0	±0.17	±0.10	±0.04	±0.17	9.42 ±0.03	±0.06	±0.08	±0.03	±0.02	±0.05	±0.01	±0.09	
DO		<u>10.17</u> 8.72	9.13	<u>10.04</u> 8.78	8.97	<u>10.05</u> 9.55	<u>10.00</u> 9.23	8.22	<u>10.05</u> 8.28	8.36	<u>10.05</u> 8.39	<u>10.01</u> 8.74	<u>10.03</u> 8.53	
(mg/L)	16.7	±0.17	±0.10	±0.14	±0.09	±0.03	±0.09	±0.04	±0.06	±0.03	±0.06	±0.03	±0.08	
(iiig/L)		8.86	8.88	8.85	9.02	<u>9.55</u>	<u>10.05</u> 9.25	8.25	8.22	8.37	<u>+0.00</u> 8.34		<u>10.00</u> 8.56	
	33.4	±0.06	±0.05	±0.01	±0.02	±0.08	±0.08	±0.09	±0.07	±0.02	±0.02	NM	±0.11	
	50.1	8.77	8.80	8.89	8.87	9.64	9.12	8.27	8.28	8.34	8.37	8.77	8.64	
		±0.05	±0.01	±0.12	±0.05	±0.05	±0.10	±0.12	±0.07	±0.08	±0.02	±0.02	±0.14	
	0.0	8.29	8.31	8.33	8.31	8.31	8.32	8.21	8.28	8.30	8.30	8.27	8.23	
		±0.05	±0.00	±0.00	±0.00	±0.00	±0.01	±0.06	±0.00	±0.00	±0.01	±0.00	±0.10	
		8.28	8.30	8.31	8.30	8.30	8.32	8.22	8.26	8.28	8.28	8.26	8.31	
	3.0 16.7 33.4	±0.02	±0.00	±0.00	±0.01	±0.00	±0.01	±0.02	±0.00	±0.01	±0.01	±0.00	±0.01	
		8.18	8.23	8.24	8.23	8.23	8.33	8.18	8.26	8.19	8.21	8.22	8.27	
рН		±0.01	±0.02	±0.02	±0.03	±0.00	±0.01	±0.05	±0.08	±0.02	±0.02	±0.02	±0.04	
		8.08	8.10	8.13	8.09	8.13	8.33	8.10	8.18	8.16	8.04		8.23	
		±0.05	±0.02	±0.03	±0.03	±0.03	±0.01	±0.04	±0.06	±0.05	±0.03	NM	±0.08	
	50.1	7.92	8.01	7.97	7.95	8.05	8.34	8.01	8.05	8.02	7.96	8.11	8.26	
		±0.06	±0.05	±0.09	±0.05	±0.03	±0.01	±0.07	±0.04	±0.04	±0.04	±0.04	±0.06	
		937	931	936	936	940	941	937	937	934	937	941	942	
	0.0	±3	±1	±1	±1	±1	±2	±2	±2	±1	±0	±1	±1	
		938	937	936	936	939	941	935	936	935	937	941	944	
Specific	3.0	±1	±0	±0	±0	±0	±0	±1	±0	±1	±0	±0	±1	
Conduct	46 7	940	938	938	937	939	940	937	937	937	938	942	942	
ance	16.7	±0	±1	±0	±1	±0	±0	±1	±0	±0	±0	±0	±1	
(µS/cm)	33.4	943	944	940	940	942	940	945	939	939	941		942	
	33.4	±2	±1	±1	±0	±0	±1	±4	±0	±0	±0	NM	±0	
	E0 4	944	945	943	943	942	941	944	944	943	944	945	942	
	50.1	±1	±0	±0	±1	±0	±1	±3	±0	±0	±0	±0	±2	
	0.0	0.02	0.05	0.03	0.03	0.03	0.02	0.02	0.04	0.03	0.03	0.03	0.01	
	0.0	±0.01	±0.01	±0.00	±0.01	±0.00	±0.01	±0.02	±0.01	±0.00	±0.02	±0.01	±0.01	
	3.0	0.28	0.29	0.28	0.28	0.26	0.02	0.29	0.30	0.27	0.20	0.32	0.03	
Free	5.0	±0.00	±0.01	±0.01	±0.00	±0.00	±0.01	±0.01	±0.02	±0.00	±0.00	±0.12	±0.09	
	16.7	0.95	0.95	0.94	0.92	0.91	0.03	1.08	1.08	1.06	1.03	0.98	0.02	
Copper (mg/L)	10.7	±0.02	±0.01	±0.02	±0.02	±0.00	±0.01	±0.01	±0.02	±0.02	±0.01	±0.01	±0.01	
(mg/L)	10.7	1.99	1.92	1.95	1.92	1.87	0.04	1.93	1.91	1.95	1.90	NM	0.04	
	22.4	1.99	1.02									13113/1		
	33.4	±0.04	±0.01	±0.02	±0.00	±0.01	±0.01	±0.01	±0.02	±0.02	±0.01	INIVI	±0.01	
	33.4 50.1				±0.00 2.78	±0.01 2.57	±0.01 0.05	±0.01 2.89	±0.02 2.84	±0.02 2.86 ±0.04	±0.01 2.79	2.41	±0.01 0.10 ±0.07	

			15	°C Test	Conditio	20°C Test Conditions							
	Earth Tec QZ (µL/L)	0 h	0.5 h	2 h	5 h	24 h	Reco very	0 h	0.5 h	2 h	5 h	24 h	Reco very
	0.0	0.02 ±0.01	0.05 ±0.01	0.03 ±0.01	0.03 ±0.01	0.03 ±0.01	0.02 ±0.01	0.03 ±0.02	0.04 ±0.02	0.02 ±0.00	0.04 ±0.01	0.02 ±0.00	0.01 ±0.01
Tatal	3.0	0.27 ±0.01	0.29 ±0.01	0.28 ±0.00	0.28 ±0.00	0.26 ±0.01	0.02 ±0.01	0.29 ±0.00	0.28 ±0.01	0.27 ±0.01	0.28 ±0.00	0.28 ±0.05	0.03 ±0.01
Total Copper	16.7	0.95 ±0.01	0.95 ±0.01	0.94 ±0.01	0.93 ±0.01	0.92 ±0.01	0.03 ±0.01	1.08 ±0.01	1.07 ±0.01	1.06 ±0.01	1.03 ±0.02	0.98 ±0.01	0.02 ±0.00
(mg/L)	33.4	1.98 ±0.04	1.91 ±0.02	1.93 ±0.02	1.91 ±0.01	1.88 ±0.03	0.04 ±0.02	1.93 ±0.00	1.90 ±0.02	1.95 ±0.02	1.90 ±0.02	NM	0.04 ±0.01
	50.1	2.83 ±0.02	2.80 ±0.03	2.83 ±0.04	2.78 ±0.03	2.57 ±0.03	0.06 ±0.02	2.88 ±0.02	2.82 ±0.01	2.83 ±0.02	2.76 ±0.03	2.42 ±0.03	0.10 ±0.07
	0.0	0.06 ±0.02	0.06 ±0.00	0.06 ±0.00	0.06 ±0.00	0.03 ±0.00	NM	0.08 ±0.01	0.08 ±0.01	0.06 ±0.01	0.05 ±0.00	0.05 ±0.00	NM
Total	3.0	0.05 ±0.01	0.06 ±0.00	0.05 ±0.00	0.06 ±0.00	0.03 ±0.00	NM	0.05 ±0.00	0.06 ±0.00	0.05 ±0.00	0.05 ±0.00	0.04 ±0.01	NM
Chlorine	16.7	0.05 ±0.00	0.06 ±0.01	0.05 ±0.01	0.06 ±0.01	0.04 ±0.01	NM	0.05 ±0.01	0.07 ±0.01	0.05 ±0.01	0.05 ±0.00	0.08 ±0.02	NM
(mg/L)	33.4	0.07 ±0.01	0.07 ±0.00	0.08 ±0.01	0.06 ±0.01	0.04 ±0.00	NM	0.09 ±0.02	0.06 ±0.01	0.05 ±0.00	0.05 ±0.00	NM	NM
	50.1	0.06 ±0.01	0.07 ±0.01	0.09 ±0.01	0.08 ±0.00	0.05 ±0.01	NM	0.10 ±0.02	0.07 ±0.01	0.08 ±0.02	0.08 ±0.02	0.07 ±0.03	NM

NM: Not Measured

Recovery: Follow up measurement at the end of the 24 h recovery period following the exposure period.

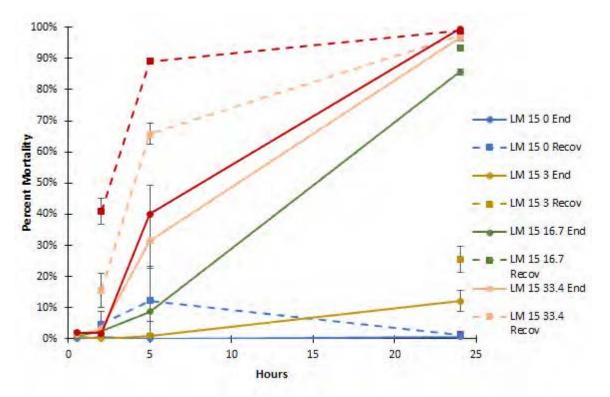


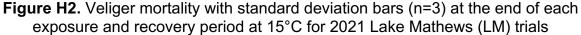


Appendix H 2021 Lake Mathews Veliger Dose-Response Figures

Figure H1. Veliger mortality with standard deviation bars (n=3) at the end of each exposure period at 15°C for 2021 Lake Mathews (LM) trials

TECHNICAL MEMORANDUM 1





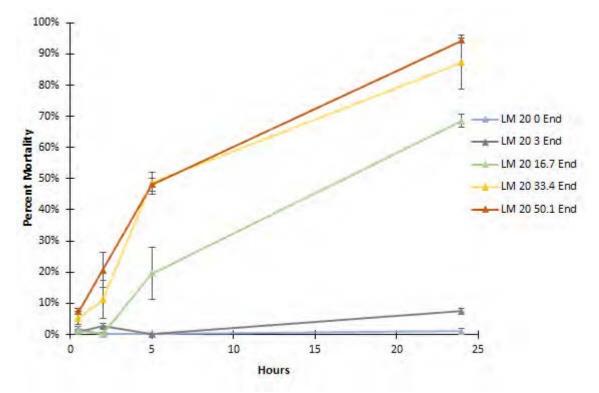


Figure H3. Veliger mortality with standard deviation bars (n=3) at the end of each exposure period at 20°C for 2021 Lake Mathews (LM) trials

TECHNICAL MEMORANDUM 1

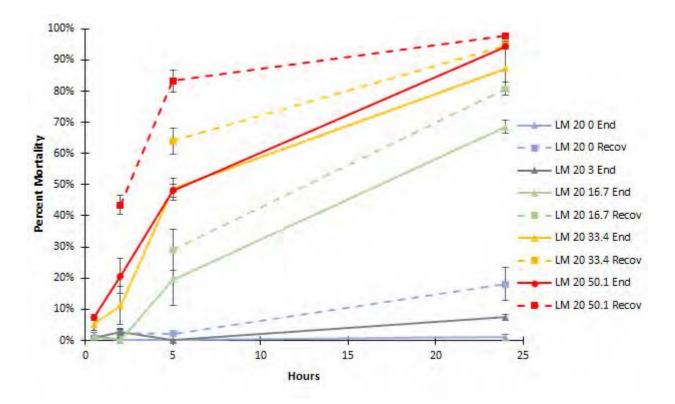


Figure H4. Veliger mortality with standard deviation bars (n=3) at the end of each exposure and recovery period at 20°C for 2021 Lake Mathews (LM) trials



Appendix I 2021 Lake Mathews Dose-Response Veliger Testing – Water Quality Data

 Table I1. Average water quality data for each 2021 Lake Mathews dose-response test
 condition

			15	°C Test (Conditio	าร		20°C Test Conditions						
	Earth Tec QZ						Reco						Reco	
	(µL/L)	0 h	0.5 h	2 h	<u>5 h</u>	24 h	very	0 h	0.5 h	2 h	<u>5 h</u>	24 h	very	
	• •	14.5	14.9	15.5	14.8	14.9	15.3	22.1	20.0	20.1	21.1	21.1	21.1	
	0.0	±0.0 14.2	±0.5	±0.1 15.5	±0.1	±0.0	±0.2 15.3	±0.6 23.2	±0.1 20.0	±0.1 20.0	±0.0 21.1	±0.0	±0.3	
	3.0	14.2 ±0.1	14.8 ±0.0	15.5 ±0.0	14.8 ±0.0	14.9 ±0.0	±0.1	23.2 ±0.9	20.0 ±0.1	20.0 ±0.1	∠1.1 ±0.1	21.1 ±0.0	NM	
Temp.	5.0	<u>14.5</u>	14.4	14.6	14.4	<u>10.0</u> 14.5	15.2	23.3	<u>19.9</u>	<u>10.1</u> 20.1	<u>10.1</u> 21.1	<u>+0.0</u> 20.1	21.0	
(°C)	16.7	±0.1	± 0.0	± 0.0	±0.1	± 0.0	±0.1	±0.4	±0.1	±0.1	±0.0	±0.1	±0.1	
(0)	10.1	14.3	14.1	14.5	14.4	14.5	15.0	21.8	20.9	20.0	20.3	20.1	20.1	
	33.4	±0.2	±0.1	±0.2	±0.1	±0.0	±0.0	±0.2	±0.0	±0.1	±0.0	±0.1	±0.1	
		14.0	14.4	15.2	15.6	15.6	15.3	21.7	20.9	20.0	20.2	20.0	20.8	
	50.1	±0.5	±0.1	±0.1	±0.1	±0.1	±0.1	±0.2	±0.0	±0.1	±0.0	±0.0	±0.3	
		9.59	9.86	9.43	9.36	9.22	8.83	8.04	8.17	8.05	8.01	7.47	7.81	
	0.0	±0.20	±0.11	±0.07	±0.08	±0.05	±0.10	±0.21	±0.04	±0.02	±0.02	±0.09	±0.12	
		9.82	10.02	9.83	9.71	9359	8.92	8.00	8.19	7.97	8.00	7.85	NM	
	3.0	±0.07	±0.01	±0.01	±0.03	±0.02	±0.05	±0.16	±0.04	±0.03	±0.05	±0.04		
DO		9.64	9.79	9.53	9.49	9.40	9.06	7.99	8.18	8.04	8.06	7.95	8.07	
(mg/L)	16.7	±0.12	±0.06	±0.06	±0.03	±0.03	±0.03	±0.13	±0.11	±0.07	±0.16	±0.01	±0.17	
	22.4	9.87	10.05	9.68	9.54	9.52	9.01	8.16	8.28	8.04	8.02	8.10	8.30	
	33.4	±0.19	±0.06	±0.06	±0.03	±0.03	±0.03	±0.14	±0.08	±0.05	±0.06	±0.08	±0.11	
	50.4	9.97	10.19	9.70	9.78	9.93	9.23	8.16	8.33	7.99	8.01	7.95	8.24	
	50.1	<u>±0.17</u> 8.49	<u>±0.01</u> 8.23	<u>±0.05</u> 8.36	<u>±0.02</u> 8.29	<u>±0.02</u> 8.35	<u>+0.07</u> 8.38	<u>±0.07</u> 8.30	<u>±0.04</u> 8.35	<u>±0.05</u> 8.33	<u>+0.03</u> 8.32	<u>±0.01</u> 8.31	<u>+0.24</u> 8.31	
	0.0	6.49 ±0.07	o.23 ±0.18	6.30 ±0.00	0.29 ±0.01	6.35 ±0.01	0.30 ±0.03	6.30 ±0.02	6.35 ±0.03	6.33 ±0.03	0.32 ±0.01	6.31 ±0.05	± 0.03	
	0.0	8.38	8.34	<u>10.00</u> 8.34	8.29	8.24	8.39	8.27	<u>10.05</u> 8.32	<u>10.03</u> 8.29	8.31	<u>10.05</u> 8.26		
	3.0	±0.05	±0.00	±0.00	±0.00	±0.01	±0.00	±0.01	±0.00	±0.01	±0.02	±0.00	NM	
	0.0	8.30	8.27	8.27	8.23	8.26	8.41	8.20	8.17	8.20	8.27	8.23	8.32	
рН	16.7	±0.04	±0.02	±0.03	±0.02	±0.01	±0.00	±0.04	±0.04	±0.02	±0.05	±0.01	±0.04	
		8.18	8.13	8.18	8.16	8.19	8.40	8.15	8.23	8.13	8.17	8.22	8.34	
	33.4	±0.04	±0.01	±0.05	±0.05	±0.02	±0.02	±0.10	±0.04	±0.04	±0.05	±0.02	±0.01	
		8.04	8.03	8.04	8.05	8.13	8.42	8.01	8.12	8.00	8.02	8.14	8.34	
	50.1	±0.05	±0.05	±0.05	±0.03	±0.02	±0.02	±0.05	±0.02	±0.05	±0.04	±0.03	±0.03	
		948	952	950	953	950	952	949	949	949	949	951	955	
	0.0	±1	±0	±0	±1	±0	±1	±4	±1	±1	±0	±0	±1	
		950	952	951	952	949	952	945	948	948	949	951	NM	
Specific	3.0	±2	±0	±0	±1	±0	±0	±3	±0	±0	±1	±0		
Conduct	46 -	954	954	953	956	949	952	947	951	951	952	953	951	
ance	16.7	±2	±0	±1	±1	±0	±0	±3	±0	±0	±0	±0	±1	
(µS/cm)	22.4	954	954	958	954	957	956	953	954	954	954	955	951	
	33.4	±3 958	±2 959	±2 959	±3 956	±0 958	±1 952	±2 957	±0 956	±0 956	±0 956	±1 957	±1 950	
	50.1	956 ±1	959 ±0	959 ±2	956 ±1	956 ±0	952 ±1	957 ±1	956 ±0	956 ±1	956 ±0	957 ±0	950 ±1	
	50.1	0.01	0.01	0.01	0.03	0.01	0.01	0.05	0.05	0.03	0.03	0.06	0.02	
	0.0	±0.01	±0.01	±0.01	±0.00	±0.01	±0.01	±0.01	±0.01	±0.02	±0.03	±0.03	±0.02	
	010	0.20	0.20	0.19	0.23	0.24	0.00	0.23	0.24	0.17	0.19	0.21		
F .	3.0	±0.00	±0.01	±0.00	±0.01	±0.03	±0.00	±0.05	±0.02	±0.01	±0.00	±0.01	NM	
Free		0.00	0.94	0.94	0.95	0.94	0.00	1.12	1.04	1.12	0.94	0.98	0.05	
Copper	16.7	±0.02	±0.01	±0.00	±0.01	±0.03	±0.00	±0.15	±0.02	±0.16	±0.01	±0.01	±0.01	
(mg/L)		1.93	1.88	1.89	1.83	1.73	0.05	2.02	1.93	1.93	1.88	1.81	0.14	
	33.4	±0.05	±0.02	±0.02	±0.01	±0.02	±0.03	±0.01	±0.01	±0.02	±0.01	±0.02	±0.03	
		2.94	2.85	2.87	2.68	2.49	0.12	2.95	2.82	2.77	2.66	2.34	0.18	
	50.1	±0.01	±0.03	±0.01	±0.02	±0.03	±0.07	±0.02	±0.02	±0.02	±0.02	±0.02	±0.07	

			15	°C Test (Conditio	ns			20	°C Test (Conditio	ns	
	Earth Tec QZ (µL/L)	0 h	0.5 h	2 h	5 h	24 h	Reco very	0 h	0.5 h	2 h	5 h	24 h	Reco very
		0.02	0.00	0.01	0.02	0.00	0.01	0.03	0.05	0.04	0.03	0.04	0.03
	0.0	±0.01	±0.00	±0.01	±0.01	±0.00	±0.01	±0.01	±0.01	±0.02	±0.02	±0.01	±0.03
Total	3.0	0.20 ±0.00	0.20 ±0.01	0.18 ±0.00	0.23 ±0.03	0.22 ±0.01	0.00 ±0.00	0.23 ±0.05	0.24 ±0.02	0.17 ±0.00	0.19 ±0.01	0.19 ±0.01	NM
		0.96	0.94	0.95	0.93	0.92	0.01	1.11	1.03	1.12	0.94	0.98	0.05
Copper	16.7	±0.01	±0.01	±0.01	±0.00	±0.01	±0.01	±0.15	±0.02	±0.16	±0.01	±0.03	±0.01
(mg/L)		1.93	1.88	1.89	1.83	1.75	0.06	2.02	1.94	1.93	1.88	1.84	0.14
	33.4	±0.02	±0.03	±0.03	±0.01	±0.03	±0.03	±0.01	±0.00	±0.01	±0.00	±0.02	±0.03
		2.92	2.84	2.85	2.68	2.79	0.12	2.96	2.83	2.75	2.65	2.35	0.19
	50.1	±0.01	±0.02	±0.02	±0.03	±0.04	±0.07	±0.01	±0.02	±0.02	±0.02	±0.03	±0.07
	0.0	0.03 ±0.01	0.03 ±0.00	0.00 ±0.00	0.00 ±0.00	0.00 ±0.00	NM	0.04 ±0.01	0.04 ±0.00	0.03 ±0.00	0.01 ±0.00	0.03 ±0.01	NM
	3.0	0.03 ±0.00	0.02 ±0.01	0.01 ±0.00	0.03 ±0.00	0.02 ±0.00	NM	0.05 ±0.03	0.03 ±0.01	0.04 ±0.02	0.01 ±0.01	0.04 ±0.01	NM
Total Chlorine	16.7	0.04 ±0.01	0.02 ±0.00	0.03 ±0.01	0.03 ±0.01	0.02 ±0.00	NM	0.06 ±0.01	0.05 ±0.01	0.04 ±0.01	0.01 ±0.01	0.05 ±0.01	NM
(mg/L)		0.04	0.01	0.04	0.04	0.07	NM	0.06	0.07	0.06	0.05	0.07	NM
	33.4	±0.01 0.05	±0.01 0.06	±0.01 0.05	±0.01 0.05	±0.01 0.06	NIM	±0.02 0.08	±0.02 0.09	±0.03 0.05	±0.01 0.08	±0.01 0.07	
	50.1	±0.01	±0.02	±0.00	±0.01	±0.01	NM	±0.00	±0.01	±0.01	±0.01	±0.03	NM

NM: Not Measured

Recovery: Follow up measurement at the end of the 24 h recovery period following the exposure period.





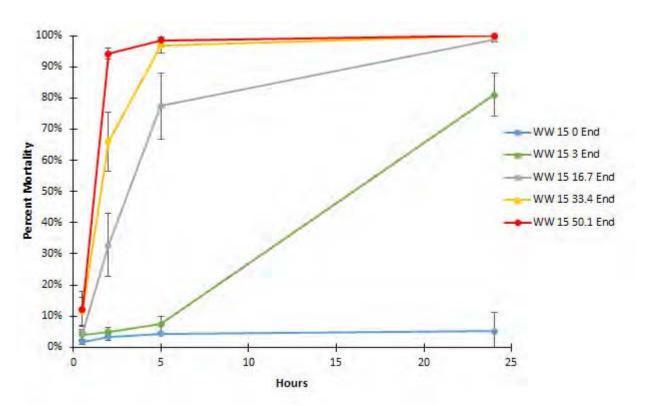
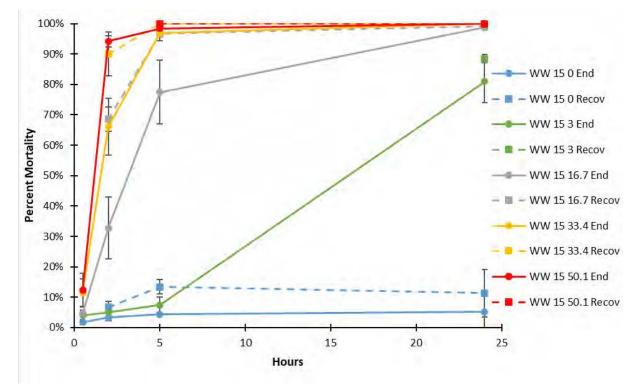
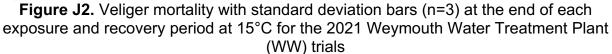


Figure J1. Veliger mortality with standard deviation bars (n=3) at the end of each exposure period at 15°C for the 2021 Weymouth Water Treatment Plant (WW) trials

TECHNICAL MEMORANDUM 1





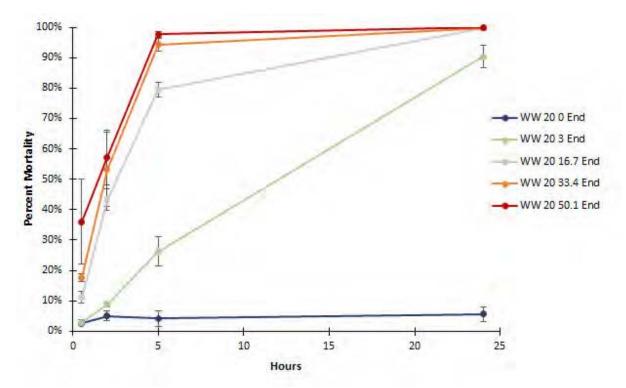


Figure J3. Veliger mortality with standard deviation bars (n=3) at the end of each exposure period at 20°C for the 2021 Weymouth Water Treatment Plant (WW) trials

TECHNICAL MEMORANDUM 1

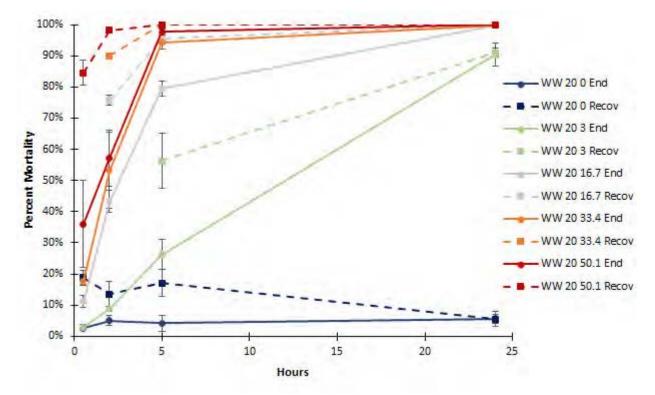


Figure J4. Veliger mortality with standard deviation bars (n=3) at the end of each exposure and recovery period at 20°C for the 2021 Weymouth Water Treatment Plant (WW) trials

Appendix K

2021 Weymouth WTP Dose-Response Veliger Testing – Water Quality Data

 Table G1. Average water quality data for each dose-response test condition using

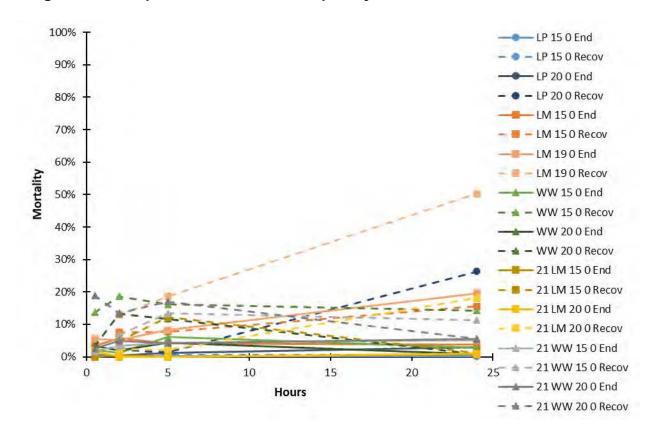
 Weymouth WTP influent in 2021

				Conditio	ons			20	°C Test	Conditio	ons	
Earth Tec QZ						Reco						Reco very
(µL/L)	0 h	0.5 h	2 h	5 h		-						-
0.0												20.7
0.0												±0.5
3.0												20.7
												±0.6
16.7												20.7
												±0.4
33.4												20.3
												±0.4
50.1												20.7
												±0.2
0.0												8.66
												±0.0
3.0												8.65
												±0.1
16.7												8.6
												±0.1
33.4												8.6
												±0.0
50.1												8.59
												<u>±0.0</u> 8.40
0.0												
												±0.0
3.0												8.39
												±0.0 8.40
16.7												±0.0
33.4												±0.0 8.39
												±0.0
												8.39
50.1												±0.0
												<u>+0.0</u> 952
0.0												952 ±1
												954
3.0												954 ±1
												953
16.7												±1
												953
33.4												±1
												952
50.1												±1
												0.00
0.0				NM								±0.0
												0.0
3.0				NM								±0.0
												0.0
16.7				NM								±0.0
				1 84								0.04
33.4												±0.0
_												0.05
50.1												±0.0
												0.00
0.0				NM								±0.00
	±0.05	±0.01	±0.01		±0.01	±0.01	±0.01	±0.01	±0.01	±0.00	±0.00	±0.0
	Earth Tec QZ (μL/L) 0.0 3.0 16.7 33.4 50.1 0.0 3.0 16.7 33.4 50.1 0.0 3.0 16.7	Earth Tec QZ 0 h 0.0 11.8 0.0 11.8 ±0.7 3.0 ±0.5 10.5 ±0.7 10.6 ±0.4 33.4 33.4 13.2 ±1.0 ±0.4 33.4 ±1.0 50.1 ±0.5 0.0 9.85 ±0.25 10.62 3.0 ±0.25 3.0 ±0.25 3.0 10.62 ±0.17 ±0.44 33.4 ±1.82 ±0.25 ±0.17 16.7 ±0.24 33.4 ±0.25 3.0 ±0.33 ±0.01 ±1.11 ±0.01 ±0.15 0.0 8.33 ±0.08 ±0.08 3.0 ±0.08 ±0.08 ±0.08 ±0.08 ±0.08 ±0.08 ±0.08 ±0.08 ±1 3.0 ±3	Earth Tec QZ0 h0.5 h(μL/L)0 h0.5 h0.011.814.0±0.7±0.13.0±0.7±0.1±0.5±0.016.710.614.1±0.4±0.133.413.213.6±1.0±0.113.6±0.1±0.110.650.111.613.6±0.5±0.110.63.010.6211.17±0.17±0.17±0.17±0.17±0.17±0.17±0.17±0.17±0.1111.4711.56±0.20±0.24±0.04±0.15±0.20±0.23±0.16±0.15±0.200.08.338.30±0.05±0.06±0.003.0±0.08±0.0016.78.288.28±0.06±0.0550.1±0.08±0.05±0.1550.1±1±20.0±3±216.7±4±03.4955956±4±0953955956±4±03.4±5±20.00.030.00±0.01±0.01±0.0116.7±0.02±0.01±0.01±0.01±0.01±0.02±0.01±0.01±0.04±0.02±0.01±0.05±0.4±0.02±0.06±0.01±0.01±0.01±0	Earth Tec Q2 (μL/.)11.814.014.40.011.814.014.40.011.814.014.4±0.7±0.1±0.13.010.514.114.8±0.5±0.0±0.1±0.110.614.114.5±0.4±0.1±0.033.413.213.614.6±0.1±0.1±0.0±0.150.111.613.614.6±0.5±0.1±0.1±0.10.09.8510.4710.17±0.25±0.06±0.223.010.6211.1710.91±0.12±0.04±0.0711.4711.5611.45±0.24±0.04±0.0733.411.8211.6111.80±0.25±0.23±0.8850.1±0.20±0.14±0.24±0.04±0.0733.411.8211.61±0.25±0.23±0.88±0.06±0.02±0.14±0.26±0.23±0.88±0.08±0.02±0.14±0.09±0.01±0.023.0±0.288.28±0.08±0.01±0.023.0±0.888.01±0.95956955±0.06±0.05±0.02±0.01±0.7±0.8±0.02±0.8±0.9±0.03±0.25±0.1±0.04±0.02±0.1±0.05±0.5 <td>Earth Tec QZ (μL/L) 0 h 0.5 h 2 h 5 h (μL/L) 0 h 0.5 h 2 h 5 h 0.0 11.8 14.0 14.4 14.9 ±0.7 ±0.1 ±0.1 ±0.1 10.1 3.0 ±0.5 ±0.0 ±0.1 ±0.0 10.6 14.1 14.5 15.0 ±0.4 ±0.1 ±0.0 ±0.1 33.4 13.2 13.6 14.6 15.3 ±1.0 ±0.1 ±0.0 ±0.1 ±0.0 ±0.5 ±0.1 ±0.1 ±0.0 ±0.1 ±0.5 ±0.1 ±0.1 ±0.0 ±0.1 ±0.5 ±0.1 ±0.1 ±0.0 ±0.1 ±0.1 ±0.0 ±0.1 ±0.0 ±0.1 ±0.5 ±0.0 ±0.01 ±0.01 ±0.1 ±0.0 ±0.15 ±0.20 ±0.14 ±0.06 ±0.00 ±0.01 ±0.15 ±0.20 ±0.14</td> <td>For the term of te</td> <td>Here the transmission of the transmission of the transmission of t</td> <td>Farth Tec Q2 Iso is a constraint of the iso is a constraint of</td> <td>Is⁵C Test Conditions 20 Earth (µL/L) 0.h 0.5 h 2.h 5.h 2.4 h Percover (Percover) 0.h 0.5 h 2.h 5.h 2.4 h Percover (Percover) 0.h 0.5 h 2.h 5.h 2.4 h 2.1.7 2.0.1 0.0 ±0.7 ±0.1 ±0.1 ±0.1 ±0.1 ±0.2 ±1.3 ±0.2 ±1.3 ±0.2 ±1.3 ±0.2 ±0.5 ±0.0 ±0.1 ±0.1 ±0.1 ±1.1 ±0.1 ±0.1 ±1.1 ±0.1 ±1.1 ±0.1 ±0.1 ±1.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.0 ±0.3 ±0.7 ±0.0 50.1 ±1.0 ±0.1 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.02 ±0.04 ±0.01</td> <td>Earth Fea Q2 (μ/L) 15°C Test Conditions 20°C Test Bearth (μ/L) 0h 0.5h 2h 5h 24h Very 0h 0.5h 2h 0.0 11.8 14.0 14.4 14.9 15.7 14.7 21.7 20.1 20.5 3.0 10.5 14.1 14.8 14.9 15.5 14.5 21.8 20.2 20.5 10.6 14.1 14.5 15.0 15.8 14.5 22.1 20.9 20.2 20.5 3.1 3.2 13.6 14.6 15.0 15.8 14.5 22.1 19.9 20.7 3.1 13.6 14.6 15.0 15.0 15.2 22.6 19.8 20.9 0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 3.0 10.7 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 3.0 ±0.25 ±0.01 ±0.01 <t< td=""><td>Is "C Test Condition: Sec 100 C Test Condition: Earth free Co2 Oh 0.5 2.0° C Test Condition: 0.0 11.8 14.0 14.4 14.9 15.7 14.7 21.7 20.1 20.5 20.0 ±0.0 ±0.1 ±0.</td><td>Into the constraint of the cons</td></t<></td>	Earth Tec QZ (μL/L) 0 h 0.5 h 2 h 5 h (μL/L) 0 h 0.5 h 2 h 5 h 0.0 11.8 14.0 14.4 14.9 ±0.7 ±0.1 ±0.1 ±0.1 10.1 3.0 ±0.5 ±0.0 ±0.1 ±0.0 10.6 14.1 14.5 15.0 ±0.4 ±0.1 ±0.0 ±0.1 33.4 13.2 13.6 14.6 15.3 ±1.0 ±0.1 ±0.0 ±0.1 ±0.0 ±0.5 ±0.1 ±0.1 ±0.0 ±0.1 ±0.5 ±0.1 ±0.1 ±0.0 ±0.1 ±0.5 ±0.1 ±0.1 ±0.0 ±0.1 ±0.1 ±0.0 ±0.1 ±0.0 ±0.1 ±0.5 ±0.0 ±0.01 ±0.01 ±0.1 ±0.0 ±0.15 ±0.20 ±0.14 ±0.06 ±0.00 ±0.01 ±0.15 ±0.20 ±0.14	For the term of te	Here the transmission of the transmission of the transmission of t	Farth Tec Q2 Iso is a constraint of the iso is a constraint of	Is ⁵ C Test Conditions 20 Earth (µL/L) 0.h 0.5 h 2.h 5.h 2.4 h Percover (Percover) 0.h 0.5 h 2.h 5.h 2.4 h Percover (Percover) 0.h 0.5 h 2.h 5.h 2.4 h 2.1.7 2.0.1 0.0 ±0.7 ±0.1 ±0.1 ±0.1 ±0.1 ±0.2 ±1.3 ±0.2 ±1.3 ±0.2 ±1.3 ±0.2 ±0.5 ±0.0 ±0.1 ±0.1 ±0.1 ±1.1 ±0.1 ±0.1 ±1.1 ±0.1 ±1.1 ±0.1 ±0.1 ±1.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.0 ±0.3 ±0.7 ±0.0 50.1 ±1.0 ±0.1 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.01 ±0.02 ±0.04 ±0.01	Earth Fea Q2 (μ/L) 15°C Test Conditions 20°C Test Bearth (μ/L) 0h 0.5h 2h 5h 24h Very 0h 0.5h 2h 0.0 11.8 14.0 14.4 14.9 15.7 14.7 21.7 20.1 20.5 3.0 10.5 14.1 14.8 14.9 15.5 14.5 21.8 20.2 20.5 10.6 14.1 14.5 15.0 15.8 14.5 22.1 20.9 20.2 20.5 3.1 3.2 13.6 14.6 15.0 15.8 14.5 22.1 19.9 20.7 3.1 13.6 14.6 15.0 15.0 15.2 22.6 19.8 20.9 0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 3.0 10.7 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 ±0.1 3.0 ±0.25 ±0.01 ±0.01 <t< td=""><td>Is "C Test Condition: Sec 100 C Test Condition: Earth free Co2 Oh 0.5 2.0° C Test Condition: 0.0 11.8 14.0 14.4 14.9 15.7 14.7 21.7 20.1 20.5 20.0 ±0.0 ±0.1 ±0.</td><td>Into the constraint of the cons</td></t<>	Is "C Test Condition: Sec 100 C Test Condition: Earth free Co2 Oh 0.5 2.0° C Test Condition: 0.0 11.8 14.0 14.4 14.9 15.7 14.7 21.7 20.1 20.5 20.0 ±0.0 ±0.1 ±0.	Into the constraint of the cons

			15	°C Test	Conditic	ons			20	°C Test	Conditic	ons	
	Earth Tec QZ (µL/L)	0 h	0.5 h	2 h	5 h	24 h	Reco very	0 h	0.5 h	2 h	5 h	24 h	Reco very
	3.0	0.17	0.16	0.16	NM	0.15	0.00	0.21	0.19	0.20	0.20	0.20	0.22
	0.0	±0.01	±0.01	±0.01		±0.00	±0.00	±0.00	±0.00	±0.00	±0.01	±0.00	±0.05
Total	16.7	0.93	0.93	0.92	NM	0.91	0.00	1.03	1.02	1.02	1.02	1.02	0.01
	10.7	±0.01	±0.01	±0.01	INIVI	±0.01	±0.00	±0.00	±0.01	±0.02	±0.02	±0.01	±0.01
Copper	22.4	1.89	1.86	1.85	1.85	1.79	0.02	1.94	1.90	1.89	1.87	1.76	0.04
(mg/L)	33.4	±0.01	±0.01	±0.00	±0.00	±0.00	±0.02	±0.01	±0.01	±0.01	±0.01	±0.00	±0.03
	50.1	2.90	2.84	2.83	2.75	2.55	0.05	2.88	2.84	2.83	2.75	2.59	0.04
		±0.02	±0.03	±0.02	±0.02	±0.01	±0.02	±0.03	±0.03	±0.02	±0.01	±0.02	±0.02
	0.0	0.11	0.11	0.10		0.07	NINA	0.08	0.09	0.06	0.06	0.06	NIN A
	0.0	±0.01	±0.00	±0.02	NM	±0.02	NM	±0.00	±0.01	±0.03	±0.01	±0.00	NM
		0.12	0.06	0.09		0.06		0.07	0.08	0.05	0.05	0.05	
	3.0	±0.01	±0.04	±0.01	NM	±0.02	NM	±0.00	±0.01	±0.03	±0.03	±0.01	NM
Total		0.11	0.10	0.09		0.06		0.07	0.09	0.07	0.05	0.04	
Chlorine	16.7	±0.02	±0.01	±0.01	NM	±0.00	NM	±0.00	±0.02	±0.01	±0.00	±0.01	NM
(mg/L)		0.09	0.07	0.09	0.09	0.08		0.06	0.07	0.08	0.07	0.05	
	33.4	±0.05	±0.02	±0.01	±0.00	±0.00	NM	±0.03	±0.00	±0.01	±0.01	±0.00	NM
		0.10	0.06	0.13	0.11	0.12		0.08	0.08	0.12	0.07	0.09	
	50.1	±0.01	±0.02	±0.00	±0.00	±0.01		±0.03	±0.01	±0.00	±0.01	±0.02	NM

NM: Not Measured

Recovery: Follow up measurement at the end of the 24 h recovery period following the exposure period.



Appendix L Veliger Dose Response at All Sites Grouped by EarthTec QZ Concentration

Figure L1. Veliger mortality of the control treatment at the end of each exposure and recovery period at 15 & 20°C for Lake Piru (LP), 2020 and 2021 Lake Mathews (LM), and 2020 and 2021 Weymouth WTP (WW) trials



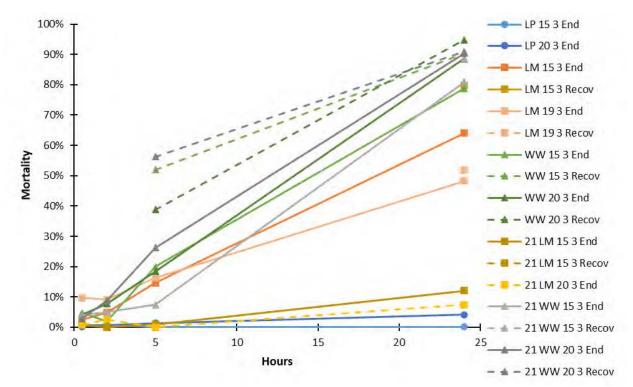


Figure L2. Veliger mortality of the EarthTec QZ 3 μl/L treatment at the end of each exposure and recovery period at 15 & 20°C for Lake Piru (LP), 2020 and 2021 Lake Mathews (LM), and 2020 and 2021 Weymouth WTP (WW) trials



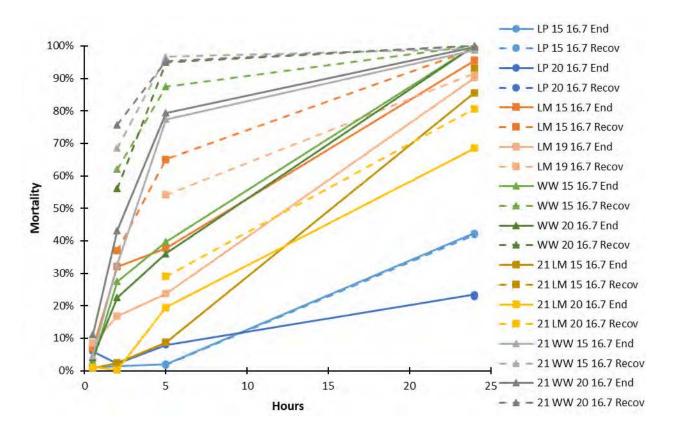


Figure L3. Veliger mortality of the EarthTec QZ 16.7 μl/L treatment at the end of each exposure and recovery period at 15 & 20°C for Lake Piru (LP), 2020 and 2021 Lake Mathews (LM), and 2020 and 2021 Weymouth WTP (WW) trials

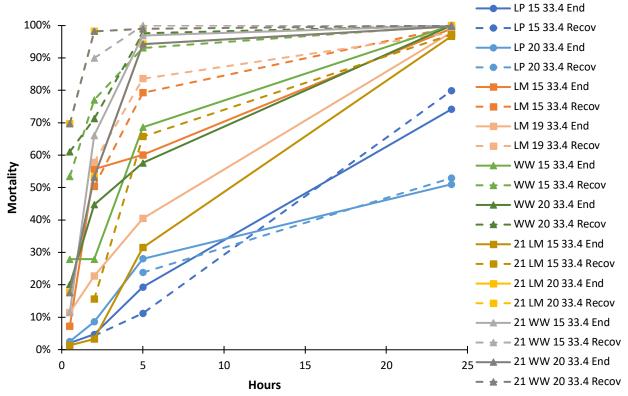


Figure L4. Veliger mortality of the EarthTec QZ 33.4 μl/L treatment at the end of each exposure and recovery period at 15 & 20°C for Lake Piru (LP), 2020 and 2021 Lake Mathews (LM), and 2020 and 2021 Weymouth WTP (WW) trials



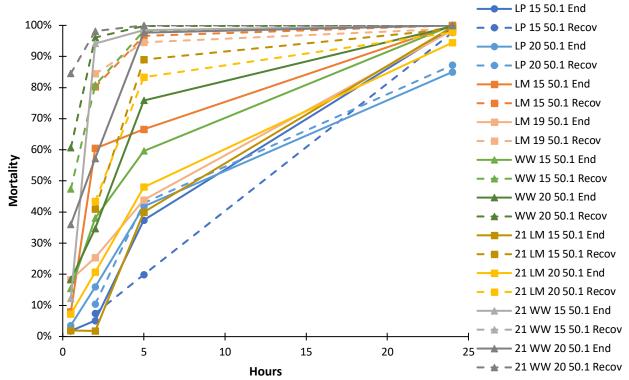


Figure L5. Veliger mortality of the EarthTec QZ 50.1 μl/L treatment at the end of each exposure and recovery period at 15 & 20°C for Lake Piru (LP), 2020 and 2021 Lake Mathews (LM), and 2020 and 2021 Weymouth WTP (WW) trials



Appendix B. Technical Memorandum 2 Toxicity Assessment



TECHNICAL MEMORANDUM 2



Toxicity Assessment

Final Date: Draft Date:	December 20, 2021 September 29, 2021
Prepared for:	Metropolitan Water District of Southern California City of Santa Ana Orange County Water District
Copies to:	Water Replenishment District of Southern California United Water Conservation District Main San Gabriel Basin Watermaster Central Basin Municipal Water District California Department of Fish and Wildlife California Department of Water Resources
Authors:	Emily Owens-Bennett, P.E., Trussell Liana Olivas, Trussell Chao-Chun Yang, Trussell Kelly Stockton-Fiti, KASF Consulting
Reviewers:	David Hokanson, Ph.D., P.E., BCEE, Trussell Adam Hutchinson, PG, CHG, OCWD Christine Pham, OCWD Tessa Lenz, UWCD
Subject:	Technical Memorandum 2

1 Introduction

1.1 Background

Since their discovery in Lake Mead within the Colorado River system in January 2007, Quagga mussels (*Dreissena bugensis*) have rapidly spread through the Metropolitan Water District of Southern California's (MWD's) Colorado River Aqueduct (CRA) and have been detected at many sites in California. The presence of this invasive species presents a barrier to the use of imported water and storm water for groundwater replenishment. Considering these challenges, the City of Santa Ana proposed a study entitled "Restoration of Local Recharge Sources from Invasive Dreissenid Mussels" (Study) to MWD's Future Supply Actions Funding Program. The Study was conducted by Trussell Technologies (Trussell), KASF Consulting, and Orange County Water District (OCWD), with support from project partners including the Water Replenishment District of Southern California (WRD), the United Water Conservation District (UWCD), the Main San Gabriel Basin Watermaster, and the Central Basin Municipal Water District. Although not directly contributing financially to the study, the California Department of Fish and Wildlife (CDFW) and California Department of Water Resources are supporting the Study by providing technical review and assistance.

1.2 Study Description

The purpose of this Study is to evaluate a potential treatment method, other than desiccation, for use in addressing quagga mussel infestations and preventing the spread of this invasive species.

Trussell led the study in partnership with KASF Consulting, a firm specializing in quagga mussel sampling, identification, and testing. The Study evaluated the effectiveness of EarthTec QZ^{™1} for control of quagga mussel veligers (the mussel's final larval stage). The testing locations included: (1) Lake Piru, (2) Lake Mathews, and (3) MWD's Weymouth Water Treatment Plant (WTP). A fourth location, OCWD's OC-28 turnout at Anaheim Lake, was originally planned but later eliminated based on scheduling issues and identification of a surrogate location. Lake Piru contains mostly imported water from the State Water Project (SWP), supplemented with local runoff. Lake Mathews is part of the CRA system. Water from Lake Mathews is chlorinated at the inlet to a pipeline that supplies Weymouth WTP; thus, these two locations represent the same water, with and without chlorine treatment. The Study included testing with samples collected from multiple locations, to allow the project team to evaluate the impact of site-specific water quality on the performance of EarthTec QZ.

The following objectives were evaluated at each testing location:

- 1. Veliger dose-response testing of EarthTec QZ
- 2. Toxicity assessment of non-target aquatic species

The purpose of this technical memorandum (TM) is to summarize the results of **Objective #2** for the study.

2 Schedule Summary

Veliger dose-response testing and associated toxicity assessments for non-target species were completed according to the schedule summarized in Table 2-1.

¹ EarthTec QZ[™] is registered with the United States Environmental Protection Agency (USEPA) as a molluscicide for the control of quagga and zebra mussels. It is also registered with the California Department of Pesticide Regulation as a molluscicide for use in lakes, streams, rivers, waterways, canals, ponds, reservoirs, irrigation systems, and catch basins.

Location	Study Status	Testing Date
Lake Piru	Completed	December 2 – 6, 2019
Lake Mathews 2020	Completed	September 9 – 11, 2020
Lake Mainews 2020	Completed	September 18 – 20, 2020
Weymouth WTP Influent 2020	Completed	September 14 – 18, 2020
OC-28 Turnout	N/A ²	
Weymouth WTP Influent 2021	Completed	June 28 – 30, 2021
	Completed	July 12 – 14, 2021
Lake Mathews 2021	Completed	June 30 – July 2, 2021
	Completed	July 14 – 16, 2021

2.1 Exemption of OC-28 Turnout

Testing was completed for each of the study testing locations (Table 2-1), with the exception of the OC-28 turnout. The study was designed with the intention of correlating the dose-response efficacy of EarthTec QZ at Lake Mathews with that of two downstream locations. Water delivered from Lake Mathews is chlorinated prior to entering transmission pipelines supplying both OC-28 and Weymouth WTP. Considering the connection of these water supplies, the Study aimed to correlate testing from Lake Mathews with the two downstream locations – OC-28 turnout and Weymouth WTP influent. Testing these three locations in a series would allow for comparison of the effects of EarthTec QZ with and without chlorine exposure. However, due to prior budgeting, OCWD only had access to Lake Mathews water at the OC-28 turnout through June 2020, and not during the 2021 fiscal year (July 2020 – June 2021). Covid-19 restrictions precluded the project team from sampling at Lake Mathews until September 2020. For these reasons, it was not possible to complete sampling from the OC-28 turnout in conjunction with the sampling and testing at Lake Mathews and Weymouth WTP influent.

The project team met with MWD staff in August 2020 to discuss alternative sampling locations for the OC-28 turnout. Although already included as a sampling location for the Study, Weymouth WTP was identified as the most appropriate surrogate monitoring location for the OC-28 turnout, as both sites can receive CRA water from Lake Mathews that is chlorinated and transmitted within a pipeline for a similar travel time and therefore, similar contact time with chlorine. Thus, sampling at OC-28 was eliminated as a sampling location for the Study. The project team proceeded with testing at Lake Mathews and Weymouth WTP during September 2020 and completed follow up testing at both of these locations in 2021.

² Sampling at OC-28 is no longer applicable given the similarity with that of Weymouth WTP, as is later discussed.



2.2 Repetition of Lake Mathews and Weymouth WTP

The project team found value in repeating paired veliger and toxicity testing at Lake Mathews and Weymouth WTP (2020 and 2021). Advantages of repeating this testing included:

- Repeating toxicity testing for Weymouth WTP influent water samples after inconsistent acute toxicity test results from the 2020 Weymouth WTP samples (discussed in Section 3);
- 2. Assessing the same acute toxicity doses on all three non-target species with both Lake Mathews and Weymouth WTP sample water;
- 3. Capturing seasonal variability by testing water samples from these locations collected during different months in the year;
- 4. Potentially capturing a larger veliger size-distribution and assessing the effects of EarthTec QZ on larger quagga mussel veligers; and
- Comparing the effect that EarthTec QZ has on veligers with no significant exposure to chlorine (Lake Mathews) to those which have been exposed to chlorine (Weymouth WTP influent).

The project team proceeded with testing at Weymouth WTP and Lake Mathews in June & July 2021.

3 Study Results

Objective #2 of the Study was to assess acute toxicity of EarthTec QZ for non-target aquatic species at the four Study locations. Testing was completed as defined in the 'Test Plan for Toxicity Assessment of Non-Target Aquatic Species,' provided in the Semi-Annual Progress Report 2019 No. 1.

Trussell collected large volume samples from each test location and delivered these to Aquatic Bioassay and Consulting Laboratories (ABC Labs) in Ventura, CA to conduct acute toxicity testing on three non-targeted indicator species: fathead minnow (*Pimephales promelas*), water flea (*Ceriodaphnia dubia*), and rainbow trout (*Oncorhynchus mykiss*). This testing was completed in parallel with the dose-response veliger testing. Each round of toxicity testing utilized the same site-specific water and EarthTec QZ stock that was used during the veliger dose-response testing (findings from Objective #1 are reported in TM 1). ABC Labs evaluated 96-hour acute toxicity for either two or three doses of EarthTec QZ per water sample. The EarthTec QZ doses were determined by Trussell and KASF Consulting based on the most effective dose identified from preliminary veliger dose-response data from each test location.

The results from the acute toxicity testing for non-target indicators are discussed in the following subsections by sampling event: Lake Piru, Lake Mathews 2020, Weymouth WTP influent 2020, Lake Mathews 2021, and Weymouth WTP influent 2021. Additional plots of the results are provided in Appendix A and the individual test reports for the acute toxicity testing from each location are provided in Appendices B-G.



3.1 Lake Piru

TU(a) *

In December 2019, toxicity testing was conducted with Lake Piru water. The preliminary data from the Lake Piru 15°C veliger dose-response tests suggested that veligers were only experiencing significant mortality (>50%) at the two highest doses of EarthTec QZ: 33.4 and 50.1 μ L/L. Trussell and KASF Consulting selected the EarthTec QZ dose with the highest veliger mortality (50.1 μ L/L or 3.0 mg/L as Cu), and the lowest dose that resulted in mortality greater than control mortality (16.7 μ L/L or 1.0 mg/L as Cu) as the targets for acute toxicity testing on the three indicator species. The results are shown in Table 3-1 and presented graphically in Appendix A. The full toxicity test reports for Lake Piru are included as Appendix B.

	Fath	nead Min	now	v	Vater Fle	a	Rainbow Trout			
EarthTec QZ Dose	0	16.7	50.1	0	16.7	50.1	0	16.7	50.1	
	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	
Average 96-hour Survival Rate	100%	57.5%	0%	100%	0%	0%	100%	0%	0%	

>1.00 >1.00

-

>1.00

>1.00

Table 3-1. 96-hour acute toxicity results of non-target indicator species in Lake Piru sample water

*The acute toxicity unit [TU(a)] is calculated as: log (% mortality)/1.7

>1.00

0.96

As shown in Table 3-1, the average survival rate for the fathead minnow was 57.5% after 96 hours of exposure to 16.7 μ L/L EarthTec QZ. This same dose and exposure time resulted in 0% survival for water fleas and rainbow trout. None of the tested species showed survival after 96 hours of exposure to 50.1 μ L/L EarthTec QZ. Acute toxicity results are typically presented relative to the effective concentration (EC) required to reach a biological endpoint (mortality, in this case). One toxic unit (TU) is defined for the standard acute toxicity analysis as EC50, or the effective concentration at which 50% of the test species reaches mortality by the end of the 96-hour exposure time. Both of the EarthTec QZ doses evaluated with the Lake Piru water samples (16.7 and 50.1 μ L/L) yielded acute toxicity values of greater than 1.0 TU(a).

The Test Plan included provisions for evaluating chronic toxicity for the non-target aquatic indicator species pending Round 1 acute toxicity testing results. Because Round 1 acute toxicity testing results indicated very limited survival rates (i.e., high levels of mortality) and chronic toxicity testing would entail longer exposure times, it is expected that chronic toxicity testing would not provide additional value to the study. For these reasons, toxicity testing focused on acute toxicity response for the non-target aquatic indicator species with subsequent rounds of testing at Lake Mathews and Weymouth WTP influent.



3.2 Lake Mathews 2020

In September 2020, toxicity testing was conducted with Lake Mathews water. The preliminary data from the Lake Mathews 20°C veliger dose-response testing suggested that veligers were more susceptible to lower EarthTec QZ doses when compared to Lake Piru. Veliger mortality was higher than 90% at 16.7 μ L/L EarthTec QZ (1.0 mg/L as Cu) after 24 hours of exposure. Based on these veliger mortality results, Trussell and KASF Consulting selected 8.35 μ L/L (50% of 16.7 μ L/L or 0.5 mg/L as Cu) and 16.7 μ L/L EarthTec QZ as the target test doses for acute toxicity assessment. The results are summarized in Table 3-2 and graphed in Appendix A. The full toxicity test reports for the Lake Mathews 2020 samples are included as Appendix C.

	Fath	nead Min	now	V	Vater Fle	a	Rainbow Trout			
EarthTec	0	8.35	16.7	0	8.35	16.7	0	8.35	16.7	
QZ Dose	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	
Average 96-hour Survival Rate	100%	97.5%	92.5%	100%	0%	0%	100%	0%	0%	
TU(a)	-	0.23	0.51	-	>1.00	>1.00	-	>1.00	>1.00	

Table 3-2. 96-hour acute toxicity results of non-target indicator species in Lake Mathews 2020 water

As shown in Table 3-2 the average survival rate for fathead minnow was 97.5% (0.23 TU(a)) and 92.5% (0.51 TU(a)) after 96 hours of exposure to 8.35 μ L/L and 16.7 μ L/L EarthTec QZ, respectively. However, 96-hour exposure to both tested doses resulted in 0% survival for water fleas and rainbow trout, which translates to acute toxicity values of greater than 1.0 TU(a) for both EarthTec QZ doses.

3.3 Weymouth Water Treatment Plant Influent 2020

In September 2020, toxicity testing was conducted with Weymouth WTP influent. Preliminary data from the 20°C veliger dose-response testing in Weymouth WTP influent indicated similar or higher efficacy of EarthTec QZ as was observed with Lake Mathews water. After 24 hours of exposure to 16.7 μ L/L EarthTec QZ (1.0 mg/L as Cu), veliger mortality was 93%. ABC Labs completed the acute toxicity assessment with the Weymouth WTP influent using the same doses as those tested with Lake Mathews water: 8.35 μ L/L and 16.7 μ L/L EarthTec QZ.

The final veliger mortality results from the Weymouth WTP influent indicated significantly higher mortality (78-89% at 24 hours exposure) at the lowest EarthTec QZ dose of 3.0 μ L/L (0.18 mg/L as Cu) when compared with the same dose at Lake Mathews (48-65% at 24 hours exposure). Therefore, Trussell and KASF Consulting requested that ABC Labs analyze acute toxicity for the Weymouth WTP influent with an additional dose of 3.0 μ L/L EarthTec QZ. This additional test condition required re-



sampling Weymouth WTP influent water, which took place two weeks after the original testing. The results from both rounds of acute toxicity testing with Weymouth WTP influent are summarized in Table 3-3 and graphed in Appendix A. The full toxicity test reports for the original Weymouth WTP influent 2020 samples are included as Appendix D. The full toxicity test reports for the Weymouth WTP 2020 re-sample are included as Appendix E.

	F	athead	Minnov	N		Wate	r Flea		Rainbow Trout			
EarthTec	0	3	8.35	16.7	0	3	8.35	16.7	0	3	8.35	16.7
QZ Dose	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L
Average 96-hour Survival Rate	97.5%	100%	100%	100%	100%	0%	100%	100%	100%	65%	0%	0%
TU(a)	0.23	-	-	-	-	>1.00	-	-	-	0.91	>1.00	>1.00

Table 3-3. 96-hour acute toxicity results of non-target indicator species in Weymouth
WTP 2020 sample water

As shown in Table 3-3, the fathead minnow survival rate was 100% after 96 hours of exposure to all three tested doses. An average of 65% of the rainbow trout survived after 96 hours of exposure to 3.0 μ L/L EarthTec QZ, which translates to an acute toxicity value of 0.91 TU(a). The same exposure to the two higher doses of 8.35 μ L/L and 16.7 μ L/L EarthTec QZ both resulted in 0% survival and acute toxicity values greater than 1.0 TU(a).

Water fleas survived at a rate of 100% at the two higher doses of 8.35 μ L/L and 16.7 μ L/L EarthTec QZ. However, 0% of water fleas survived the lower dose of 3 μ L/L EarthTec QZ, which translates to an acute toxicity value of 1.0 TU(a).

It is unclear why no water fleas survived at the lowest EarthTec QZ dose, whereas 100% survival was observed with the two higher doses. As previously mentioned, the addition of the third and lower dose condition (3.0 μ L/L EarthTec QZ) required a separate sampling event two weeks after the initial Weymouth WTP influent sample was collected for the higher two doses (8.35 μ L/L and 16 μ L/L EarthTec QZ). The results indicate limited change in the water quality of the two Weymouth WTP samples. A slightly higher chlorine residual (0.05 mg/L) was measured in the second sample, used for the 3.0 μ L/L EarthTec QZ condition, compared to the original water sample (0.02 mg/L). ABC Labs used the same batch of diluted EarthTec QZ for dosing the tested conditions for both rounds of toxicity testing. ABC Labs conducted a quality control audit of the results and found no obvious explanation for the inconsistent results.

As previously discussed in Section 2, these inconsistent results were one of the motivations to repeat testing at both Lake Mathews and Weymouth WTP.



3.4 Weymouth Water Treatment Plant Influent 2021

In July 2021, a repeat round of toxicity testing was conducted with Weymouth WTP water. As discussed in the previous section, the acute toxicity tests with the Weymouth WTP 2020 sample water resulted in inconsistent water flea survival data. To provide more clarity on the effects that EarthTec QZ has on the water flea, the same three doses that were used in the 2020 Weymouth WTP toxicity tests were selected for the follow up testing in 2021: 3, 8.35 & 16.7 μ L/L as EarthTec QZ, or 0.18, 0.5 and 1.0 mg/L as Cu, respectively. The results are presented in Table 3-4 and graphed in Appendix A. The full toxicity test reports for Lake Mathews 2021 are included as Appendix F.

	F	athead	Minnov	N		Wate	r Flea		Rainbow Trout			
EarthTec	0	3	8.35	16.7	0	3	8.35	16.7	0	3	8.35	16.7
QZ Dose	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L
Average 96-hour Survival Rate	100%	100%	97.5%	97.5%	100%	0%	0%	0%	100%	100%	0%	0%
TU(a)	-	-	0.23	0.23	-	>1.00	>1.00	>1.00	-	-	>1.00	>1.00

Table 3-4. 96-hour acute toxicity results of non-target indicator species in Weymouth WTP 2021 sample water

As shown in Table 3-4, the average survival rate for fathead minnow and rainbow trout was 100% after 96 hours of exposure to the lowest tested dose 3 μ L/L EarthTec QZ. However, the average survival rate for water flea was 0% after 96 hours of exposure to this same lowest dose. Furthermore, the average survival rate for fathead minnow was 97.5% (0.23 TU(a)) after 96 hours of exposure to both 8.35 μ L/L and 16.7 μ L/L EarthTec QZ to 8.35 μ L/L and 16.7 μ L/L EarthTec QZ resulted in 0% survival for water fleas and rainbow trout, which translates to acute toxicity values of greater than 1.0 TU(a) for both EarthTec QZ doses.

3.5 Lake Mathews 2021

In July 2021, a repeat round of toxicity testing was conducted with Lake Mathews sample water. As discussed in the previous section, the original acute toxicity tests with Weymouth WTP sample water resulted in inconsistent water flea survival data. To obtain consistent data with the Weymouth WTP, the same three doses that were used for the repeated Weymouth WTP toxicity testing (3, 8.35 & 16.7 μ L/L as EarthTec QZ, or 0.18, 0.5 and 1.0 mg/L as Cu, respectively) were selected for this location as well. The results are presented in Table 3-5 and graphed in Appendix A. The full toxicity test reports for Lake Mathews are included as Appendix G.

Table 3-5. 96-hour acute toxicity results of non-target indicator species in Lake Mathews 2021 sample water

	Fathead Minnow					Wate	r Flea		Rainbow Trout					
EarthTec QZ Dose	0	3	8.35	16.7	0	3	8.35	16.7	0	3	8.35	16.7		
	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L	μL/L		
Average 96-hour Survival Rate	100%	100%	100%	97.5%	100%	15%	0%	0%	100%	100%	0%	0%		
TU(a)	-	-	-	0.23	-	>1.00	>1.00	>1.00	-	-	>1.00	>1.00		

As shown in Table 3-5, the average survival rate for fathead minnow and rainbow trout was 100% after 96 hours of exposure to the lowest tested dose 3 µL/L EarthTec QZ. However, the average survival rate for water flea was only 15% (>1.0 TU(a)) after 96 hours of exposure to this same lowest dose. The average fathead minnow survival rates after 96 hours of exposure to 8.35 µL/L and 16.7 µL/L EarthTec QZ were also high at 100% and 97.5% (0.23 TU(a)), respectively. However, the same exposure to 8.35 µL/L and 16.7 µL/L EarthTec QZ resulted in 0% survival for water fleas and rainbow trout, or acute toxicity values of greater than 1.0 TU(a).

4 Analysis

This section includes a high-level analysis of the results presented in Section 3. Further discussion, correlations, statistical analysis, integrated analyses and recommendations will be provided in the Final Report.

4.1 Experimental Setup

The toxicity assessment for non-target organisms was based on the standard acute toxicity test method, which exposes each of the three indicator species to the selected EarthTec QZ dose for 96 hours. This is 72 hours longer than the longest exposure time for the veliger dose-response tests at 24 hours (an additional 24-hour recovery period was assessed after exposure to fresh sample water without EarthTec QZ). Therefore, it should be noted that the non-target indicator species experienced significantly longer exposure times to EarthTec QZ compared to the veligers in the corresponding dose-response tests. The final report compares the acute toxicity results with the veliger mortality on the basis of total exposure to EarthTec QZ, using a time-dose variable (the product of the copper concentration and exposure time of each sample).

Another notable difference in the veliger dose-response testing conditions compared with the acute toxicity test procedure is the ambient temperature. The veliger dose-response testing included two temperature conditions, 15 °C and 20°C. ABC Labs followed the standard method for acute toxicity testing and maintained a temperature of approximately 24°C for the fathead minnow and water flea, and a temperature of



approximately 13°C for rainbow trout. These temperature conditions were selected as they provide constant and acceptable temperature conditions for the non-target indicator species, so that the control may yield high survival and varying temperature does not add an additional factor that could cause non-chemical related mortality.

4.2 Water Quality Comparison

The water quality associated with acute toxicity testing is shown in Table 4-1. Raw water quality values include the sample water that the project team collected and analyzed during veliger testing, along with the water quality analysis provided by ABC Labs for the same sample water.³ The results in Table 4-1 indicated as being analyzed by ABC Labs include both raw water quality and measurements from the sample containing EarthTec QZ. While copper was not reported by ABC Labs, it was measured to confirm accurate dosing of EarthTec QZ during testing. The full laboratory reports provided by ABC Labs for each of the tests are included in **Appendices B through G**.

The water quality for Lake Mathews and Weymouth WTP was mostly consistent, since these two locations represent the same CRA water, with the addition of chlorine in the pipeline upstream of Weymouth WTP. Lake Piru represents mostly imported water from the SWP and had higher DOC, hardness, and alkalinity, but lower conductivity compared with Lake Mathews and Weymouth WTP. Similar pH values were measured from all three locations.

³ ABC Labs used both the sample raw water and their own lab-made water for the control conditions during acute toxicity testing. The control conditions with the sample water served as a quality control method to rule out mortality to the indicator species caused by the water sample, and not the EarthTec QZ. All the control conditions with sample water yielded 100% survival, confirming that none of the mortality was attributed to the sample source. The survival results reported in **Section 3** for 0 μ L/L EarthTec QZ reflect the test results run with the lab-made control water. The water quality titled 'ABC Labs: Raw Water' in **Table 4-1** reflects the sample water quality measured by ABC Labs.

			-	Dissolved Oxygen	Conductivity	Hd	Temperature	Alkalinity	Hardness	Total Copper	Free Copper	Total Chlorine	ORP	Chemical Oxygen Demand	Dissolved Organic Carbon
Location	Year	Analysis	Test Condition	mg/L	μS/	pН	ů Ten	mg/	/L as	mg/L	만 표 mg/L	mg/L	mV	mg/L	⊡ 000 mg/L
Location		-		ing/E	cm	unit		Ca	CO3	iiig/E	- mg/E	- mg/L		ilig/L	iiig/L
Lake Piru	Raw Wat	ter Quality		0.00	010	0.05	110	454	040	0.40	0.40	0.40	400	5.05	5.05
		Field	20°C Tests Raw Water	8.88 7.50	913 776	8.25 7.70	14.8 24.0	154 98	316 315	0.16	0.16	0.12	192	5.65	5.05
	2019	ABC Labs	16.7 µL/L EarthTec (1.0 mg/L as Cu)	8.37	947	8.83	24.0	- 90	315	-	-	-	-	-	-
			$50.1 \mu\text{L/L}$ EarthTec (3.0 mg/L as Cu)	8.37	947 990	8.83	24.1	- 160	- 161	-	-	-	-	-	-
	Statiatio	al Analysia	50.1 µL/L Earth Tec (3.0 mg/L as Cu)	8.25	990	8.10	24.1	160	161	-	-	-	-	-	-
	Statistica	al Analysis	Maar	0.40	0.45	7.98	19.4	126	316	0.40	0.40	0.40	192	E 0E	5.05
	All Sample Collections		Mean Standard Deviation	8.19 0.98	845 97	0.39	6.5	40	0.71	0.16	0.16	0.12	192	5.65	5.05
	Den Wet	ter Quality	Standard Deviation	0.98	97	0.39	6.5	40	0.71	-	-	-	-	-	-
	Raw Wat	Field	15ºC Tests	7.57	946	8.18	25.1	115	138	0.02	0.02	0.02	213	4.67	3.01
		ABC Labs	Raw Water	7.90	946 788	8.30	23.1	113	288	- 0.02	0.02	- 0.02	-	4.07	3.01
	2020		8.35 µL/L EarthTec (0.5 mg/L as Cu)	7.60	1129	7.90	23.9	100	200 350	-	-	-	-	-	-
			$16.7 \mu\text{L/L}$ EarthTec (1.0 mg/L as Cu)	7.46	1097	7.90	24.1	-		-	-	-	-	-	
			15°C Tests	8.46	950	8.24	24.1	138	281	0.00	0.00	0.01	186	4.65	2.98
		Field	Raw Water	7.83	1044	7.53	24.0	120	250	-	-	-	-	4.05	- 2.90
Lake	2021	ABC Labs	3 µL/L EarthTec (0.15 mg/L as Cu)	8.00	1044	7.53	24.1	-	- 230		-		-	-	-
Mathews	2021		$8.35 \mu\text{L/L}$ EarthTec (0.15 mg/L as Cu)	7.87	1013	7.53	24.1	-	-	-	-		-	-	-
			$16.7 \mu\text{L/L}$ EarthTec (1.0 mg/L as Cu)	7.87	1013	7.53	24.1	125	330	-			-	-	-
	Statistics	al Analysis	10.7 µL/L Eartiffec (1.0 mg/L as Cu)	1.01	1025	7.55	24.1	125	330	-	-	-	-	-	-
	Statistica	ai Anaiysis	Mean	7.74	867	8.24	24.5	114	213	0.02	0.02	0.02	213	4.67	3.01
	2020 Raw Samples		Standard Deviation	0.23	112	0.08	0.8	1	106	-	-	- 0.02	-	-	5.01
			Mean	8.15	997.0	7.89	24.34	129	266	0.00	0.00	0.01	186	4.65	2.98
	2021 Raw Samples		Standard Deviation	0.44	66.47	0.50	0.37	129	200	- 0.00	0.00	0.01	-	4.05	2.90
	Paw Wat	ter Qualty	Standard Deviation	0.44	00.47	0.50	0.57	15	22						_
		Field	15°C Tests	8.27	944	8.02	25.6	119	150	0.01	0.01	0.04	214	8.50	4.09
		ABC Labs	Raw Water	8.10	1056	8.00	24.1	111	362	0.01	0.01	- 0.04	-	-	-
			8.35 µL/L EarthTec (0.5 mg/L as Cu)	7.67	1107	7.90	24.1	108	315	_	_	_	-	_	-
	2020		$16.7 \mu\text{L/L}$ EarthTec (1.0 mg/L as Cu)	7.50	1107	7.87	24.1	-		-			-		
	2020	Field	Additional Sampling *	8.19	955	8.12	26.8	119	145	0.02	0.02	0.05	211	7.88	4.05
		ABC Labs	Raw Water	8.30	1022	8.10	20.0	103	311	-	-	-	-	-	-
			3 µL/L EarthTec (0.15 mg/L as Cu)	7.40	1022	7.70	24.0	113	238	-		- I	-	-	
Weymouth WTP			15°C Tests	8.69	969	8.18	21.9	137	275	0.02	0.03	0.10	196	4.46	3.01
		ABC Labs	Raw Water	7.90	1009	7.67	24.1	123	295	-	-	-	-	+0	-
	2021		3 µL/L EarthTec (0.15 mg/L as Cu)	7.93	1003	7.70	24.1	-	-	-			-	-	-
	2021		$8.35 \mu\text{L/L}$ EarthTec (0.5 mg/L as Cu)	7.90	105	7.63	24.1	-	-	-	-	-	-	-	-
			16.7 µL/L EarthTec (1.0 mg/L as Cu)	7.87	1012	7.63	24.1	129	330	-	_	- I	-	-	-
	Statistic	al Analysis		1.01	1012	7.00	27.1	125	000						
		, i i i i i i i i i i i i i i i i i i i	Mean	8.19	1000	8.01	24.9	115	256	0.01	0.01	0.04	214	8.50	4.09
	2020 R	aw Samples	Standard Deviation	0.13	79	0.01	1.1	6	150	-	-	-	-	-	05
	2020 P	aw Samples	Mean	8.25	989	8.11	25.4	111	228	0.02	0.02	0.05	211	7.88	4.05
		nal Sampling)	Standard Deviation	0.08	47	0.01	2.0	11	117	-	-		-	-	00
	2021 Raw Samples		Mean	8.30	989	7.92	23.0	130	285	0.02	0.03	0.10	196	4.46	3.01
			Standard Deviation	0.56	28	0.36	1.6	10	14	0.02	0.00	0.10	- 130	4.40	0.01
De eemple of Wey				0.00	20 1 Earth		Thio w	10	14	- od for vo				-	

Table 4-1. Water Quality of Acute Toxicity Test Samples with and without EarthTec QZ

* Re-sample of Weymouth WTP influent for acute toxicity testing with 3 µL/L EarthTec QZ. This water was not used for veliger testing.



4.3 General Trends

The toxicity response of non-target organisms to EarthTec QZ were tested on three species – fathead minnow, water flea, and rainbow trout. The mortality response of the tested non-target organisms is summarized in Figure 4-1.

Both water flea and rainbow trout were highly sensitive to EarthTez QZ and exhibited acute mortality response at the lower concentrations tested in this Study. Water flea and rainbow trout acute mortality was observed to be 100% at a dose greater than or equal to 8.35 μ L/L EarthTec QZ which corresponds to 0.5 mg/L as copper.

Meanwhile, fathead minnow showed a mixed response to EarthTec QZ. Lake Mathews and Weymouth WTP water test conditions showed little to no mortality of fathead minnows for all EarthTec QZ doses tested up to 16.7 μ L/L which corresponds to 1 mg/L as copper. However, the Lake Piru water test conditions had 42.5% mortality at 16.7 μ L/L. The difference in mortality observed for fathead minnows is thought to be the result of differences in water quality between the test locations. The discussion on water quality and mortality can be found in Section 4.4.



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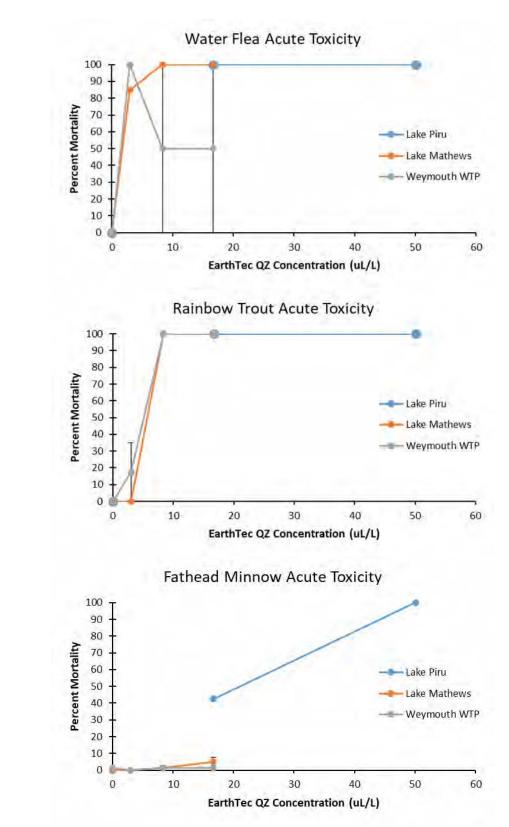


Figure 4-1 Average acute toxicity with standard deviations bars (A) Water Flea; (B) Rainbow Trout; and (C) Fathead Minnow for each location with EarthTec QZ



4.4 Water Quality Impact on EarthTec QZ Performance

Water quality affects the toxicity of EarthTec QZ. The following information is listed on the EarthTec QZ label:

"Certain water conditions including low pH (\leq 6.5), low dissolved organic carbon (DOC) levels (3.0 mg/L or lower) and "soft" waters (i.e., alkalinity less than 50 mg/L) increases the potential acute toxicity to non-target aquatic organisms. The application rates on this label are appropriate for water with alkalinity greater than 50 mg/L. Do not use these application rates for water with less than 50 ppm alkalinity (e.g., soft or acid waters) because trout and other species of fish may be killed under such conditions."

The raw water quality for each test condition is summarized in Table 4-1 and discussed briefly in Section 4.2. While the alkalinity, pH, and DOC are within the conditions specified by the EarthTec QZ label, it is expected that water quality still plays a role in the toxicity response. The influence of water quality on toxicity response can be explained using the biotic ligand model as described in Section 4.4.1.

4.4.1 Copper Bioavailability and Oxidants on Mortality

Copper toxicity in fish is a function of bioavailable copper as well as competitive ions in the water. Typically, the biotic ligand model is used to predict copper toxicity by accounting for bioavailability of copper and ion competition through modeling using a multitude of water quality parameters. The water quality parameters used by the model are pH, DOC, alkalinity, ions, and temperature (USEPA 2016). These water quality parameters affect the chemical composition of copper in the water and determine the bioavailability. For example, alkalinity, pH, hardness, and anions affect the saturation indices for copper and the percentage of total copper existing in dissolved form. It has been demonstrated that copper toxicity decreases when pH and hardness increase (Welsh et al. 1995). Additionally, DOC can also form organic complexes with copper that decrease the fraction of bioavailable copper existing in the dissolved fraction. Meanwhile, other cations, especially sodium, can compete with free copper ions for binding sites in the gills of fish (Nelson et al., 1986; Welsh et al. 1995; Parametrix and HydroQual 2006; USEPA 2016). Therefore, different waters can exhibit a wide range of mortality response at the same given dose of EarthTec QZ due to site-specific water quality differences that affect copper toxicity.

The water quality of the three test locations varied for the influential parameters related to the biotic ligand model, which likely explained why there was no clear trend in the toxicity of EarthTec QZ to the three non-target species based on location. Lake Piru had higher DOC, hardness, and alkalinity compared with Lake Mathews and Weymouth WTP; these parameters were more correlated with lowering copper toxicity. Similar pH values were measured from all three locations. The full suite of water quality for predicting toxicity with the biotic ligand model was not measured for these tests. In prior studies conducted by KASF Consulting, sodium levels in Lake Piru in 2019 were



lower (65 mg/L) than those measured in Colorado River water (100 mg/L) in 2015. While sodium measurements were not included in this study, the higher sodium concentration for Lake Mathews and Weymouth WTP should have provided more protection from the copper toxicity for fish species. In general, water quality clearly affects copper toxicity and could be the reason for the difference in Lake Piru fathead minnow mortality.

In addition to bioavailability of copper, other toxic constituents in water are expected to increase overall mortality. While not apparent in the non-target organisms in this Study, total chlorine residual is another environmental stressor and is thought to compound copper toxicity. An increase in toxicity response is seen in veligers as seen from the results of Objective 1 of this Study.



References

Nelson, Henry, Duane Benoit, Russ Erickson, Vince Mattson, and Jim Lindberg. 1986. *The Effects of Variable Hardness, pH, and Alkalinity, and Humics on the Chemical Speciation and Aquatic Toxicity of Copper.* USEPA (Duluth, MN 55804).

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USEPA. 2016. Water Quality Standards Academy: Biotic Ligand Model and Copper Criteria.

Welsh, Paul, Joanne Parrott, D. G. Dixon, Peter Hodson, Doug Spry, and G. Mierle. 2011. "Estimating acute copper toxicity to larval fathead minnow (Pimephales promelas) in soft water from measurements of dissolved organic carbon, calcium, and pH." *Canadian Journal of Fisheries and Aquatic Sciences* 53: 1263-1271.



Appendix List

APPENDIX A – PLOTS OF ACUTE TOXICITY RESULTS FROM LAKE PIRU, LAKE MATHEWS 2020, WEYMOUTH WTP 2021, AND LAKE MATHEWS 2021

- APPENDIX B LAKE PIRU TOXICITY TEST REPORT
- APPENDIX C LAKE MATHEWS 2020 TOXICITY TEST REPORT
- APPENDIX D WEYMOUTH WTP INFLUENT 2020 TOXICITY TEST REPORT
- APPENDIX E WEYMOUTH WTP INFLUENT 2020 (RE-SAMPLE) TOXICITY TEST REPORT
- APPENDIX F WEYMOUTH WTP INFLUENT 2021 TOXICITY TEST REPORT
- APPENDIX G LAKE MATHEWS 2021 TOXICITY TEST REPORT



Appendix A –

Plots of Acute Toxicity Results from Lake Piru, Lake Mathews 2020, Weymouth WTP 2020, Weymouth WTP 2021, and Lake Mathews 2021

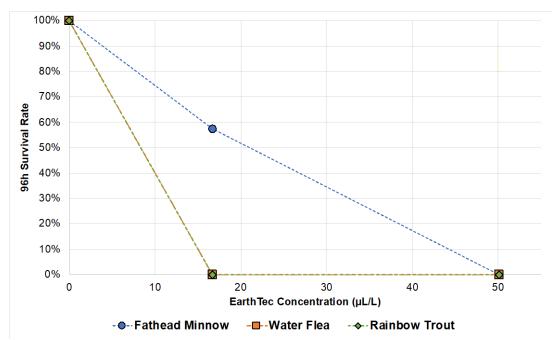
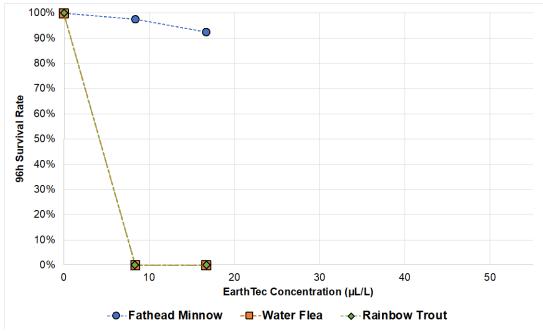
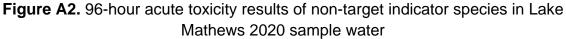


Figure A1. 96-hour acute toxicity results of non-target indicator species in Lake Piru sample water





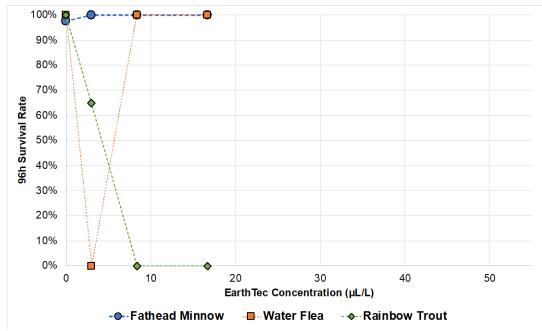


Figure A3. 96-hour acute toxicity results of non-target indicator species in Weymouth WTP influent 2020 sample water

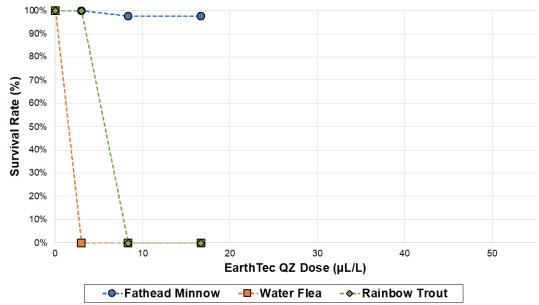


Figure A4. 96-hour acute toxicity results of non-target indicator species in Weymouth WTP influent 2021 sample water



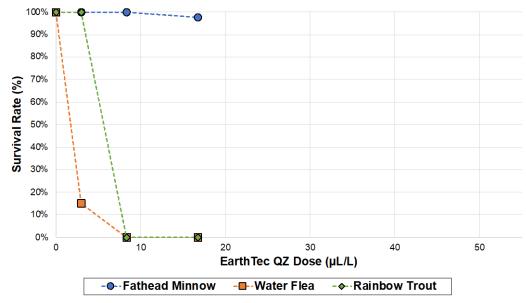


Figure A5. 96-hour acute toxicity results of non-target indicator species in Lake Mathews 2021 sample water



Appendix B – Lake Piru Toxicity Test Report

Trussell Technologies, Inc. | KASF Consulting



December 23, 2019

Mr. David Hokanson Trussell Technologies 232 N. Lake Avenue Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms EPA-821-R-02-012.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Trussell Technologies
SAMPLE ID.:	Lake Piru Raw
DATE RECEIVED:	6 Dec – 19
ABC LAB NO.:	EUR1219.056

ACUTE FATHEAD MINNOW SURVIVAL BIOASSAY

% Survival = 0 % Survival in 50.1 mg/l Sample *TU(a) = >1.00 @ 16.7 mg/l *TU(a) = >1.00 @ 50.1 mg/l * TU(a) Is calculated by: log (% Mortality)/1.7

Yours very truly, Scott Johnson Laboratory Director

CETIS Summary Report

 Report Date:
 19 Dec-19 15:27 (p 1 of 1)

 Test Code/ID:
 TRU1219.056afml / 00-7302-2552

Aquatic Bioassay & Consulting Labs, Inc.

Fathead Minnow 96-h Acute Survival Test

Batch ID:	07-7352-6059	Test Type:	Survival (96h)	Analyst:		
Start Date:	06 Dec-19 16:05	Protocol:	EPA/821/R-02-012 (2002)	Diluent:	Laboratory Water	
Ending Date:	10 Dec-19 14:10	Species:	Pimephales promelas	Brine:	Not Applicable	
Test Length:	94h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CO	Age
Sample ID:	20-2611-5180	Code:	TRU1219.056afml	Project:		
Sample Date	: 04 Dec-19 09:00	Material:	Sample Water	Source:	Bioassay Report	
Receipt Date	: 06 Dec-19 13:00	CAS (PC):		Station:	Lake Piru Raw	
Sample Age:	55h (6.5 °C)	Client:	Trussell Technologies			

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method		P-Value	Compar	ison Result			S
11-9941-2527	96h Survival Rate	Steel Many-One Rank Sum Test		0.0105	16.7mg/	L failed 96h su	urvival rate		1
Point Estimat	e Summary								_
Analysis ID	Endpoint	Point Estimate Method	\checkmark	Level	mg/L	95% LCL	95% UCL	ти	s
05-9379-4708	96h Survival Rate	Linear Interpolation (ICPIN)		EC5	1.965	1.048	4.165		1
				EC10	3.929	2.096	8.33		
				EC15	5.894	3.144	12.5		
				EC20	7.859	4.191	16.66		
				EC25	9.824	5.239	20.83		
				EC40	15.72	8.383	27.98		
				EC50	21.06	9.633	31.9		

Test Acceptabili	ty						
Analysis ID Er	ndpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
05-9379-4708 96	h Survival Rate	Control Resp	1	0.9	>>	Yes	Passes Criteria
11-9941-2527 96	oh Survival Rate	Control Resp	1	0.9	>>	Yes	Passes Criteria

Conc-mg/L Code Count 95% LCL 95% UCL Std Err Std Dev CV% Mean Min Max %Effect 0 Ν 4 1.0000 1.0000 1:0000 1.0000 1.0000 0.0000 0.0000 0.00% 0.00% 16.7 4 0.5750 0.2470 0.9030 0.4000 0.8000 0.1031 0.2062 35.85% 42.50% 50.1 4 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 100.00%

96h Survival Rate Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
16.7		0.8000	0.7000	0.4000	0.4000
50.1		0.0000	0.0000	0.0000	0.0000

96h Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	10/10	10/10	10/10	10/10
16.7		8/10	7/10	4/10	4/10
50.1		0/10	0/10	0/10	0/10

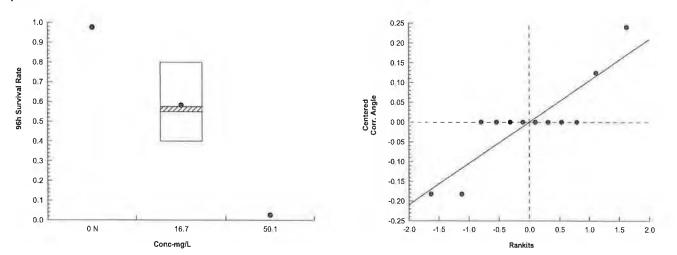
Analyst: _____ QA: _____

								oouono.			7002 200
Fathead Minnov	w 96-h Acute S	Survival Tes	st			_		Aquatic B	ioassay & (Consulting	Labs, Inc
	1-9941-2527 9 Dec-19 12:47			96h Survival Ra Nonparametric-		reatments		S Version: us Level:	CETISv1 1	.9.5	
Batch ID: 0	7-7352-6059	Test	Type:	Survival (96h)			Anal	yst:			
Start Date: 0	6 Dec-19 16:05			EPA/821/R-02-0	012 (2002)		Dilue		oratory Wat	er	
Ending Date: 1	0 Dec-19 14:10) Spe	cies:	Pimephales pro	melas		Brin	e: Not	Applicable		
Test Length: 9	4h	Тахо	on:	Actinopterygii			Sour	r ce: Aqu	atic Biosyst	ems, CO	Age:
	0-2611-5180	Cod	e:	TRU1219.056a	fml		Proje	ect:			
Sample Date: 0			erial:	Sample Water			Sou	ce: Bioa	assay Repor	t	
Receipt Date: 0			(PC):				Stati	on: Lak	e Piru Raw		
Sample Age: 5	5h (6.5 °C)	Clie	nt:	Trussell Techno	ologies						
Data Transform		Alt Hyp					- 4	son Result			PMSD
Angular (Correct	ted)	C > T					16.7mg/L	failed 96h s	urvival rate		12.96%
Steel Many-One	e Rank Sum Te	est									
Control vs	S Control I	I	Test S	tat Critical	Ties DF	P-Type	P-Value	Decision	α:5%)		
Negative Contro	l 16.7*		10	12	0 6	CDF	0.0105	Significan	t Effect		
Test Acceptabil	lity Criteria	TAC L	imits								
Attribute	Test Stat		Upper	Overlap	Decision						
Control Resp	1	0.9	>>	Yes	Passes Ci	riteria					
ANOVA Table											
Source	Sum Squa	ares	Mean	Square	DF	F Stat	P-Value	Decision	(α:5%)		
Between	0.594225		0.5942	25	1	25.55	0.0023	Significan	t Effect		
Error	0.139539		0.0232	565	6						
Total	0.733764				7						_
ANOVA Assum	ptions Tests										
Attribute	Test				Test Stat	Critical	P-Value	Decision	(α:1%)		-
Variance		quality of Va			59.23	13.75	2.5E-04	Unequal \			
		ne Equality			39.49	13.75	7.6E-04	Unequal \			
Distribution		Darling A2 I		y Test	0.5621	3.878	0.1497	Normal D			
	-	ov-Smirnov			0.25	0.3313	0.1599	Normal D			
	Shapiro-W	/ilk W Norm	ality Tes	t	0.8906	0.6451	0.2370	Normal D	istribution		
96h Survival Ra	ate Summary										
Conc-mg/L	Code	Count	Mean	95% LCL		Median	Min	Мах	Std Err	CV%	%Effect
0	N	4	1.0000		1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
16.7		4	0.5750		0.9030	0.5500	0.4000	0.8000	0.1031	35.85%	42.50%
50.1	_	4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
Angular (Corre			-								
Conc-mg/L	Code	Count	Mean	95% LCL			Min	Max	Std Err	CV%	%Effect
0	N	4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
16.7		4	0.8669		1.21	0.8379	0.6847	1.107	0.1078	24.88%	38.60%
50.1	_	4	0.1588	0.1588	0.1588	0.1588	0.1588	0.1588	0	0.00%	88.76%
96h Survival Ra											
Conc-mg/L	Code	Rep 1	Rep 2		Rep 4					_	
0	N	1.0000	1.0000		1.0000						
16.7		0.8000	0.7000		0.4000						
50.1		0.0000	0.0000	0.0000	0.0000						

Analyst: _____ QA: ____

CETIS Ana	alytical Repo	rt				Report Date: Test Code/ID:	19 Dec-19 15:26 (p 2 of 2) TRU1219.056afml / 00-7302-2552
Fathead Min	now 96-h Acute S	urvival T	est			Aquatic B	lioassay & Consulting Labs, Inc.
Analysis ID: Analyzed:	11-9941-2527 19 Dec-19 12:47			5h Survival R onparametric	Rate c-Control vs Treatments	CETIS Version: Status Level:	CETISv1.9.5 1
Angular (Cor	rected) Transform	ned Deta	il				
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4		
0	N	1.412	1.412	1.412	1.412		
16.7		1.107	0.9912	0.6847	0.6847		
50.1		0.1588	0.1588	0.1588	0.1588		
96h Survival	Rate Binomials						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4		
0	N	10/10	10/10	10/10	10/10		
16.7		8/10	7/10	4/10	4/10		
50.1		0/10	0/10	0/10	0/10		

Graphics



QA:_ P Analyst:

CETIS Analytical Report

Report Date: 19 Dec-19 15:26 (p 1 of 2) Test Code/ID:

TRU1219.056afml / 00-7302-2552

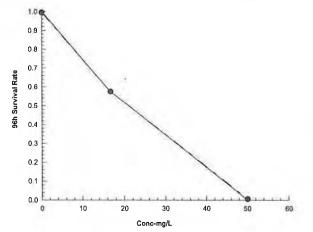
Fathead Minn	now 96-h Acute S	urvival Tes	t					Aquatic E	Bioassay &	Consulting	g Labs, Inc
Analysis ID:	05-9379-4708		point:	96h Survival F				TIS Version:		1.9.5	
Analyzed:	19 Dec-19 12:48	Anal	ysis:	Linear Interpo	lation (ICPIN	1)	Sta	tus Level:	1		
Batch ID:	07-7352-6059	Test	Type:	Survival (96h)	1		Ana	alyst:			
Start Date:	06 Dec-19 16:05	Prote	ocol:	EPA/821/R-02	2-012 (2002)		Dil	uent: Lab	oratory Wa	ter	
Ending Date:	10 Dec-19 14:10	Spec	ies:	Pimephales p	romelas		Bri	ne: Not	Applicable		
Test Length:	94h	Тахо	n:	Actinopterygii			So	u rce: Aqu	atic Biosys	tems, CO	Age:
Sample ID:	20-2611-5180	Code	e:	TRU1219.056	Bafml		Pro	ject:			
Sample Date:	: 04 Dec-19 09:00	Mate	rial:	Sample Wate	r		So	urce: Bioa	assay Repo	ort	
Receipt Date:	: 06 Dec-19 13:00	CAS	(PC):				Sta	tion: Lak	e Piru Raw		
Sample Age:	55h (6.5 °C)	Clier	nt:	Trussell Tech	nologies						
Linear Interp	olation Options										
X Transform	Y Transform	Seed	1	Resamples	Exp 95%	GCL Me	thod				
Linear	Linear	0		280	Yes	Tw	o-Point Inter	polation			
Test Accepta	bility Criteria	TAC Li	mits								
Attribute	Test Stat	Lower	Uppe	er Overlap	Decision	1					
Control Resp	1	0.9	>>	Yes	Passes (_					
Point Estima	tes										
Level mg/l	95% LCL	95% UCL									
EC5 1.96	5 1.048	4.165									
EC10 3.92	9 2.096	8.33									
EC15 5.89	4 3.144	12.5									
EC20 7.85	9 4.191	16.66									
EC25 9.82	4 5.239	20.83									
EC40 15.7	2 8.383	27.98									
EC50 21.0	6 9.633	31.9									
96h Survival	Rate Summary				Calc	ulated Var	iate(A/B)			Isoto	nic Variate
Conc-mg/L	Code	Count	Mear	n Min	Мах	Std Dev	/ CV%	%Effect	A/B	Mean	%Effect
0	N	4	1.000	00 1.0000	1.0000	0.0000	0.00%	0.0%	40/40	1	0.0%
16.7		4	0.575	50 0.4000	0.8000	0.2062	35.85%	42.5%	23/40	0.575	42.5%
50.1		4	0.000	0.0000 0.0	0.0000	0.0000		100.0%	0/40	0	100.0%
96h Survival	Rate Detail										
Conc-mg/L	Code	Rep 1	Rep	2 Rep 3	Rep 4						-
0	N	1.0000	1.000	00 1.0000	1.0000						
16.7		0.8000	0.700	0.4000	0.4000						
50.1		0.0000	0.000	0.0000 0.000	0.0000						
96h Survival	Rate Binomials										
Cono mall	Code	Don 1	Der	2 Dan 3	Ban (

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	
0	N	10/10	10/10	10/10	10/10	
16.7		8/10	7/10	4/10	4/10	
50.1		0/10	0/10	0/10	0/10	

Analyst:_____QA:____

000-189-126-0

CETIS Ana	alytical Report			Report Date: Test Code/ID:	19 Dec-19 15:26 (p 2 of 2) TRU1219.056afml / 00-7302-2552		
Fathead Minn	now 96-h Acute Surv	vival Test		Aquatic Bioassay & Consulting Labs, Inc			
Analysis ID:	05-9379-4708	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.9.5		
Analyzed:	19 Dec-19 12:48	Analysis:	Linear Interpolation (ICPIN)	Status Level:	1		



000-189-126-0

CETIS™ v1.9.5.5

Analyst: QA

Report Date: 19 Dec-19 15:26 (p 1 of 3)

Test Code/ID: TRU1219.056afml / 00-7302-2552

Fathead Minn	ow 96-h Acute S	Surviva	l Test					Aquati	c Bioassay &	Consulting	Labs, Inc.
Batch ID: Start Date: Ending Date: Test Length:	07-7352-6059 06 Dec-19 16:05 10 Dec-19 14:10 94h	5)	Test Type: Protocol: Species: Taxon:	Survival (96h) EPA/821/R-02 Pimephales pr Actinopterygii			D B	rine: N	aboratory Wa Not Applicable Aquatic Biosys		Age:
•	20-2611-5180 04 Dec-19 09:00 06 Dec-19 13:00)	Code: Material: CAS (PC):	TRU1219.056a Sample Water	afml		S		Bioassay Repo .ake Piru Raw	rt	
Sample Age:	55h (6.5 °C)		Client:	Trussell Techn	ologies						
Alkalinity (Ca	CO3)-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
0	N	3	60	60	60	60	60	0	0	0.0%	0
50.1		3	160	160	160	160	160	0	0	0.0%	0
Overall		6	110	52.52	167.5	60	160	22.36	54.77	49.79%	0 (0%)
Conductivity-	µmhos										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
0	N	3	336.3	296.1	376.6	326	355	9.351	16.2	4.82%	0
16.7		3	946.7	920.8	972.5	935	955	6.009	10.41	1.1%	0
50.1		2	990	939.2	1041	986	994	4	5.657	0.57%	0
Overall		8	728.6	456.5	1001	326	994	115.1	325.5	44.67%	0 (0%)
Dissolved Ox	ygen-mg/L										. ,
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
0	N	3	7.9	7.896	7.904	7.9	7.9	0	0	0.0%	0
16.7		3	8.367	5.878	10.85	7.4	9.4	0.5783	1.002	11.97%	0
50.1		2	8.25	-6.362	22.86	7.1	9.4	1.15	1.626	19.71%	0
Overall		8	8.162	7.456	8.869	7.1	9.4	0.2988	0.845	10.35%	0 (0%)
Hardness (Ca	CO3)-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Cour
0	N	3	94	94	94	94	94	0	0	0.0%	0
50.1		3	161	161	161	161	161	0	0	0.0%	0
Overall		6	127.5	88.99	166	94	161	14.98	36.7	28.78%	0 (0%)
pH-Units					-						
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Мах	Std Err	Std Dev	CV%	QA Cour
0	N	3	7.667	7.38	7.954	7.6	7.8	0.0666	7 0.1155	1.51%	0
16.7		3	7.833		7.977	7.8	7.9	0.0333		0.74%	0
50.1		2	8.1	6.829	9.371	8	8.2	0.1	0.1414	1.75%	0
Overall		8	7.838	7.671	8.004	7.6	8.2	0.0705		2.55%	0 (0%)
Temperature-	°C										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Er	Std Dev	CV%	QA Cour
0	N	3	24	24	24	24	24	0	0	0.0%	0
16.7		3	24.07	23.92	24.21	24	24.1	0.0332		0.24%	0
50.1		2	24.05	23.42	24.68	24	24.1	0.0499		0.29%	0
											-

CETIS™ v1.9.5.5

Analyst: _____ QA: _____

Report Date: Test Code/ID: TRU1219.056afml / 00-7302-2552

Fathead Minnow 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

Alkalinity (CaCC	03)-mg/L								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		60					
50.1				160					
0	N	2		60					1
50.1				160					
0	N	3		60					
50.1				160					
Conductivity-µr	nhos								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		326					
16.7				955					
50.1				994					
0	N	2		328					
16.7				950					
50.1				986					
0	N	3		355					
16.7				935					
Dissolved Oxyg	jen-mg/L								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.9					
16.7				9.4					
50.1				9.4					
0	N	2		7.9		_			
16.7				7.4					
50.1				7.1					
0	N	3		7.9	-				
16.7				8.3					
Hardness (CaC	O3)-mg/L								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		94					
0				161					
50.1	N	2		94					
50.1 0	N	2		94 161					
50.1 0 50.1				161					
50.1 0 50.1 0	N	2 3		161 94				_	
50.1 0 50.1 0 50.1				161					
50.1 0 50.1 0 50.1 pH-Units			Time	161 94 161	QA	Diff-%	Inst ID	Analyst	Notes
50.1 0 50.1 0 50.1 pH-Units Conc-mg/L	N	3	Time	161 94 161 Measure	QA	Diff-%	Inst ID	Analyst	Notes
50.1 0 50.1 0 50.1 pH-Units Conc-mg/L 0	N	3 Read	Time	161 94 161	QA	Diff-%	Inst ID	Analyst	Notes
50.1 50.1 50.1 50.1 pH-Units Conc-mg/L 0 16.7	N	3 Read	Time	161 94 161 Measure 7.6	QA	Diff-%	Inst ID	Analyst	Notes
50.1 0 50.1 50.1 pH-Units Conc-mg/L 0 16.7 50.1	N Code N	3 Read 1	Time	161 94 161 Measure 7.6 7.9 8.2	QA	Diff-%	Inst ID	Analyst	Notes
50.1 0 50.1 0 50.1 pH-Units Conc-mg/L 0 16.7 50.1	N	3 Read	Time	161 94 161 Measure 7.6 7.9	QA	Diff-%	Inst ID	Analyst	Notes
50.1 50.1 50.1 0 50.1 pH-Units Conc-mg/L 0 16.7 50.1 0 16.7 50.1	N Code N	3 Read 1	Time	161 94 161 Measure 7.6 7.9 8.2 7.8	QA	Diff-%	Inst ID	Analyst	Notes
50.1 0 50.1 0 50.1 pH-Units Conc-mg/L 0 16.7 50.1 0 16.7	N Code N	3 Read 1	Time	161 94 161 Measure 7.6 7.9 8.2 7.8 7.8 7.8	QA	Diff-%	Inst ID	Analyst	Notes

QA:

Report Date: 19 Dec-19 15:27 (p 3 of 3)

Test Code/ID: TRU1219.056afml / 00-7302-2552

Fathead Minnow 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C	;							
Conc-mg/L	Code	Read	Time	Measure QA	Diff-%	Inst ID	Analyst Notes	
0	N	1		24				
16.7				24.1				
50.1				24.1				
0	N	2		24				
16.7				24.1				
50.1				24				
0	N	3		24				
16.7				24				

Analyst: _____QA:____



December 23, 2019

Mr. David Hokanson Trussell Technologies 232 N. Lake Avenue Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms EPA-821-R-02-012.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Trussell Technologies
SAMPLE ID.:	Lake Piru Raw
DATE RECEIVED:	6 Dec – 19
ABC LAB NO.:	EUR1219.056

ACUTE CERIODAPHNIA SURVIVAL BIOASSAY

% Survival = 0 % Survival in 50.1mg/l Sample *TU(a) = >1.00 @ 16.7 mg/l *TU(a) = >1.00 @ 50.1 mg/l * TU(a) Is calculated by: log (% Mortality)/1.7

Yours very truly, cott Johnson Laboratory Director

							Tes					-
Ceriodaphnia	96-h Acute Survi	ival Test	_					Aquatic E	Bioassay & C	consulting l	Labs, Ir	ıc.
Batch ID:	18-1458-7538	Tes	t Type:	Survival (96h)			Ana	lyst:				
Start Date:	06 Dec-19 16:05	Pro	tocol:	EPA/821/R-02-	012 (2002)		Dilu	ient: Lab	oratory Wate	er		
•	10 Dec-19 14:10	•	ecies:	Ceriodaphnia d	ubia		Brir	ne: Not	Applicable			
Test Length:	94h	Тах	ion:	Branchiopoda			Source: Aquatic Biosystems, CO					
Sample ID:	09-3098-8150	Co	de:	TRU1219.056a	cer		Project:					
Sample Date:	04 Dec-19 09:00	Ma	terial:	Sample Water			Sou	irce: Bio	assay Report	t		
Receipt Date:	06 Dec-19 13:00	CA	S (PC):			Stat	tion: Lak	e Piru Raw				
Sample Age:	55h (6.5 °C)	Clie	ent:	Trussell Techno	ologies							
Point Estimat	e Summary											
	Endpoint		Point	Estimate Meth	od	~	Level	mg/L	95% LCL	95% UCL	ŤU	S
18-7406-0446	96h Survival Rate	Э	Linear	Interpolation (IG	CPIN)		EC5	0.835	0.835	0.835		1
							EC10	1.67	1.67	1.67		
							EC15	2.505	2.505	2.505		
							EC20	3.34	3.34	3.34		
							EC25	4.175	4.175	4.175		
							EC40	6 68	6 6 8	6 69		
							EC40 EC50	6.68 8.35	6.68 8.35	6.68 8.35		
Test Accental	aility						EC50		6.68 8.35	6.68 8.35		_
Test Acceptal			Attrib	ute	Tost Stat	TAC L	EC50	8.35	8.35			-
Analysis ID	Endpoint	9	Attrib		Test Stat	Lower	EC50 imits Upper	8.35 Overlap	8.35 Decision	8.35		
Analysis ID 18-7406-0446			Contro	ute ol Resp ol Resp	Test Stat 1 1		EC50	8.35	8.35	8.35 riteria		
Analysis ID 18-7406-0446 21-2716-7875	Endpoint 96h Survival Rate		Contro	ol Resp	1	Lower 0.9	EC50 imits Upper >>	8.35 Overlap Yes	8.35 Decision Passes Ci	8.35 riteria		
Analysis ID 18-7406-0446 21-2716-7875 96h Survival I	Endpoint 96h Survival Rate 96h Survival Rate		Contro	ol Resp	1 1	Lower 0.9 0.9	EC50 imits Upper >>	8.35 Overlap Yes	8.35 Decision Passes Ci	8.35 riteria	%Effe	ect
Analysis ID 18-7406-0446 21-2716-7875 96h Survival I Conc-mg/L	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary	9	Contro Contro	ol Resp ol Resp 95% LCL	1 1	Lower 0.9 0.9	EC50 imits Upper >> >>	8.35 Overlap Yes Yes	8.35 Decision Passes Ci Passes Ci	8.35 riteria riteria	%Effe 0.00%	_
Analysis ID 18-7406-0446 21-2716-7875 96h Survival I Conc-mg/L 0	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code	e Count	Contro Contro Mean	ol Resp ol Resp 95% LCL 0 1.0000	1 1 95% UCL	Lower 0.9 0.9 Min	EC50 imits Upper >> >> Max	8.35 Overlap Yes Yes Std Err	8.35 Decision Passes Cr Passes Cr Std Dev	8.35 riteria riteria CV%		,
Analysis ID 18-7406-0446 21-2716-7875 96h Survival I Conc-mg/L 0 16.7	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code	e Count 4	Contro Contro Mean 1.0000	ol Resp ol Resp 95% LCL 0 1.0000 0 0.0000	1 1 95% UCL 1.0000	Lower 0.9 0.9 Min 1.0000	EC50 imits Upper >> >> Max 1.0000	8.35 Overlap Yes Yes Std Err 0.0000	8.35 Decision Passes Cr Passes Cr Std Dev 0.0000	8.35 riteria riteria CV%	0.00%	, 0%
Analysis ID 18-7406-0446 21-2716-7875 96h Survival I Conc-mg/L 0 16.7 50.1	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N	Count 4 4	Contro Contro Mean 1.0000	ol Resp ol Resp 95% LCL 0 1.0000 0 0.0000	1 1 95% UCL 1.0000 0.0000	Lower 0.9 0.9 Min 1.0000 0.0000	EC50 imits Upper >> >> Max 1.0000 0.0000	8.35 Overlap Yes Yes Std Err 0.0000 0.0000	8.35 Decision Passes Cr Passes Cr Std Dev 0.0000 0.0000	8.35 riteria riteria CV%	0.00% 100.0	, 0%
Analysis ID 18-7406-0446 21-2716-7875 96h Survival I Conc-mg/L 0 16.7 50.1 96h Survival I Conc-mg/L	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code	Count 4 4	Contro Contro Mean 1.0000	95% LCL 0 1.0000 0	1 1 95% UCL 1.0000 0.0000	Lower 0.9 0.9 Min 1.0000 0.0000	EC50 imits Upper >> >> Max 1.0000 0.0000	8.35 Overlap Yes Yes Std Err 0.0000 0.0000	8.35 Decision Passes Cr Passes Cr Std Dev 0.0000 0.0000	8.35 riteria riteria CV%	0.00% 100.0	, 0%
Analysis ID 18-7406-0446 21-2716-7875 96h Survival I Conc-mg/L 0 16.7 50.1 96h Survival I Conc-mg/L 0	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail	e Count 4 4 4 4 Rep 1 1.0000	Contro Contro Mean 1.0000 0.0000 0.0000 Rep 2 1.0000	95% LCL 0 1.0000 0 0.0000 0 0.0000 0 0.0000 0 0.0000 0 0.0000 0 0.0000 0 0.0000	1 1 95% UCL 1.0000 0.0000 0.0000 Rep 4 1.0000	Lower 0.9 0.9 Min 1.0000 0.0000	EC50 imits Upper >> >> Max 1.0000 0.0000	8.35 Overlap Yes Yes Std Err 0.0000 0.0000	8.35 Decision Passes Cr Passes Cr Std Dev 0.0000 0.0000	8.35 riteria riteria CV%	0.00% 100.0	。 0%
Analysis ID 18-7406-0446 21-2716-7875 96h Survival I Conc-mg/L 0 16.7 50.1 96h Survival I Conc-mg/L 0	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code	Count 4 4 4 Rep 1	Contro Contro Mean 1.0000 0.0000 0.0000 Rep 2	95% LCL 0 1.0000 0 0.0000 0 0.0000 0 0.0000 0 0.0000 0 0.0000 0 0.0000 0 0.0000	1 1 95% UCL 1.0000 0.0000 0.0000 Rep 4	Lower 0.9 0.9 Min 1.0000 0.0000	EC50 imits Upper >> >> Max 1.0000 0.0000	8.35 Overlap Yes Yes Std Err 0.0000 0.0000	8.35 Decision Passes Cr Passes Cr Std Dev 0.0000 0.0000	8.35 riteria riteria CV%	0.00% 100.0	, 0%
Analysis ID 18-7406-0446 21-2716-7875 96h Survival I Conc-mg/L 50.1 96h Survival I Conc-mg/L 0 16.7	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code	e Count 4 4 4 4 Rep 1 1.0000	Contro Contro Mean 1.0000 0.0000 0.0000 Rep 2 1.0000	Poil Resp 95% LCL 0 1.0000 0 0.0000 0 0.0000 0 1.0000 0 0.0000 0 0.0000	1 1 95% UCL 1.0000 0.0000 0.0000 Rep 4 1.0000	Lower 0.9 0.9 Min 1.0000 0.0000	EC50 imits Upper >> >> Max 1.0000 0.0000	8.35 Overlap Yes Yes Std Err 0.0000 0.0000	8.35 Decision Passes Cr Passes Cr Std Dev 0.0000 0.0000	8.35 riteria riteria CV%	0.00% 100.0	, 0%
Analysis ID 18-7406-0446 21-2716-7875 96h Survival I Conc-mg/L 0 16.7 50.1 96h Survival I Conc-mg/L 0 16.7 50.1	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code	Count 4 4 4 4 1 1.0000 0.0000	Contro Contro 1.0000 0.0000 Rep 2 1.0000 0.0000	Poil Resp 95% LCL 0 1.0000 0 0.0000 0 0.0000 0 1.0000 0 0.0000 0 0.0000	1 1 95% UCL 1.0000 0.0000 0.0000 Rep 4 1.0000 0.0000	Lower 0.9 0.9 Min 1.0000 0.0000	EC50 imits Upper >> >> Max 1.0000 0.0000	8.35 Overlap Yes Yes Std Err 0.0000 0.0000	8.35 Decision Passes Cr Passes Cr Std Dev 0.0000 0.0000	8.35 riteria riteria CV%	0.00% 100.0	, 0%
Analysis ID 18-7406-0446 21-2716-7875 96h Survival I Conc-mg/L 0 16.7 50.1 96h Survival I Conc-mg/L 0 16.7 50.1 96h Survival I 50.1	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code N Rate Binomials Code	Count 4 4 4 4 1.0000 0.0000 0.0000 0.0000 Rep 1	Contro Contro 0.0000 0.0000 Rep 2 1.0000 0.0000 0.0000 Rep 2	95% LCL 0 0 1.0000 0 <tr< td=""><td>1 1 95% UCL 1.0000 0.0000 0.0000 Rep 4 1.0000 0.0000 0.0000 Rep 4</td><td>Lower 0.9 0.9 Min 1.0000 0.0000</td><td>EC50 imits Upper >> >> Max 1.0000 0.0000</td><td>8.35 Overlap Yes Yes Std Err 0.0000 0.0000</td><td>8.35 Decision Passes Cr Passes Cr Std Dev 0.0000 0.0000</td><td>8.35 riteria riteria CV%</td><td>0.00% 100.0</td><td>, 0%</td></tr<>	1 1 95% UCL 1.0000 0.0000 0.0000 Rep 4 1.0000 0.0000 0.0000 Rep 4	Lower 0.9 0.9 Min 1.0000 0.0000	EC50 imits Upper >> >> Max 1.0000 0.0000	8.35 Overlap Yes Yes Std Err 0.0000 0.0000	8.35 Decision Passes Cr Passes Cr Std Dev 0.0000 0.0000	8.35 riteria riteria CV%	0.00% 100.0	, 0%
Analysis ID 18-7406-0446 21-2716-7875 96h Survival I Conc-mg/L 0 16.7 50.1 96h Survival I Conc-mg/L 0 16.7 50.1 96h Survival I 96h Survival I	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code N Rate Binomials	Count 4 4 4 1.0000 0.0000 0.0000	Contro Contro 1.0000 0.0000 0.0000 Rep 2 1.0000 0.0000	95% LCL 0 0 1.0000 0 0 0 0 0	1 1 95% UCL 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 Rep 4 5/5	Lower 0.9 0.9 Min 1.0000 0.0000	EC50 imits Upper >> >> Max 1.0000 0.0000	8.35 Overlap Yes Yes Std Err 0.0000 0.0000	8.35 Decision Passes Cr Passes Cr Std Dev 0.0000 0.0000	8.35 riteria riteria CV%	0.00% 100.0	, 0%
Analysis ID 18-7406-0446 21-2716-7875 96h Survival I Conc-mg/L 0 16.7 50.1 96h Survival I Conc-mg/L 0 16.7 50.1	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code N Rate Binomials Code	Count 4 4 4 4 1.0000 0.0000 0.0000 0.0000 Rep 1	Contro Contro 0.0000 0.0000 Rep 2 1.0000 0.0000 0.0000 Rep 2	95% LCL 0 0 1.0000 0 <tr< td=""><td>1 1 95% UCL 1.0000 0.0000 0.0000 Rep 4 1.0000 0.0000 0.0000 Rep 4</td><td>Lower 0.9 0.9 Min 1.0000 0.0000</td><td>EC50 imits Upper >> >> Max 1.0000 0.0000</td><td>8.35 Overlap Yes Yes Std Err 0.0000 0.0000</td><td>8.35 Decision Passes Cr Passes Cr Std Dev 0.0000 0.0000</td><td>8.35 riteria riteria CV%</td><td>0.00% 100.0</td><td>, 0%</td></tr<>	1 1 95% UCL 1.0000 0.0000 0.0000 Rep 4 1.0000 0.0000 0.0000 Rep 4	Lower 0.9 0.9 Min 1.0000 0.0000	EC50 imits Upper >> >> Max 1.0000 0.0000	8.35 Overlap Yes Yes Std Err 0.0000 0.0000	8.35 Decision Passes Cr Passes Cr Std Dev 0.0000 0.0000	8.35 riteria riteria CV%	0.00% 100.0	, 0%

DA: PA35 Analyst:_____

Analysis ID:

Analyzed:

Batch ID:

Start Date:

Report Date: 19 Dec-19 15:28 (p 1 of 2) Test Code/ID: TRU1219.056acer / 07-0764-7780

Bioassay Report

Lake Piru Raw

Ceriodaphnia 96-h Acute Survival Test Aquatic Bioassay & Consulting Labs, Inc. 21-2716-7875 Endpoint: 96h Survival Rate **CETIS Version:** CETISv1.9.5 19 Dec-19 15:28 Analysis: Nonparametric-Two Sample Status Level: 1 18-1458-7538 Test Type: Survival (96h) Analyst: 06 Dec-19 16:05 EPA/821/R-02-012 (2002) Protocol: **Diluent:** Laboratory Water Ending Date: 10 Dec-19 14:10 Species: Ceriodaphnia dubia Brine: Not Applicable Branchiopoda Taxon: Aquatic Biosystems, CO Source: Age:

Project:

Source:

Station:

Test Length: 94h	Taxon:	Branchiopoda
Sample ID: 09-3098-8	150 Code :	TRU1219.056acer
Sample Date: 04 Dec-19	09:00 Material:	Sample Water
Receipt Date: 06 Dec-19	13:00 CAS (PC)	:
Sample Age: 55h (6.5 °C	C) Client:	Trussell Technologies

Test Acceptab	ility Criteria	TAC Limits			
Attribute	Test Stat	Lower	Upper		

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	1	0.9	>>	Yes	Passes Criteria

96h Survival Rate Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
16.7		4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
50.1		4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.00%	0.00%
16.7		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.00%	83.24%
50.1		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.00%	83.24%

96h Survival Rate Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
16.7		0.0000	0.0000	0.0000	0.0000
50.1		0.0000	0.0000	0.0000	0.0000

Angular (Corrected) Transformed Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.345	1.345	1.345	1.345
16.7		0.2255	0.2255	0.2255	0.2255
50.1		0.2255	0.2255	0.2255	0.2255

96h Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	5/5	5/5	5/5	5/5
16.7		0/5	0/5	0/5	0/5
50.1		0/5	0/5	0/5	0/5

Analyst: _____ QA:

CETIS Ana	alytical Report				Report Date: Test Code/ID:	19 Dec-19 15:28 (p 2 of 2) TRU1219.056acer / 07-0764-7780		
Ceriodaphnia	a 96-h Acute Surviva	l Test			Aquatic Bioassay & Consulting Labs, Inc.			
Analysis ID: Analyzed:	21-2716-7875 19 Dec-19 15:28	Endpoint: Analysis:	96h Survival Rate Nonparametric-Two Samp	le	CETIS Version: Status Level:	CETISv1.9.5 1		
Graphics								
1.0 0.9	•		a	1.0 F	1			
0.8				08	1			
Survival				Centered Corr. Angle 5 0				
୍ଟ୍ରେ 0.5 0.4				505 505				
0.3				0.3 -				
0.1	0 N	16.7	9 50.1	0.0	• • • • • • 15 -10 -05 0.0	05 10 15 2.0		
		onc-mg/L	50.1	-2.0 -	Rankits			

Analyst: _____QA:____

1

Report Date: 19 Dec-19 15:28 (p 1 of 2) Test 80

Ceriodanhnia 96-h Acute Survival Test

st Code/ID:	TRU1219.056acer / 07-0764-778
Aquatic E	Bioassay & Consulting Labs, Inc.

Ceriodap	ohnia 🤅	96-h Acute Surv	ival Test	_					Aquatic	Bioassay 8	Consulting	J Labs, Inc
Analysis Analyzed		18-7406-0446 19 Dec-19 15:28		point: ysis:	96h Survival R Linear Interpol				TIS Version tus Level:	CETISV 1	1.9.5	
Batch ID:	:	18-1458-7538	Test	Type:	Survival (96h)			Ana	alyst:			
Start Date	e:	06 Dec-19 16:05		ocol:	EPA/821/R-02	-012 (2002)			-	poratory Wa	ater	
Ending D	Date:	10 Dec-19 14:10	Spec	cies:	Ceriodaphnia d	dubia		Bri		t Applicable		
Test Leng	gth:	94h	Taxo	on:	Branchiopoda			So		uatic Biosy		Age:
Sample II	ID:	09-3098-8150	Cod	e:	TRU1219.056	acer		Pro	oject:			
Sample D	Date:	04 Dec-19 09:00	Mate	erial:	Sample Water			So	urce: Bio	assay Rep	ort	
Receipt D	Date:	06 Dec-19 13:00	CAS	(PC):				Sta	tion: La	ke Piru Rav	/	
Sample A	Age:	55h (6.5 °C)	Clier	nt:	Trussell Techr	ologies						
Linear In	nterpo	lation Options										
X Transfo	orm	Y Transform	Seed	d	Resamples	Exp 95%	CL Met	hod		_		
Linear		Linear	0		280	Yes	Two	-Point Inter	polation			
Test Acc	eptab	ility Criteria	TAC Li	imits								
Attribute		Test Stat	Lower	Uppe	r Overlap	Decision						
Control R	Resp	1	0.9	>>	Yes	Passes Ci	riteria					
Point Est	timate	15										
	mg/L	95% LCL	95% UCL	_								
Level EC5	mg/L 0.835	95% LCL 0.835	95% UCL 0.835								_	
Level EC5 EC10	mg/L 0.835 1.67	95% LCL 0.835 1.67	0.835 1.67									
Level EC5 EC10 EC15	mg/L 0.835	95% LCL 0.835 1.67	0.835									
Level EC5 EC10 EC15	mg/L 0.835 1.67	95% LCL 0.835 1.67	0.835 1.67						-	_		
Level EC5 EC10 EC15 EC20	mg/L 0.835 1.67 2.505	95% LCL 0.835 1.67 2.505 3.34	0.835 1.67 2.505									
Level EC5 EC10 EC15 EC20 EC25	mg/L 0.835 1.67 2.505 3.34	95% LCL 0.835 1.67 2.505 3.34	0.835 1.67 2.505 3.34						-			
Level EC5 EC10 EC15 EC20 EC25 EC25 EC26 EC40	mg/L 0.835 1.67 2.505 3.34 4.175	95% LCL 0.835 1.67 2.505 3.34 4.175	0.835 1.67 2.505 3.34 4.175									
Level EC5 EC10 EC15 EC20 EC25 EC40 EC50	mg/L 0.835 1.67 2.505 3.34 4.175 6.68 8.35	95% LCL 0.835 1.67 2.505 3.34 4.175 6.68	0.835 1.67 2.505 3.34 4.175 6.68			Calcu	lated Varia	ate(A/B)			Isoto	nic Variate
Level EC5 EC10 EC15 EC20 EC25 EC40 EC50	mg/L 0.835 1.67 2.505 3.34 4.175 6.68 8.35 /ival F	95% LCL 0.835 1.67 2.505 3.34 4.175 6.68 8.35	0.835 1.67 2.505 3.34 4.175 6.68	Mean	Min	Calcu Max	ilated Varia Std Dev	ate(A/B) CV%	%Effect	A/B	Isoto Mean	
Level EC5 EC10 EC15 EC20 EC25 EC40 EC50 96h Surv	mg/L 0.835 1.67 2.505 3.34 4.175 6.68 8.35 /ival F	95% LCL 0.835 1.67 2.505 3.34 4.175 6.68 8.35 Rate Summary	0.835 1.67 2.505 3.34 4.175 6.68 8.35	Mean 1.000					%Effect	A/B 20/20		
Level EC5 EC10 EC25 EC20 EC25 EC40 EC50 96h Surv Conc-mg 0	mg/L 0.835 1.67 2.505 3.34 4.175 6.68 8.35 /ival F	95% LCL 0.835 1.67 2.505 3.34 4.175 6.68 8.35 Rate Summary Code	0.835 1.67 2.505 3.34 4.175 6.68 8.35 Count		0 1.0000	Max	Std Dev	CV%		20/20	Mean	%Effec 0.0%
Level EC5 EC10 EC15 EC20 EC25 EC40 EC50 96h Surv Conc-mg	mg/L 0.835 1.67 2.505 3.34 4.175 6.68 8.35 /ival F	95% LCL 0.835 1.67 2.505 3.34 4.175 6.68 8.35 Rate Summary Code	0.835 1.67 2.505 3.34 4.175 6.68 8.35 Count 4	1.000	0 1.0000 0 0.0000	Max 1.0000	Std Dev 0.0000	CV%	0.0%		Mean 1	nic Variate %Effec 0.0% 100.0% 100.0%
Level EC5 EC10 EC15 EC20 EC25 EC40 EC50 96h Surv Conc-mg 0 16.7 50.1	mg/L 0.835 1.67 2.505 3.34 4.175 6.68 8.35 vival F g/L	95% LCL 0.835 1.67 2.505 3.34 4.175 6.68 8.35 Rate Summary Code	0.835 1.67 2.505 3.34 4.175 6.68 8.35 Count 4 4	1.000 0.000	0 1.0000 0 0.0000	Max 1.0000 0.0000	Std Dev 0.0000 0.0000	CV%	0.0% 100.0%	20/20 0/20	Mean 1 0	%Effec 0.0% 100.0%
Level EC5 EC10 EC15 EC20 EC25 EC40 EC50 96h Surv Conc-mg 0 16.7 50.1	mg/L 0.835 1.67 2.505 3.34 4.175 6.68 8.35 vival F g/L	95% LCL 0.835 1.67 2.505 3.34 4.175 6.68 8.35 Rate Summary Code N	0.835 1.67 2.505 3.34 4.175 6.68 8.35 Count 4 4	1.000 0.000	0 1.0000 0 0.0000 0 0.0000	Max 1.0000 0.0000	Std Dev 0.0000 0.0000	CV%	0.0% 100.0%	20/20 0/20	Mean 1 0	%Effec 0.0% 100.0%
Level EC5 EC10 EC15 EC20 EC25 EC40 EC50 96h Surv Conc-mg 0 16.7 50.1 96h Surv	mg/L 0.835 1.67 2.505 3.34 4.175 6.68 8.35 vival F g/L	95% LCL 0.835 1.67 2.505 3.34 4.175 6.68 8.35 Rate Summary Code N	0.835 1.67 2.505 3.34 4.175 6.68 8.35 Count 4 4 4	1.000 0.000 0.000	0 1.0000 0 0.0000 0 0.0000 2 Rep 3	Max 1.0000 0.0000 0.0000	Std Dev 0.0000 0.0000	CV%	0.0% 100.0%	20/20 0/20	Mean 1 0	%Effec 0.0% 100.0%
Level EC5 EC10 EC15 EC20 EC25 EC40 EC50 96h Surv Conc-mg 0 16.7 50.1 96h Surv Conc-mg	mg/L 0.835 1.67 2.505 3.34 4.175 6.68 8.35 vival F g/L	95% LCL 0.835 1.67 2.505 3.34 4.175 6.68 8.35 Rate Summary Code N Rate Detail Code	0.835 1.67 2.505 3.34 4.175 6.68 8.35 Count 4 4 4 4 Rep 1	1.000 0.000 0.000 Rep 2	0 1.0000 0 0.0000 0 0.0000 2 Rep 3 0 1.0000	Max 1.0000 0.0000 0.0000 Rep 4	Std Dev 0.0000 0.0000	CV%	0.0% 100.0%	20/20 0/20	Mean 1 0	%Effec 0.0% 100.0%
Level EC5 EC10 EC15 EC20 EC25 EC40 EC50 96h Surv Conc-mg 0 16.7 50.1 96h Surv Conc-mg 0	mg/L 0.835 1.67 2.505 3.34 4.175 6.68 8.35 vival F g/L	95% LCL 0.835 1.67 2.505 3.34 4.175 6.68 8.35 Rate Summary Code N Rate Detail Code	0.835 1.67 2.505 3.34 4.175 6.68 8.35 Count 4 4 4 4 4 4 1.0000	1.000 0.000 0.000 Rep 2 1.000	0 1.0000 0 0.0000 0 0.0000 2 Rep 3 0 1.0000 0 0.0000	Max 1.0000 0.0000 0.0000 0.0000 Rep 4 1.0000	Std Dev 0.0000 0.0000	CV%	0.0% 100.0%	20/20 0/20	Mean 1 0	%Effec 0.0% 100.0%
Level EC5 EC10 EC15 EC20 EC25 EC40 EC50 96h Surv Conc-mg 0 16.7 50.1 96h Surv Conc-mg 0 16.7 50.1	mg/L 0.835 1.67 2.505 3.34 4.175 6.68 8.35 vival F g/L	95% LCL 0.835 1.67 2.505 3.34 4.175 6.68 8.35 Rate Summary Code N Rate Detail Code	0.835 1.67 2.505 3.34 4.175 6.68 8.35 Count 4 4 4 4 4 4 Rep 1 1.0000 0.0000	1.000 0.000 0.000 Rep 2 1.000 0.000	0 1.0000 0 0.0000 0 0.0000 2 Rep 3 0 1.0000 0 0.0000	Max 1.0000 0.0000 0.0000 Rep 4 1.0000 0.0000	Std Dev 0.0000 0.0000	CV%	0.0% 100.0%	20/20 0/20	Mean 1 0	%Effec 0.0% 100.0%
Level EC5 EC10 EC15 EC20 EC25 EC40 EC50 96h Surv Conc-mg 0 16.7 50.1 96h Surv Conc-mg 0 16.7 50.1	mg/L 0.835 1.67 2.505 3.34 4.175 6.68 8.35 vival F g/L vival F	95% LCL 0.835 1.67 2.505 3.34 4.175 6.68 8.35 Rate Summary Code N Rate Detail Code N	0.835 1.67 2.505 3.34 4.175 6.68 8.35 Count 4 4 4 4 4 4 Rep 1 1.0000 0.0000	1.000 0.000 0.000 Rep 2 1.000 0.000	0 1.0000 0 0.0000 0 0.0000 2 Rep 3 0 1.0000 0 0.0000 0 0.0000	Max 1.0000 0.0000 0.0000 Rep 4 1.0000 0.0000	Std Dev 0.0000 0.0000	CV%	0.0% 100.0%	20/20 0/20	Mean 1 0	%Effec 0.0% 100.0%
Level EC5 EC10 EC15 EC20 EC25 EC40 EC50 96h Surv Conc-mg 0 16.7 50.1 96h Surv Conc-mg 0 16.7 50.1	mg/L 0.835 1.67 2.505 3.34 4.175 6.68 8.35 vival F g/L vival F	95% LCL 0.835 1.67 2.505 3.34 4.175 6.68 8.35 Rate Summary Code N Rate Detail Code N Rate Binomials	0.835 1.67 2.505 3.34 4.175 6.68 8.35 Count 4 4 4 4 4 1.0000 0.0000 0.0000	1.000 0.000 0.000 Rep 2 1.000 0.000 0.000	0 1.0000 0 0.0000 0 0.0000 2 Rep 3 0 1.0000 0 0.0000 0 0.0000	Max 1.0000 0.0000 0.0000 Rep 4 1.0000 0.0000 0.0000	Std Dev 0.0000 0.0000	CV%	0.0% 100.0%	20/20 0/20	Mean 1 0	%Effec 0.0% 100.0%
Level EC5 EC10 EC15 EC20 EC25 EC40 EC50 96h Surv Conc-mg 0 16.7 50.1 96h Surv Conc-mg 0 16.7 50.1	mg/L 0.835 1.67 2.505 3.34 4.175 6.68 8.35 vival F g/L vival F	95% LCL 0.835 1.67 2.505 3.34 4.175 6.68 8.35 Rate Summary Code N Rate Detail Code N Rate Binomials Code	0.835 1.67 2.505 3.34 4.175 6.68 8.35 Count 4 4 4 4 4 Rep 1 1.0000 0.0000 0.0000 Rep 1	1.000 0.000 0.000 Rep 2 1.000 0.000 0.000	0 1.0000 0 0.0000 2 Rep 3 0 1.0000 0 0.0000 0 0.0000 2 Rep 3	Max 1.0000 0.0000 0.0000 Rep 4 1.0000 0.0000 0.0000 Rep 4	Std Dev 0.0000 0.0000	CV%	0.0% 100.0%	20/20 0/20	Mean 1 0	%Effec 0.0% 100.0%

Analyst: _____ QA:____

CETIS Ana	alytical Report		Report Date: Test Code/ID:	19 Dec-19 15:28 (p 2 of 2) TRU1219.056acer / 07-0764-7780			
Ceriodaphnia	a 96-h Acute Surviva	l Test		Aquatic Bioassay & Consulting Labs, Inc.			
Analysis ID:	18-7406-0446	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.9.5		
Analyzed:	19 Dec-19 15:28	Analysis:	Linear Interpolation (ICPIN)	Status Level:	1		

Graphics 1.00 0.9 0.8 0.7 96h Survival Rate 06 0.5 0.4 0.3 0.2 0.1 0.0 E ÷ 1 10 20 30 40 50 60 Conc-mg/L

Analyst: _____ QA:____

Report Date: 19 Dec-19 15:28 (p 1 of 3)

Test Code/ID: TRU1219.056acer / 07-0764-7780

Ceriodaphnia	96-h Acute Surv	vival Tes	st					Aquatic	Bioassay &	Consulting	Labs, Inc.
Batch ID: Start Date: Ending Date: Test Length:	06 Dec-19 16:05 Protocol: te: 10 Dec-19 14:10 Species: th: 94h Taxon:			EPA/821/R-02-012 (2002)Ceriodaphnia dubiaBranchiopoda				Analyst:Diluent:Laboratory WaterBrine:Not ApplicableSource:Aquatic Biosystems, CO			
Receipt Date:	ople ID: 09-3098-8150 Code: ople Date: 04 Dec-19 09:00 Material: eipt Date: 06 Dec-19 13:00 CAS (PC): ople Age: 55h (6.5 °C) Client:			Sample Water					bassay Repo ke Piru Raw	rt	
Alkalinity (Ca	CO3)-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	3	60	60	60	60	60	0	0	0.0%	0
50.1		2	160	160	160	160	160	0	0	0.0%	0
Overall		5	100	31.99	168	60	160	24.49	54.77	54.77%	0 (0%)
Conductivity-	-µmhos										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	3	336.3	296.1	376.6	326	355	9.351	16.2	4.82%	0
16.7		3	946.7	920.8	972.5	935	955	6.009	10.41	1.1%	0
50.1		2	990	939.2	1041	986	994	4	5.657	0.57%	0
Overall		8 728.6		456.5	1001	326	994	115.1	325.5	44.67%	0 (0%)
Dissolved Ox	(ygen-mg/L		_								- (/
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	3	7.9	7.896	7.904	7.9	7.9	0	0	0.0%	0
16.7		3	8.367	5.878	10.85	7.4	9.4	0.5783	1.002	11.97%	0
50.1		2	8.25	-6.362	22.86	7.1	9.4	1.15	1.626	19.71%	0
Overall		8	8.162	7.456	8.869	7.1	9.4	0.2988	0.845	10.35%	0 (0%)
Hardness (Ca	aCO3)-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
0	N	3	94	94	94	94	94	0	0	0.0%	0
50.1		2	161	161	161	161	161	0	0	0.0%	0
Overall		5	120.8	75.23	166.4	94	161	16.41	36.7	30.38%	0 (0%)
pH-Units										_	. ,
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Мах	Std Err	Std Dev	CV%	QA Coun
0	N	3	7.667	7.38	7.954	7.6	7.8	0.06667	0.1155	1.51%	0
16.7		3	7.833	7.69	7.977	7.8	7.9	0.03333	0.05774	0.74%	0
50.1		2	8.1	6.829	9.371	8	8.2	0.1	0.1414	1.75%	0
Overall		8	7.838	7.671	8.004	7.6	8.2	0.07055	0.1996	2.55%	0 (0%)
	-°C										
Temperature					95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
Temperature Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL						
		Count 3	Mean 24	24	24	24	24	0	0	0.0%	0
Conc-mg/L	Code			24	24	24	24				
Conc-mg/L	Code	3	24					0	0	0.0%	0

Analyst: _____QA:____

Report Date: 19 Dec-19 15:28 (p 2 of 3)

Test Code/ID: TRU1219.056acer / 07-0764-7780

Ceriodaphnia 9	6-h Acute S	urvival Te	st	_	_			_	Aquatic Bioassay & Consulting Labs, Inc
Alkalinity (CaCO	03)-mg/L								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		60					
50.1		_		160		_	_		
0	Ν	2		60					
50.1				160					
0	N	3	_	60					
Conductivity-µr	nhos								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		326					
16.7				955					
50.1				994					
0	N	2		328					
16.7				950					
50.1				986					
0	N	3		355					
16.7				935					
Dissolved Oxy	jen-mg/L								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.9					
16.7				9.4					
50.1				9.4					
0	N	2		7.9					
16.7				7.4					
50.1				7.1					
0	N	3		7.9	-				
16.7				8.3					
Hardness (CaC	O3)-mg/L								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		94					
50.1				161					
0	N	2	_	94	-	-			
50.1		-		161					
0	N	3		94	-		_		
pH-Units					-				
Conc-mg/L	Code	Read	Time	Maaaur	• ••	D:44 0/	Inct ID	Analiset	Notos
0	N	1	Time	Measure 7.6	QA	Diff-%	Inst ID	Analyst	NOTES
16.7	IN	1		7.8 7.9					
50.1				7.9 8.2					
					_	_			
0	N	2		7.8					
16.7				7.8					
50.1		_	_	8		-		_	
	N	3		7.6 7.8					
0 16.7									

 Report Date:
 19 Dec-19 15:28 (p 3 of 3)

 Test Code/ID:
 TRU1219.056acer / 07-0764-7780

Ceriodaphnia 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C	;								
Conc-mg/L	Code	Read	Time	Measure QA	Diff-%	Inst ID	Analyst	Notes	
0	N	1		24					
16.7				24.1					
50.1				24.1					
0	N	2		24					
16.7				24.1					
50.1				24					
0	N	3		24					
16.7				24					

CETIS™ v1.9.5.5



December 19, 2019

Mr. David Hokanson Trussell Technologies 232 N. Lake Ave Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed acute bioassay report. The test was conducted under the guidelines prescribed in "Methods for Measuring the Acute Toxicity of Effluents and Receiving water to Freshwater and Marine Organisms" (Fourth Edition) EPA/600/ 4-90/027F, August 1993. The results were as follows:

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CLIENT:	Trussell Technologies
SAMPLE I.D.:	Lake Piru Raw (16.7mg/l)
DATE RECEIVED:	12/06/19
ABC LAB. NO.:	TRU1219.056

NPDES PERCENT SURVIVAL BIOASSAY RAINBOW TROUT

PERCENT SURVIVAL = 0% Survival in 16.7mg/l Sample

TUa = >1.00 @ 16.7mg/l

very truly, Johnson tory Director

AQUATIC BIOASSAY AND CONSULTING LABORATORIES, INC. 29 North Olive Street Ventura, CA 93001 (805) 643-5621

NPDES Percent Survival Bioassay for Effluents and Stormwater

S	SAMPLE INFORMATION
CLIENT:	Trussell Technologies Date: 12/06/19
SAMPLE I.D.:	Lake Piru Raw (16.7mg/l) LAB # TRU1219.056

WATER QUALITY

DILUTION WAT Reconst. Fresh	AERATION Single Bubble Air							
CONTROL HARDNESS	CONTROL ALKALINITY							
Beg: 90 mg/l End: 100 mg/l	Beg: 60 mg/l End: 63 mg/l							
SAMPLE HARDNESS	SAMPLE ALKALINITY							
Beg: 300 mg/l End: 310 mg/l	Beg: 150 mg/l End: 154 mg/l							

ORGANISM INFORMATION

SPECIES:	Oncorhynchus mykiss	DATE REC'D:	11/24/19
COMMON NAME:	Rainbow Trout		
SOURCE:	Thomas Fish Co.		
CARRIER:	California Overnight	NO. FISH / TANK	10

TEST DATA

	I	NITIAL		24	HOU	RS		48	HOU	RS		72	HOU	RS		96	HOU	RS		
DATE: TIME:	12/06/19 1450				12/07/19 1100			12/08/19 1530			12/09/19 1200			12/10/19 1450						
CONC.	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy.	Temp. dg.C	pН	#Fish		Temp dg.C	pН	#Fish
0 (Con.)	9.8	11.8	7.9	10	6.9	11.0	7.9	10	7.0	12.1	7.1	10	7.0	12.0	7.1	10	11.0	11.0	8.0	10
0 (Con.)	10.0	11.8	8.0	10	7.0	11.0	8.0	10	7.0	12.0	7.1	10	7.1	12.0	7.0	10	10.9	11.0	8.1	10
16.7mg/l	9.2	13.9	7.5	10	10.9	11.0	7.8	0				0				0				0
16.7mg/l	9.3	13.9	7.5	10	10.9	11.0	7.8	0				0	1			0				0

	FINAL DATA									
	TOTAL	FISH SURVIVAL								
	0 (Con.)	10								
	0 (Con.)	10								
	16.7mg/l	0								
J	16.7mg/l	0								

 FINAL RESULTS

 PERCENT SURVIVAL =
 0% Survival in 16.7mg/l Sample

 TUa =
 >1.00 (a) 16.7mg/l

Joe Freas, Senior/Toxicologist

Date 12



December 19, 2019

Mr. David Hokanson Trussell Technologies 232 N. Lake Ave Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed acute bioassay report. The test was conducted under the guidelines prescribed in "Methods for Measuring the Acute Toxicity of Effluents and Receiving water to Freshwater and Marine Organisms" (Fourth Edition) EPA/600/ 4-90/027F, August 1993. The results were as follows:

CLIENT:	Trussell Technologies
SAMPLE I.D.:	Lake Piru Raw (50.1mg/l)
DATE RECEIVED:	12/06/19
ABC LAB. NO.:	TRU1219.056

NPDES PERCENT SURVIVAL BIOASSAY RAINBOW TROUT

PERCENT SURVIVAL = 0% Survival in 50.1/mg/l Sample

TUa = >1.00 @ 50.1mg/1

very truly, Johnson atory Director

AQUATIC BIOASSAY AND CONSULTING LABORATORIES, INC. 29 North Olive Street Ventura, CA 93001 (805) 643-5621

NPDES Percent Survival Bioassay for Effluents and Stormwater

	SAMPLE INFORMAT	ION	
CLIENT:	Trussell Technologies	Date: 12/0)6/19
SAMPLE I.D.:	Lake Piru Raw (50.1mg/	I) LAB I TRU	1219.056

WATER QU	ALITY
DILUTION WATI Reconst. Fresh	AERATION Single Bubble Air
CONTROL HARDNESS	CONTROL ALKALINITY
Beg: 90 mg/l End: 100 mg/l	Beg: 60 mg/l End: 63 mg/l
SAMPLE HARDNESS	SAMPLE ALKALINITY
Beg: 320 mg/l End: 325 mg/l	Beg: 161 mg/l End: 162 mg/l

ORGANISM INFORMATION

SPECIES:	Oncorhynchus mykiss	DATE REC'D:	11/24/19
COMMON NAME:	Rainbow Trout		
SOURCE:	Thomas Fish Co.		
CARRIER:	California Overnight	NO. FISH / TANK	10

										TES	ST DA	TA								
	l	NITIAL		24	HOU	RS		48	HOU	RS		72	HOU	RS		96	HOU	RS		
DATE: TIME:		12/06/19 1450	, ,			1100	9			2/08/1 1530	9			12/09/19 1200	9			2/10/1 1450	9	
CONC.	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy	Temp. dg.C	pН	#Fish	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy.	Temp dg.C	pН	#Fish
0 (Con.)	9.8	11.8	7.9	10	6.9	11.0	7.9	10	7.0	12.1	7.1	10	7.0	12.0	7.1	10	11.0	11.0	8.0	10
0 (Con.)	10.0	11.8	8.0	10	7.0	11.0	8.0	10	7.0	12.0	7.1	10	7.1	12.0	7.0	10	10.9	11.0	8.1	10
50.1mg/1	9.2	13.9	7.3	10	10.7	11.0	7.7	0				0				0				0
50.1mg/1	8.9	13.9	7.0	10	10.6	11.0	7.7	0				0				0				0

	FINAL I	DATA
	TOTAL	FISH SURVIVAL
	0 (Con.)	10
	0 (Con.)	10
l	50.1mg/l 50.1mg/l	0
	50.1mg/1	0

 FINAL RESULTS

 PERCENT SURVIVAL =
 0% Survival in 50.1/mg/l Sample

 TUa =
 >1.00 @ 50.1mg/l

-7. Joe Freas, Senfor Toxicologist

Date

CHAIN OF CUSTODY RECORD

Client:		-	-		Project P	lame/Nu	mber:									Analy	ysis					
					Liar	a olin	105													•		
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Phone N	umber:				Sampled	By (sigp	ature)			1 g	でい	6 C										
(626)	375	-8	150	0	4	LU				te	ء بح	te o										
Date	Time	Comp.	Grab	Matrix	7	Sample	dl .	Volu Nun	ume/ nber	Acut	Acc	Aute								Comm	ients	
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Aquatic Bioassay and Consulting Laboratories 29 N. Olive Street Ventura, CA 93001 Phone: (805) 643-5621 Fax: (805) 643-2930



Appendix C – Lake Mathews 2020 Toxicity Test Report



October 22, 2020

Mr. David Hokanson Trussell Technologies 232 N. Lake Avenue Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms EPA-821-R-02-012.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Trussell Technologies
SAMPLE ID.:	Lake Mathews Raw with EarthTec
DATE RECEIVED:	10 Sept – 20
ABC LAB NO.:	TRU0920.134

ACUTE FATHEAD MINNOW SURVIVAL BIOASSAY

% Survival

al = 92.5 % Survival in 16.7 mg/l Sample

EC50 = >16.7 mg/l

ery truly, cott Johnson Laboratory Director

CETIS Summary Report

Report Date: Test Code/ID: TRU0920.134afml / 20-4338-7613

21 Oct-20 15:15 (p 1 of 1)

							-	Test	Code/ID	IRUU	920.1	34afml / 20-	4000-701
Fathead Minn	ow 96-h Acute S	Survival Test							Aquati	c Bioassa	ay & C	consulting l	abs, Inc.
Batch ID:	03-3365-6779	Test Ty	pe: S	Survival (96h)				Anal	lyst:				
Start Date:	22 Sep-20 13:25	Protoco	ol: E	EPA/821/R-02-0	012 (2002)			Dilu	ent: L	aboratory	Wate	er	
Ending Date:	26 Sep-20 13:30) Species	s: F	Pimephales pro	melas			Brin	e: N	Not Applica	able		
Test Length:	4d 0h	Taxon:	ŀ	Actinopterygii				Sou	rce: A	Aquatic Bio	osyste	ems, CO	Age:
Sample ID:	05-3885-0428	Code:	٦	FRU0920.134at	fml			Proj	ect:				
Sample Date:	10 Sep-20 09:50) Materia	l: 8	Sample Water				Sou	rce: E	Bioassay F	Report	t	
Receipt Date:	10 Sep-20 09:50	CAS (PC	C):					Stat	ion: L	ake Math	ews F	Raw with Ear	th Tec
Sample Age:	12d 4h (9.3 °C)	Client:	- 1	Trussell Techno	ologies								
Multiple Com	parison Summa	ry											
Analysis ID	Endpoint			rison Method			\checkmark	NOEL	LOEL	TOE	L	PMSD	
07-4137-4317	96h Survival Rat	te St	eel M	lany-One Rank	Sum Test			16.7	>16.7			9.21%	
Point Estimat	e Summary												
Analysis ID	Endpoint			stimate Metho			_	Level	mg/L	95%	LCL	95% UCL	
09-5562-0350	96h Survival Rat	te Lii	near l	Interpolation (IC	CPIN)			EC10	>16.7				
								EC15	>16.7				
								EC20	>16.7				
								EC25	>16.7				
								EC40	>16.7				
								E050	- 40 7				
								EC50	>16.7	352			
Test Acceptal	bility					ТАС		-	>16.7				
	bility Endpoint	At	ttribu	te	Test Stat	TAC Lower	Lin	-	Overla	274	ision		
Test Acceptal Analysis ID 07-4137-4317	-		_	te Resp	Test Stat		Lin	nits		ap Deci	ision ses Ci		
Analysis ID 07-4137-4317	Endpoint	te C	ontrol			Lower	Lin	nits Upper	Overla	ap Deci Pass	_	riteria	
Analysis ID 07-4137-4317 09-5562-0350	Endpoint 96h Survival Rat	te C	ontrol	Resp	1	Lower 0.9	Lin	nits Upper >>	Overla Yes	ap Deci Pass	ses Ci	riteria	
Analysis ID 07-4137-4317 09-5562-0350	Endpoint 96h Survival Rai 96h Survival Rai Rate Summary Code	te Co te Co Count M	ontrol ontrol ean	Resp Resp 95% LCL	1 1 95% UCL	Lower 0.9 0.9	Lin	nits Upper >>	Overla Yes	ap Deci Pass Pass	ses Ci ses Ci	riteria	%Effec
Analysis ID 07-4137-4317 09-5562-0350 96h Survival Conc-mg/L 0	Endpoint 96h Survival Rai 96h Survival Rai Rate Summary	te Co te Co <u>Count M</u> 4 1.	ontrol ontrol ean 0000	Resp Resp 95% LCL 1.0000	1	Lower 0.9 0.9	Lin	nits Upper >> >>	Overla Yes Yes	ap Deci Pass Pass	ses Ci ses Ci Dev	riteria riteria	%Effec 0.00%
Analysis ID 07-4137-4317 09-5562-0350 96h Survival Conc-mg/L 0 8.35	Endpoint 96h Survival Rai 96h Survival Rai Rate Summary Code	te Co te Co Count M 4 1. 4 0.	ontrol ontrol ean 0000 9750	Resp Resp 95% LCL 1.0000 0.8954	1 1 95% UCL	Lower 0.9 0.9 Min	Lin	nits Upper >> >>	Overla Yes Yes Std Er	ap Deci Pass Pass rr Std	ses Ci ses Ci Dev	riteria riteria CV%	
Analysis ID 07-4137-4317 09-5562-0350 96h Survival Conc-mg/L 0	Endpoint 96h Survival Rai 96h Survival Rai Rate Summary Code	te Co te Co Count M 4 1. 4 0.	ontrol ontrol ean 0000	Resp Resp 95% LCL 1.0000 0.8954	1 1 95% UCL 1.0000	Lower 0.9 0.9 Min 1.0000	Lin	nits Upper >> >> Max 1.0000	Overla Yes Yes Std Er	ap Deci Pass Pass rr Std 0 0.00 0 0.05	ses Ci ses Ci Dev 100 500	riteria riteria CV%	0.00%
Analysis ID 07-4137-4317 09-5562-0350 96h Survival Conc-mg/L 0 8.35	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N	te Co te Co Count M 4 1. 4 0.	ontrol ontrol ean 0000 9750	Resp Resp 95% LCL 1.0000 0.8954	1 1 95% UCL 1.0000 1.0550	Lower 0.9 0.9 Min 1.0000 0.9000	Lin	nits Upper >> >> Max 1.0000 1.0000 1.0000	Overla Yes Yes Std Er 0.0000 0.0250 0.0475	ap Deci Pass Pass Pass Pass Pass Pass 0 0.00 0 0.05 0 0.09	ses Ci ses Ci 000 500	riteria riteria CV% 5.13%	0.00% 2.50% 7.50%
Analysis ID 07-4137-4317 09-5562-0350 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code	te Co te Co Count M 4 1. 4 0. 4 0. Rep 1 R	ontrol ontrol 0000 9750 9250 ep 2	Resp 95% LCL 1.0000 0.8954 0.7727 Rep 3	1 1 95% UCL 1.0000 1.0550 1.0770 Rep 4	Lower 0.9 0.9 Min 1.0000 0.9000	Lin	nits Upper >> >> Max 1.0000 1.0000 1.0000	Overla Yes Yes Std Er 0.0000 0.0250 0.0475	ap Deci Pass Pass Pass Pass Pass Pass 0 0.00 0 0.05 0 0.09	ses Ci ses Ci 000 500	riteria riteria CV% 5.13% 10.35%	0.00% 2.50% 7.50%
Analysis ID 07-4137-4317 09-5562-0350 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail	te Co te Co Count M 4 1. 4 0. 4 0. 4 0. Rep 1 R o 1.0000 1.	ean 0000 9750 9250 ep 2 0000	Resp 95% LCL 1.0000 0.8954 0.7727 Rep 3 1.0000	1 1 95% UCL 1.0000 1.0550 1.0770 Rep 4 1.0000	Lower 0.9 0.9 Min 1.0000 0.9000	Lin	nits Upper >> >> Max 1.0000 1.0000 1.0000	Overla Yes Yes Std Er 0.0000 0.0250 0.0475	ap Deci Pass Pass Pass Pass Pass Pass 0 0.00 0 0.05 0 0.09	ses Ci ses Ci 000 500	riteria riteria CV% 5.13% 10.35%	0.00% 2.50% 7.50%
Analysis ID 07-4137-4317 09-5562-0350 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0 8.35	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code	te Co te Co Count M 4 1. 4 0. 4 0. 4 0. Rep 1 R o 1.0000 1.	ontrol ontrol 0000 9750 9250 ep 2	Resp 95% LCL 1.0000 0.8954 0.7727 Rep 3 1.0000	1 1 95% UCL 1.0000 1.0550 1.0770 Rep 4	Lower 0.9 0.9 Min 1.0000 0.9000	Lin	nits Upper >> >> Max 1.0000 1.0000 1.0000	Overla Yes Yes Std Er 0.0000 0.0250 0.0475	ap Deci Pass Pass Pass Pass Pass Pass 0 0.00 0 0.05 0 0.09	ses Ci ses Ci 000 500	riteria riteria CV% 5.13% 10.35%	2.50% 7.50%
Analysis ID 07-4137-4317 09-5562-0350 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0 8.35	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code	te Co te Co <u>Count M</u> 4 1. 4 0. 4 0. 4 0. <u>Rep 1 R</u> 1.0000 1. 1.0000 1.	ean 0000 9750 9250 ep 2 0000	Resp 95% LCL 1.0000 0.8954 0.7727 Rep 3 1.0000 1.0000	1 1 95% UCL 1.0000 1.0550 1.0770 Rep 4 1.0000	Lower 0.9 0.9 Min 1.0000 0.9000	Lin	nits Upper >> >> Max 1.0000 1.0000 1.0000	Overla Yes Yes Std Er 0.0000 0.0250 0.0475	ap Deci Pass Pass Pass Pass Pass Pass 0 0.00 0 0.05 0 0.09	ses Ci ses Ci 000 500	riteria riteria CV% 5.13% 10.35%	0.00% 2.50% 7.50%
Analysis ID 07-4137-4317 09-5562-0350 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0 8.35 16.7	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code	te Co te Co <u>Count M</u> 4 1. 4 0. 4 0. 4 0. <u>Rep 1 R</u> 1.0000 1. 1.0000 1.	ean 0000 9750 9250 ep 2 0000 0000	Resp 95% LCL 1.0000 0.8954 0.7727 Rep 3 1.0000 1.0000	1 1 95% UCL 1.0000 1.0550 1.0770 Rep 4 1.0000 0.9000	Lower 0.9 0.9 Min 1.0000 0.9000	Lin	nits Upper >> >> Max 1.0000 1.0000 1.0000	Overla Yes Yes Std Er 0.0000 0.0250 0.0475	ap Deci Pass Pass Pass Pass Pass Pass 0 0.00 0 0.05 0 0.09	ses Ci ses Ci 000 500	riteria riteria CV% 5.13% 10.35%	0.00% 2.50% 7.50%
Analysis ID 07-4137-4317 09-5562-0350 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code N	te Co te Co Count M 4 1. 4 0. 4 0. 4 0. 7 8 9 1.0000 1. 1.0000 1. 1.0000 1. 0.8000 0. 8 8 9 8 9 9 1 8 8 9 1 8 8 9 1 8 9 1 8 1 8	ean 00000 9750 9250 0000 0000 9000 9000	Resp 95% LCL 1.0000 0.8954 0.7727 Rep 3 1.0000 1.0000	1 1 95% UCL 1.0000 1.0550 1.0770 Rep 4 1.0000 0.9000	Lower 0.9 0.9 Min 1.0000 0.9000	Lin	nits Upper >> >> Max 1.0000 1.0000 1.0000	Overla Yes Yes Std Er 0.0000 0.0250 0.0475	ap Deci Pass Pass Pass Pass Pass Pass 0 0.00 0 0.05 0 0.09	ses Ci ses Ci 000 500	riteria riteria CV% 5.13% 10.35%	0.00% 2.50% 7.50%
Analysis ID 07-4137-4317 09-5562-0350 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival	Endpoint 96h Survival Rat 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code N Rate Binomials	te Co te Co Count M 4 1. 4 0. 4 0. 4 0. 7 8 9 1.0000 1. 1.0000 1. 1.0000 1. 0.8000 0. 8 8 9 8 9 9 1 8 8 9 1 8 8 9 1 8 9 1 8 1 8	ean 00000 9750 9250 ep 2 0000 0000 9000	Resp 95% LCL 1.0000 0.8954 0.7727 Rep 3 1.0000 1.0000 1.0000	1 1 95% UCL 1.0000 1.0550 1.0770 Rep 4 1.0000 0.9000 1.0000	Lower 0.9 0.9 Min 1.0000 0.9000	Lin	nits Upper >> >> Max 1.0000 1.0000 1.0000	Overla Yes Yes Std Er 0.0000 0.0250 0.0475	ap Deci Pass Pass Pass Pass Pass Pass 0 0.00 0 0.05 0 0.09	ses Ci ses Ci 000 500	riteria riteria CV% 5.13% 10.35%	0.00% 2.50% 7.50%
Analysis ID 07-4137-4317 09-5562-0350 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code N Rate Binomials Code	te Co te Co Count M 4 1. 4 0. 4 0. 4 0. 4 0. 7 1.0000 1. 1.0000 1. 0.8000 0. 8 Rep 1 Ro 0.8000 0.	ean 00000 9750 9250 0000 0000 9000 9000	Resp 95% LCL 1.0000 0.8954 0.7727 Rep 3 1.0000 1.0000 1.0000	1 1 95% UCL 1.0000 1.0550 1.0770 Rep 4 1.0000 0.9000 1.0000 Rep 4	Lower 0.9 0.9 Min 1.0000 0.9000	Lin	nits Upper >> >> Max 1.0000 1.0000 1.0000	Overla Yes Yes Std Er 0.0000 0.0250 0.0475	ap Deci Pass Pass Pass Pass Pass Pass 0 0.00 0 0.05 0 0.09	ses Ci ses Ci 000 500	riteria riteria CV% 5.13% 10.35%	0.00% 2.50% 7.50%

Analyst:__ 0 QA:

							163	t Code/ID;	11(00320.	134ami / 20	-4000-701
Fathead Minne	ow 96-h Acute S	Survival Te	st					Aquatic E	lioassay & (Consulting	Labs, Inc
Analysis ID:	07-4137-4317	End	point: 96h	n Survival Ra	te		CET	IS Version:	CETISv1	.9.7	
Analyzed:	21 Oct-20 15:14	Ana	lysis: No	nparametric-(Control vs 1	Freatments	Stat	tus Level:	1		
Edit Date:	21 Oct-20 15:13	MD	5 Hash: B7	E7C8A5E8F8	5272CD299	73742D21E	33F9 Edi	tor ID:	000-189-	126-0	
Batch ID:	03-3365-6779	Tes	t Type: Su	rvival (96h)			Ana	lyst:			
Start Date:	22 Sep-20 13:25	5 Prot	tocol: EP	A/821/R-02-0	012 (2002)		Dilu	ient: Lab	oratory Wat	er	
Ending Date:	26 Sep-20 13:30) Spe	cies: Pin	nephales pro	melas		Brin	ne: Not	Applicable		
Test Length:		Тах	on: Act	tinopterygii			Sou		atic Biosyst	ems, CO	Age:
Sample ID:	05-3885-0428	Cod		U0920.134af	iml		Pro	ject:			
	10 Sep-20 09:50			mple Water				-	assay Repor	+	
-	10 Sep-20 09:50		6 (PC):	inple water					e Mathews I		arth Tec
	12d 4h (9.3 °C)			ussell Techno	logies		Jta		ie matricws i		
		-			logica	_		_		_	_
Data Transfor		Alt Hyp				NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corre	cted)	C > T				16.7	>16.7	***	***	0.09209	9.21%
Steel Many-Or	ne Rank Sum To	est									
Control	vs Conc-mo	g/L	Test Stat	Critical	Ties DF	P-Type	P-Value	Decision	(α:5%)		
Negative Contr	rol 8.35		16	11	1 6	CDF	0.4206	Non-Sign	ificant Effec	t	
	16.7		14	11	1 6	CDF	0.2042	Non-Sign	ificant Effec	t	
Test Acceptat	oility Criteria	TACL	Imito								
Attribute	Test Stat	TAC L Lower	Upper	Overlap	Decision						
Control Resp	1	0.9	>>	Yes	Passes C	riteria				_	_
					1 46666 6	intoina	_			_	
ANOVA Table											
Source	Sum Squ	ares	Mean Sq		DF	F Stat	P-Value		* *		
Between	0.028198		0.014099		2	1.498	0.2744	Non-Sigr	ificant Effec	t	
Error	0.084704	9	0.009411	7	9	_					
Total	0.112903				11	2					
ANOVA Assur	mptions Tests										
Attribute	Test				Test Stat	Critical	P-Value	Decision	n(α:1%)		
Variance	Bartlett E	quality of Va	ariance Test					Indeterm			
		quality of Va			8.187	8.022	0.0094	Unequal	Variances		
		ne Equality			3.623	8.022	0.0701	Equal Va			
Distribution		-Darling A2			0.6319	3.878	0.1002	•	Distribution		
		o Skewness			1.332	2.576	0.1827		Distribution		
	-	rov-Smirnov			0.25	0.2801	0.0369		Distribution		
		Vilk W Norn			0.906	0.8025	0.1897		Distribution		
96h Survival	Rate Summary										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	. Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
-	IN	4		0.8954	1.0000	1.0000	0.9000	1.0000	0.0000	0.00% 5.13%	0.00% 2.50%
8.35 16.7		4	0.9750 0.9250	0.8954	1.0000	0.9500	0.9000	1.0000	0.0250	5.13% 10.35%	2.50% 7.50%
			_	0.1121	1.0000	0.3000	0.0000	1.0000	0.0473	10.0070	7.0070
Angular (Corr	rected) Transfo		nary								
Conc-mg/L	Code	Count	Mean	95% LCL			Min	Max	Std Err	CV%	%Effect
0	N	4	1.4120	1.4120	1.4120	1.4120	1.4120	1.4120	0.0000	0.00%	0.00%
8.35		4	1.3710	1.2420	1.5010	1.4120	1.2490	1.4120	0.0407	5.94%	2.89%
16.7		4	1.2950	1.0610	1.5290	1.3310	1.1070	1.4120	0.0735	11.35%	8.28%
96h Survival	Rate Detail										
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4						
0	N	1.0000	1.0000	1.0000	1.0000						
8.35		1.0000	1.0000	1.0000	0.9000						
10.7		0.0000	0.0000	4 0000	4 0000						

0.8000

0.9000

1.0000

16.7

1.0000

P

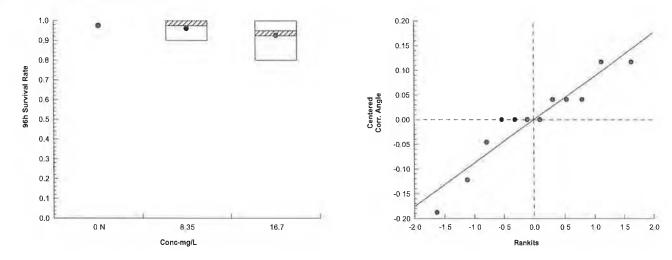
CETIS Ana	alytical Report			Report Date: Test Code/ID:	21 Oct-20 15:15 (p 2 of 2) TRU0920.134afml / 20-4338-7613
Fathead Mini	now 96-h Acute Surv	vival Test		Aquatic B	ioassay & Consulting Labs, Inc.
Analysis ID;	07-4137-4317	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.9.7
Analyzed:	21 Oct-20 15:14	Analysis:	Nonparametric-Control vs Treatments	Status Level:	1
Edit Date:	21 Oct-20 15:13	MD5 Hash:	B7E7C8A5E8F5272CD29973742D21B3F9	Editor ID:	000-189-126-0

Angular (Corre		Jinica Detai				
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	
0	N	1.4120	1.4120	1.4120	1.4120	
8.35		1.4120	1.4120	1.4120	1.2490	
16.7		1.1070	1.2490	1.4120	1.4120	

Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	10/10	10/10	10/10	10/10
8.35		10/10	10/10	10/10	9/10
16.7		8/10	9/10	10/10	10/10

Graphics



Analyst: QA:

Fathead Minn	ow 96-h Acute Surv	ival Test				Aqua	tic Bi	oassay & Consulting	g Labs, In
Analysis ID: Analyzed: Edit Date:	09-5562-0350 21 Oct-20 15:14 21 Oct-20 15:13	Endpoint: Analysis: MD5 Hash:	96h Survival R Linear Interpol B7E7C8A5E86	2D21B3F9	CETIS Vers Status Lev Editor ID:		CETISv1.9.7 1 000-189-126-0		
Batch ID:	03-3365-6779	Test Type:	Survival (96h)						
Start Date:	22 Sep-20 13:25	Protocol:	EPA/821/R-02	-012 (2002)		Diluent:	Laboratory Water		
Ending Date:	26 Sep-20 13:30	Species:	Pimephales pr		Brine:	Not Applicable			
Test Length:	4d Oh	Taxon:	Actinopterygii			Source:	Aqua	tic Biosystems, CO	Age:
Sample ID:	05-3885-0428	Code:	TRU0920.134	afml		Project:			
Sample Date:	10 Sep-20 09:50	Material:	Sample Water			Source:	Bioa	ssay Report	
Receipt Date:	10 Sep-20 09:50	CAS (PC):				Station:	Lake	Mathews Raw with E	arth Tec
Sample Age:	12d 4h (9.3 °C)	Client:	Trussell Techr	nologies					
Linear Interpo	olation Options								
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method				
Linear	Linear	0	280	Yes	Two-Point	Interpolation			

Test Acceptabili	ty Criteria	TAC	Limits			
Attribute	Test Stat	Lower	Upper	Overlap	Decision	
Control Resp	1	0.9	>>	Yes	Passes Criteria	

Point Estimates

Level	mg/L	95% LCL	95% UCL	
EC10	>16.7) also		
EC15	>16.7			
EC20	>16.7			
EC25	>16.7			
EC40	>16.7			
EC50	>16.7			

96h Survival Ra	ate Summary	1	-	Isotonic Variate							
Conc-mg/L	Code	Count	Mean	Median	Min	Мах	CV%	%Effect	A/B	Mean	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	40/40	1.0000	0.00%
8.35		4	0.9750	1.0000	0.9000	1.0000	5.13%	2.50%	39/40	0.9750	2.50%
16.7		4	0.9250	0.9500	0.8000	1.0000	10.35%	7.50%	37/40	0.9250	7.50%

96h Survival Rate Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
8.35		1.0000	1.0000	1.0000	0.9000
16.7		0.8000	0.9000	1.0000	1.0000

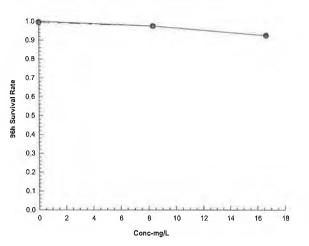
96h Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	10/10	10/10	10/10	10/10
8.35		10/10	10/10	10/10	9/10
16.7		8/10	9/10	10/10	10/10

P QA: Analyst:_____

CETIS Ana	alytical Report		Report Date: Test Code/ID:	21 Oct-20 15:15 (p 2 of 2) TRU0920.134afml / 20-4338-7613	
Fathead Mini	now 96-h Acute Surv	vival Test	2-1	Aquatic B	ioassay & Consulting Labs, Inc.
Analysis ID:	09-5562-0350	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.9.7
Analyzed:	21 Oct-20 15:14	Analysis:	Linear Interpolation (ICPIN)	Status Level:	1
Edit Date:	21 Oct-20 15:13	MD5 Hash:	B7E7C8A5E8F5272CD29973742D21B3F9	Editor ID:	000-189-126-0

Graphics



Analyst: QA

Report Date: 21 Oct-20 15:15 (p 1 of 3)

Fathead Minn	ow 96-h Acute S	urvival	Test					Aquation	c Bioassay &	Consulting	Labs, Inc.
•				Survival (96h) EPA/821/R-02-012 (2002) Pimephales promelas Actinopterygii				Analyst:Diluent:Laboratory WaterBrine:Not ApplicableSource:Aquatic Biosystems, CO			Age:
•	05-3885-0428 10 Sep-20 09:50 10 Sep-20 09:50) [Code: Material: CAS (PC):	TRU0920.134a Sample Water	ifml		Sc		Bioassay Repo .ake Mathews		arth Tec
Sample Age:	12d 4h (9.3 °C)		Client:	Trussell Techn	Trussell Technologies						
Alkalinity (Ca	CO3)-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Мах	Std Err	Std Dev	CV%	QA Count
0	N	3	60	60	60	60	60	0	0	0.00%	0
8.35		3	100	100	100	100	100	0	0	0.00%	0
Overall		6	80	57.01	103	60	100	8.944	21.91	27.39%	0 (0%)
Conductivity-	µmhos										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	3	337.7	332.5	342.8	336	340	0.6939	2.082	0.62%	0
8.35		3	1129	1067	1191	1102	1151	8.293	24.88	2.20%	0
16.7		3	1097	1090	1103	1094	1099	0.8389	2.517	0.23%	0
Overall		9	854.4	556.2	1153	336	1151	129.3	388	45.41%	0 (0%)
Dissolved Ox	ygen-mg/L				-						
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Мах	Std Er	Std Dev	CV%	QA Count
0	N	3	7.4	6.655	8.145	7.1	7.7	0.1	0.3	4.05%	0
8.35		3	7.6	6.11	9.09	7	8.2	0.2	0.6	7.89%	0
16.7		3	7.467	6.463	8.471	7	7.7	0.1347	0.4041	5.41%	0
Overall		9	7.489	7.18	7.797	7	8.2	0.1338	0.4014	5.36%	0 (0%)
Hardness (Ca	aCO3)-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Er	r Std Dev	CV%	QA Count
0	N	3	85	85	85	85	85	0	0	0.00%	0
8.35		3	350	350	350	350	350	0	0	0.00%	0
Overall		6	217.5	65.18	369.8	85	350	59.26	145.1	66.73%	0 (0%)
pH-Units											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Er	r Std Dev	CV%	QA Count
0	N	3	8	7.57	8.43	7.9	8.2	0.0577	3 0.1732	2.17%	0
8.35		3	7.9	7.652	8.148	7.8	8	0.0333	3 0.1	1.27%	0
16.7		3	7.867	7.723	8.01	7.8	7.9	0.0192	4 0.05772	0.73%	0
Overall		9	7.922	7.83	8.015	7.8	8.2	0.0400	6 0.1202	1.52%	0 (0%)
Temperature	-°C										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Er	r Std Dev	CV%	QA Coun
0	N	3	24	24	24	24	24	0	0	0.00%	0
8.35		3	24.1	23.67	24.53	24	24.3	0.0577	5 0.1732	0.72%	0
16.7		3	24.13		24.71	24	24.4	0.0769	0.2309	0.96%	0
Overall		9	24.08		24.2	24	24.4	0.0521	2 0.1563	0.65%	0 (0%)

Fathead Minnow 96-h Acute Survival Test

Test Code/ID: TRU0920.134afml / 20-4338-7613 Aquatic Bioassay & Consulting Labs, Inc.

Report Date:

21 Oct-20 15:15 (p 2 of 3)

Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1	inne	60	Q(A	D111-70	matio	Analyst	Notes
8.35				100					
0	N	2		60	-				
8.35	IN .	2		100					
0	N								
	Ν	3		60					
8.35		_		100					
Conductivity-µn	nhos								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		337					
8.35				1102					
16.7				1094					
0	N	2		336					
8.35				1134					
16.7				1097					
0	N	3		340	-				
8.35		0		1151					
16.7				1099					
			-	1000				_	
Dissolved Oxyg	jen-mg/L								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.7					
8.35				8.2					
16.7				7.7					
0	N	2		7.4					
8.35				7.6					
16.7				7.7					
0	N	3		7.1					
8.35				7					
16.7				7					
Hardness (CaC	02)								
		Deed	-		~ •	Diff of	1	A 1 4	Neter
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0 8.35	Ν	1		85 350					
0	N	2		85					
8.35			_	350					
0	Ν	3		85					
8.35				350					
pH-Units									
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		8.2		70		, indigot	
8.35				7.8					
16.7				7.8					
0	N	2	_	7.9					
8.35	IN	2		7.9 8					
16.7				o 7.9					
					_				
0	Ν	3		7.9					
8.35				7.9					

16.7

7.9

QA

Fathead Minnow 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C								
Conc-mg/L	Code	Read	Time	Measure Q	A Diff-	% Inst ID	Analyst	Notes
0	N	1		24				
8.35				24				
16.7				24				
0	N	2		24				
8.35				24.3				
16.7				24.4				
0	N	3		24				
8.35				24				
16.7				24				

QA: Analyst:



October 22, 2020

Mr. David Hokanson Trussell Technologies 232 N. Lake Avenue Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms EPA-821-R-02-012.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Trussell Technologies
SAMPLE ID.:	Lake Mathews Raw with EarthTec
DATE RECEIVED:	10 Sept – 20
ABC LAB NO.:	TRU0920.134

ACUTE CERIODAPHNIA SURVIVAL BIOASSAY

% Survival = 0 % Survival in 8.35mg/l & 16.7mg/l Sample

EC50 = 4.175 mg/l

Yours very truly, hnson Laboratory Director

CETIS Summary Report							Report Date: 21 Oct-20 15:24 (p 1 of 1) Test Code/ID: TRU0920.134acer / 06-8706-0944					
Ceriodaphnia	96-h Acute Surv	ival Test	-						ioassay & C			
Batch ID: 16-7661-4185 Test Type: Start Date: 22 Sep-20 13:25 Protocol: Ending Date: 26 Sep-20 13:30 Species: Test Length: 4d 0h Taxon:				Survival (96h) EPA/821/R-02-012 (2002) Ceriodaphnia dubia Branchiopoda				Analyst:Diluent:Laboratory WaterBrine:Not ApplicableSource:Aquatic Biosystems, CO				
Receipt Date:	12-0106-0394 10 Sep-20 09:50 10 Sep-20 09:50 12d 4h (9.3 °C)	Code:TRU0920.134acerMaterial:Sample WaterCAS (PC):Trussell Technologies					Sou	Project: Source: Bioassay Report Station: Lake Mathews Raw with Earth Tec				
Point Estimat	e Summary											
Analysis ID	Endpoint		Point	Estimate Meth	od	\checkmark	Level	mg/L	95% LCL	95% UCL	:	
14-9409-9402	96h Survival Rat	e	Linea	r Interpolation (I	CPIN)		EC10 EC15 EC20 EC25 EC40 EC50	0.835 1.253 1.67 2.088 3.34 4.175	0.835 1.253 1.67 2.088 3.34 4.175	0.835 1.253 1.67 2.088 3.34 4.175		
Test Acceptal	bility					TAC L	imite					
Analysis ID	Endpoint		Attrit	oute	Test Stat		Upper	Overlap	Decision			
	96h Survival Rat 96h Survival Rat			ol Resp ol Resp	1 1	0.9 0.9	>> >>	Yes Yes	Passes Criteria Passes Criteria			
96h Survival	Rate Summary											
Conc-mg/L	Code	Count	Mear	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect	
0 8.35 16.7	Ν	4 4 4	1.000 0.000 0.000	0.0000 0.000	1.0000 0.0000 0.0000	1.0000 0.0000 0.0000	1.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	 	0.00% 100.00% 100.00%	
96h Survival	Rate Detail						ME	5: 79242C	0938E02BA8	B3CB4769	263E98D9	
Conc-mg/L	Code	Rep 1	Rep	2 Rep 3	Rep 4							
0	N	1.0000	1.000	00 1.0000	1.0000							
8.35 16.7		0.0000 0.0000	0.000 0.000		0.0000 0.0000							
96h Survival	Rate Binomials											
Conc-mg/L	Code	Rep 1	Rep	2 Rep 3	Rep 4							
0	N	5/5	5/5	5/5	5/5							
			0/5		0/5							
8.35		0/5	0/5	0/5	0/5							

PASS QA:_ Analyst:_

 Report Date:
 21 Oct-20 15:24 (p 1 of 2)

 Test Code/ID:
 TRU0920.134acer / 06-8706-0944

Ceriodaphnia	96-h Acute Surv	ival Test						Aquatic B	ioassay & (Consulting	Labs, Inc.
Analysis ID: Analyzed: Edit Date:	21 Oct-20 15:23 Analysis:		i alysis: F	96h Survival Rate Parametric-Two Sample : 79242C0938E02BA8B3CB4769263E98D9			State	Status Level: 1		.9.7 126-0	
Batch ID: Start Date: Ending Date: Fest Length:	16-7661-4185 22 Sep-20 13:25 26 Sep-20 13:30 4d 0h	Pro Spe	ecies: (Survival (96h) EPA/821/R-02-(Ceriodaphnia di Branchiopoda	· · ·		Anal Dilu Brin Sou	ent: Labo e: Not	oratory Wat Applicable atic Biosyst		Age:
Receipt Date:	12-0106-0394 10 Sep-20 09:50 10 Sep-20 09:50 12d 4h (9.3 °C)	CA	terial: S S (PC):	FRU0920.134a Sample Water Frussell Techno			Proj Sou Stat	rce: Bioa	assay Repoi e Mathews		arth Tec
Test Accepta	bility Criteria	TAC	_imits								
Attribute	Test Stat	Lower	Upper	Overlap	Decision						
Control Resp	1	0.9	>>	Yes	Passes Cr	iteria					
ANOVA Assu	mptions Tests										
Attribute	Test				Test Stat	Critical	P-Value	Decision	(a:1%)		
Distribution	Shapiro-W	ilk W Norr	nality Test	t				Indetermi			
96h Survival	Rate Summary										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
8.35		4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
16.7		4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	122201	100.00%
Angular (Cor	rected) Transform	ned Sumi	mary								
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.3450	1.3450	1.3460	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
8.35		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0.0000	0.00%	83.24%
16.7		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0.0000	0.00%	83.24%
96h Survival	Rate Detail				_						
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4						
0	N	1.0000	1.0000		1.0000						
8.35		0.0000	0.0000	0.0000	0.0000						
16.7		0.0000	0.0000	0.0000	0.0000						
Angular (Cor	rected) Transfor	med Deta	il								
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4						
0	N	1.3450	1.3450	1.3450	1.3450						
8.35		0.2255	0.2255	0.2255	0.2255						
16.7		0.2255	0.2255	0.2255	0.2255						
96h Survival	Rate Binomials										
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4						
0	N	5/5	5/5	5/5	5/5						
8.35		0/5	0/5	0/5	0/5						

Analyst:_____QA:____

16.7

0/5

0/5

0/5

0/5

CETIS Ana	alytical Report					Test Code/ID:	TRU0920.134acer / 06-8706-0944
Ceriodaphnia	a 96-h Acute Surviv	al Test	Aquatic B	Aquatic Bioassay & Consulting Labs, Inc.			
Analysis ID: Analyzed: Edit Date:	17-2439-4970 21 Oct-20 15:23 21 Oct-20 15:21	Analysis:					CETISv1.9.7 1 000-189-126-0
Graphics							
1 0 0 9 0 8	••		Reject Null		10		
6,0 7,0 8,0 9,0 9,0 9,0 9,0 9,0 9,0 9,0 9,0 9,0 9					8 -	1	
ភ្លេ 05 សូ 05				Centered Corr. Angle	05 -	1	
0.3					03		
0.1	0 N	8.35	16.7		0.0 -2.0 -1.1	5 -10 -05 0.0	05 10 15 20
		Conc-mg/L	10.7		-4.0 -1.	Rankits	

Report Date:

21 Oct-20 15:24 (p 2 of 2)

_____QA:____ Analyst:

CETIS Analytical Report

CETIS Analytical Report

 Report Date:
 21 Oct-20 15:24 (p 1 of 2)

 Test Code/ID:
 TRU0920.134acer / 06-8706-0944

Ceriodaphnia	a 96-h Acute Surv	ival Test				Aqua	atic Bioassay & Consulting Labs, Inc
Analysis ID:	14-9409-9402	Endpoint	: 96h Survival Ra	ate		CETIS Vers	sion: CETISv1.9.7
Analyzed:	21 Oct-20 15:23	Analysis:	Linear Interpola	tion (ICPIN)		Status Leve	el: 1
Edit Date:	21 Oct-20 15:21	MD5 Has	h: 79242C0938E0	2BA8B3CB47692	263E98D9	Editor ID:	000-189-126-0
Batch ID:	16-7661-4185	Test Type	: Survival (96h)			Analyst:	
Start Date:	22 Sep-20 13:25	Protocol:	EPA/821/R-02-	012 (2002)		Diluent:	Laboratory Water
Ending Date:	26 Sep-20 13:30	Species:	Ceriodaphnia d	ubia		Brine:	Not Applicable
Test Length:	4d Oh	Taxon:	Branchiopoda			Source:	Aquatic Biosystems, CO Age:
Sample ID:	12-0106-0394	Code:	TRU0920.134a	cer		Project:	
Sample Date:	: 10 Sep-20 09:50	Material:	Sample Water			Source:	Bioassay Report
Receipt Date:	: 10 Sep-20 09:50	CAS (PC)	:			Station:	Lake Mathews Raw with Earth Tec
Sample Age:	12d 4h (9.3 °C)	Client:	Trussell Techno	ologies			
Linear Interp	olation Options						
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method		
Linear	Linear	0	280	Yes	Two-Point	Interpolation	1
Test Accepta	bility Criteria	TAC Limits					
Attribute	Test Stat	Lower Upp	oer Overlap	Decision			
Control Resp	1	0.9 >>	Yes	Passes Criteria			
Point Estimat	tes						
Level mg/l	L 95% LCL	95% UCL					
EC10 0.83	5 0.835	0.835					
EC15 1.25	3 1.253	1.253					
EC20 1.67	1.67	1.67					
		2.088					
EC25 2.08	8 2.088	2.000					
EC25 2.08 EC40 3.34		3.34					

96h Survival Ra		Calculated Variate(A/B)							Isotonic Variate		
Conc-mg/L	Code	Count	Mean	Median	Min	Мах	CV%	%Effect	A/B	Mean	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	20/20	1.0000	0.00%
8.35		4	0.0000	0.0000	0.0000	0.0000		100.00%	0/20	0.0000	100.00%
16.7		4	0.0000	0.0000	0.0000	0.0000		100.00%	0/20	0.0000	100.00%

96h Survival Rate Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
8.35		0.0000	0.0000	0.0000	0.0000
16.7		0.0000	0.0000	0.0000	0.0000

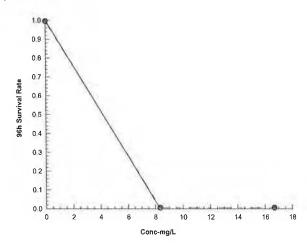
96h Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	5/5	5/5	5/5	5/5
8.35		0/5	0/5	0/5	0/5
16.7		0/5	0/5	0/5	0/5

Analyst: _____QA:____

CETIS Ana	alytical Report			Report Date: Test Code/ID:	21 Oct-20 15:24 (p 2 of 2) TRU0920.134acer / 06-8706-0944
Ceriodaphnia	a 96-h Acute Surviva	Il Test		Aquatic B	lioassay & Consulting Labs, Inc.
Analysis ID:	14-9409-9402	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.9.7
Analyzed:	21 Oct-20 15:23	Analysis:	Linear Interpolation (ICPIN)	Status Level:	1
Edit Date:	21 Oct-20 15:21	MD5 Hash:	79242C0938E02BA8B3CB4769263E98D9	Editor ID:	000-189-126-0

Graphics



Analyst:_

CETIS Measurement Report

Report Date: 21 Oct-20 15:24 (p 1 of 3)

Ceriodaphnia 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID:	16-7661-4185			Survival (96h)				nalyst:			
Start Date:	22 Sep-20 13:2		Protocol:	EPA/821/R-02-	012 (2002)		D		aboratory Wat	er	
Ending Date:	26 Sep-20 13:3	0 9	Species:	Ceriodaphnia c	lubia		В		ot Applicable		
Test Length:	4d Oh		Taxon:	Branchiopoda			S	ource: A	quatic Biosyst	tems, CO	Age:
Sample ID:	12-0106-0394	(Code:	TRU0920.134a	acer		Р	roject:			
Sample Date:	10 Sep-20 09:5	0 1	Material:	Sample Water			S	ource: Bi	ioassay Repo	rt	
Receipt Date:	: 10 Sep-20 09:5	0	CAS (PC):				S	tation: La	ake Mathews	Raw with E	arth Tec
Sample Age:	12d 4h (9.3 °C)) (Client:	Trussell Techn	ologies						
Alkalinity (Ca	CO3)-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL		Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	3	60	60	60	60	60	0	0	0.00%	0
8.35		3	100	100	100	100	100	0	0	0.00%	0
Overall		6	80	57.01	103	60	100	8.944	21.91	27.39%	0 (0%)
Conductivity	-µmhos										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Мах	Std Err	Std Dev	CV%	QA Count
0	Ν	3	337.7	332.5	342.8	336	340	0.6939	2.082	0.62%	0
8.35		3	1129	1067	1191	1102	1151	8.293	24.88	2.20%	0
16.7		3	1097	1090	1103	1094	1099	0.8389	2.517	0.23%	0
Overall		9	854.4	556.2	1153	336	1151	129.3	388	45.41%	0 (0%)
Dissolved O	kygen-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
0	N	3	7.4	6.655	8.145	7.1	7.7	0.1	0.3	4.05%	0
8.35		3	7.6	6.11	9.09	7	8.2	0.2	0.6	7.89%	0
16.7		3	7.467	6.463	8.471	7	7.7	0.1347	0.4041	5.41%	0
Overall		9	7.489	7.18	7.797	7	8.2	0.1338	0.4014	5.36%	0 (0%)
Hardness (C	aCO3)-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Мах	Std Err	Std Dev	CV%	QA Coun
0	N	3	85	85	85	85	85	0	0	0.00%	0
8.35		3	350	350	350	350	350	0	0	0.00%	0
Overall		6	217.5	65.18	369.8	85	350	59.26	145.1	66.73%	0 (0%)
pH-Units											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Мах	Std Err	Std Dev	CV%	QA Coun
0	N	3	8	7.57	8.43	7.9	8.2	0.05773	0.1732	2.17%	0
8.35		3	7.9	7.652	8.148	7.8	8	0.03333		1.27%	0
16.7		3	7.867	7.723	8.01	7.8	7.9	0.01924	0.05772	0.73%	0
Overall		9	7.922	7.83	8.015	7.8	8.2	0.04006	6 0.1202	1.52%	0 (0%)
Temperature	e-°C										
Conc-mg/L	Code	Count	t Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Cour
0	N	3	24	24	24	24	24	0	0	0.00%	0
8.35		3	24.1	23.67	24.53	24	24.3	0.05775	5 0.1732	0.72%	0
16.7		3	24.13	3 23.56	24.71	24	24.4	0.07698	0.2309	0.96%	0
Overall		9	24.08	3 23.96	24.2	24	24.4	0.05212	2 0.1563	0.65%	0 (0%)

_____QA:____ Analyst:

Ceriodaphnia 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

Alkalinity (CaCC	03)-mg/L								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
)	N	1		60					
8.35				100					
0	N	2		60					
8.35				100					
0	N	3	_	60	_			_	
8.35				100					
Conductivity-µr	nhos								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		337					
8.35				1102					
16.7				1094					
0	N	2		336					
8.35		-		1134					
16.7				1097					
	K1	2				_			
0	Ν	3		340					
8.35				1151					
16.7				1099			_	_	
Dissolved Oxy									
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.7					
8.35				8.2					
16.7				7.7					
0	N	2		7.4					
8.35				7.6					
16.7				7.7					
0	N	3		7.1					
8.35				7					
16.7				7					
Hardness (CaC	:O3)-mg/L								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	inst ID	Analyst	Notes
0	N	1		85					
8.35				350					
0	N	2		85					
8.35				350					
0	N	3		85					
8.35		-		350					
pH-Units									
Conc-mg/L	Code	Read	Time	Measure	AQ e	Diff-%	Inst ID	Analys	t Notes
0	N	1		8.2		2,111 70		, and yo	
8.35		<i>1</i> 0		7.8					
16.7				7.8					
0	N	2		7.9					
0 8.35	IN	2							
8.35 16.7				8 7.9					
0	Ν	3		7.9					
8.35				7.9					
16.7				7.9					

000-189-126-0

Analyst:

QA:___

 Report Date:
 21 Oct-20 15:24 (p 3 of 3)

 Test Code/ID:
 TRU0920.134acer / 06-8706-0944

Ceriodaphnia 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C				
Conc-mg/L	Code	Read	Time	Measure QA Diff-% Inst ID Analyst Notes
0	N	1		24
8.35				24
16.7				24
0	N	2		24
8.35				24.3
16.7				24.4
0	N	3		24
8.35				24
16.7				24

Analyst: _____ QA: ____



October 21, 2020

Mr. David Hokanson Trussell Technologies 232 N. Lake Ave Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed acute bioassay report. The test was conducted under the guidelines prescribed in "Methods for Measuring the Acute Toxicity of Effluents and Receiving water to Freshwater and Marine Organisms" (Fourth Edition) EPA/600/ 4-90/027F, August 1993. The results were as follows:

CLIENT:	Trussell Technologies	1.0
SAMPLE I.D.:	Lake Mathews Raw Earthtec 8.35mg/l	
DATE RECEIVED:	09/10/20	
ABC LAB. NO.:	TRU0920.134	

NPDES PERCENT SURVIVAL BIOASSAY RAINBOW TROUT

PERCENT SURVIVAL = 0% Survival in 8.35/mg/l Sample

TUa = >1.00 @ 8.35mg/l

truly, ohnson ory Director

AQUATIC BIOASSAY AND CONSULTING LABORATORIES, INC. 29 North Olive Street Ventura, CA 93001 (805) 643-5621

NPDES Percent Survival Bioassay for Effluents and Stormwater

	SAMPLE INFORMATION	
CLIENT:	Trussell Technologies Date: 09/10/20	
AMDLE ID .	Lake Mathema Day Earth LAD # TDU0020 124	

And an and a second sec		
CLIENT:	Trussell Technologies Date: 09/10/20	٦
SAMPLE I.D.:	Lake Mathews Raw Eartht LAB # TRU0920.134	

WATER QUALITY AERATION Single Bubble Air CONTROL ALKALINITY Beg: 63 mg/l End: 68 mg/l SAMPLE ALKALINITY Beg: 117 mg/l End: 122 mg/l DILUTION WATTReconst. Fresh CONTROL HARDNESS 94 mg/l Eud: 101 mg/l SAMPLE HARDNESS Beg: 330 mg/l Beg: 330 mg/l End:

ORGANISM INFORMATION

SPECIES:	Oncorhynchus mykiss	DATE REC'D:	09/15/20
COMMON NAME:	Rainbow Trout		
SOURCE:	Thomas Fish Co.		
CARRIER:	California Overnight	NO. FISH / TANK	10

										TE	ST DA	TA								
						48	HOURS 721			HOURS 96			5 HOURS							
DATE: FIME:	09/22/20 1500 09/23/20 1450					09/24/20 1550			09/25/20 1500				09/26/20 1550							
CONC.	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy.		pН	#Fish	Dis. Oxy.	Temp. dg.C	pH	#Fish		Temp. dg.C	pН	#Fish		1	pН	#Fish
0 (Con.)	10.0	13.3	7.4	10	10.6	13.8	6.9	10	10.5	13.8	6.9	10	10.5	13.8	6.8	10	10.3	13.8	6.9	10
0 (Con.)	10.1	13.3	7.4	10	10.9	13.8	6.9	10	10.4	13.8	6.9	10	10.6	13.8	6.9	10	10.4	13.8	6.9	10
50.1mg/l	10.6	13.6	7.5	10	10.6	13.8	7.3	0	1			0				0				0
50.1mg/l	10.7	13.6	7.4	10	10.5	13.8	7.2	0				0				0	1.			0

FINAL I	ОАТА
TOTAL	FISH SURVIVAL
0 (Con.)	10
0 (Con.)	10
50.1mg/l	0
50.1mg/l	0

FINAL RESULTS 0% Survival in 8.35/mg/1 Sample >1.00 (*a*) 8.35mg/1 PERCENT SURVIVAL = TUa =

Joe Freas, Sonior oxicologist

Date 10/2/20



October 21, 2020

Mr. David Hokanson Trussell Technologies 232 N. Lake Ave Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed acute bioassay report. The test was conducted under the guidelines prescribed in "Methods for Measuring the Acute Toxicity of Effluents and Receiving water to Freshwater and Marine Organisms" (Fourth Edition) EPA/600/ 4-90/027F, August 1993. The results were as follows:

CLIENT:Trussell TechnologiesSAMPLE I.D.:Lake Mathews Raw Earthtec 16.7mg/lDATE RECEIVED:09/10/20ABC LAB. NO.:TRU0920.134

NPDES PERCENT SURVIVAL BIOASSAY RAINBOW TROUT

PERCENT SURVIVAL = 0% Survival in 16.7/mg/l Sample

TUa = >1.00 @ 16.7mg/l

truly, ohnson ory Director

AQUATIC BIOASSAY AND CONSULTING LABORATORIES, INC. 29 North Olive Street Ventura, CA 93001 (805) 643-5621

NPDES Percent Survival Bioassay for Effluents and Stormwater

	SAMPLE INFORMATION	
CLIENT:	Trussell Technologies Date: 09/10/20	-
SAMPLE I.D.:	Lake Mathews Raw Eartht LAB # TRU0920.134	

WATER QUALITY

	and a second sec							
DILUTION WAT Reconst. Fresh	AERATION Single Bubble Air CONTROL ALKALINITY							
CONTROL HARDNESS								
Beg: 94 mg/l End: 101 mg/l	Beg: 63 mg/l End: 68 mg/l							
SAMPLE HARDNESS	SAMPLE ALKALINITY							
Beg: 350 mg/l End: 360 mg/l	Beg: 100 mg/l End: 117 mg/l							

ORGANISM INFORMATIONSPECIES:Oncorhynchus mykissDATE REC'D:09/15/20COMMON NAME:Rainbow TroutSOURCE:Thomas Fish Co.CARRIER:California OvernightNO. FISH / TANK10

										TES	ST DA	TA								
	INITIAL 24 HOURS					48	48 HOURS 72 1 09/24/20 1550			72	72 HOURS 9			96	5 HOURS					
DATE: TIME:	09/22/20 1500 09/23/20 1450					09/25/20 1500				09/26/20 1550										
CONC.	Dis. Oxy.	Temp. dg.C	pH	#Fish	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy.	Temp. dg.C	pН	#Fish
0 (Con.) 0 (Con.)	10.0	13.3 13.3	7.4 7.4	10 10	10.6 10.9	13.8 13.8	6.9 6.9	10 10	10.5 10.4	13.8 13.8	6.9 6.9	10 10	10.5 10.6	13.8 13.8	6.8 6.9	10 10	10.3 10.4	13.8 13.8	6.9 6.9	10 10
50.1mg/1 50.1mg/1	10.4	13.5 13.5	7.4 7.4	10 10	10.6 10.5	13.8 13.8	7.3 7.3	0				0				0				0

FINAL I	
TOTAL	FISH SURVIVAL
0 (Con.)	10
0 (Con.)	10
50.1mg/l	0
50.1mg/1	0

 FINAL RESULTS

 PERCENT SURVIVAL =
 0% Survival in 16.7/mg/l Sample

 TUa =
 >1.00 (a) 16.7mg/l

Joe Freas, Sentor Toxicologist

Date 10/c/rs

	Deste A Reas Alternation	Vierbor:	Analycie
Client:	Project Name/Number:		Analysis
Trussell Technologies	626 -	Ŏ	
F.	-		
er:	Sampled By (signature)	To To Ykis dapl	
_	Deres Maria		
Date Time Comp Grab	Matrix Sample ID	Number ACT ACC	Comments
4	Liquid Lake Mathens Rand	1 28 L 2 2 2	The Easthter Joses each
	Earth		
Relinquised By:(signature)	& new-	Date: Time: Relinquised By:(signature)	Date: Time:
Received By:(signature)		Date: Time: Received By:(signature) $\eta_{l,\sigma}/\iota_{0} q'(l)$	Date: Time:
Upon sample reciept record the following results: Temp (°C) $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$	CI (mg/L):		

Aquatic Bioassay and Consulting Laboratories 29 N. Olive Street Ventura, CA 93001 Phone: (805) 643-5621 Fax: (805) 643-2930



Appendix D – Weymouth WTP Influent 2020 Toxicity Test Report



October 22, 2020

Mr. David Hokanson Trussell Technologies 232 N. Lake Avenue Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms EPA-821-R-02-012.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Trussell Technologies
SAMPLE ID.:	Lake Weymouth Raw with EarthTec
DATE RECEIVED:	17 Sept – 20
ABC LAB NO.:	TRU0920.262

ACUTE FATHEAD MINNOW SURVIVAL BIOASSAY

% Survival

al = 100 % Survival in 16.7 mg/l Sample

EC50 =>16.7 mg/l

Yours truly, Scott Johnson Laboratory Director

Report Date: t Codo/ID

21 Oct-20 15:33 (p 1 of 1) 262afml / 10 6450 9296

								1.5			
Fathead Minn	ow 96-h Acute S	urvival Tes	st					Aquatic	Bioassay & C	Consulting I	_abs, Inc.
Batch ID:	13-6522-3425	Test	t Type: S	Survival (96h)			Ana	yst:			
Start Date:	22 Sep-20 13:22	Prot	tocol: E	PA/821/R-02-0	012 (2002)		Dilu	ent: La	boratory Wate	ər	
Ending Date:	26 Sep-20 13:35	Spe	cies: F	vimephales pro	melas		Brin	e: No	t Applicable		
Test Length:	4d Oh	Tax	on: A	Actinopterygii			Sou	rce: Aq	uatic Biosyste	ems, CO	Age:
Sample ID:	02-8796-6967	Cod	le: 1	RU0920.262a	fml		Ргој	ect:			
Sample Date:	17 Sep-20 09:44	Mate	erial: S	Sample Water			Sou	rce: Bio	bassay Repor	t	
Receipt Date:	17 Sep-20 09:44	CAS	6 (PC):				Stat	ion: La	ke Weymouth	n Raw with E	arth Tec
Sample Age:	5d 4h (20.8 °C)	Clie	nt: 1	russell Techno	ologies						
Multiple Com	parison Summar	у									
Analysis ID	Endpoint	_		rison Method		√	NOEL	LOEL	TOEL	PMSD	5
09-5347-6586	96h Survival Rat	e	Steel M	any-One Rank	Sum Test		16.7	>16.7		4.84%	
Point Estimat	te Summary										
Analysis ID	Endpoint		Point E	stimate Meth	bd	\checkmark	Level	mg/L	95% LCL	95% UCL	
09-1766-0348	96h Survival Rat	е	Linear	nterpolation (IC	CPIN)		EC10	>16.7			
							EC15	>16.7			
							EC20	>16.7		***	
							EC25	>16.7			
							EC40	>16.7			
							EC40 EC50	>16.7 >16.7			
Test Accepta	bility					TAC L	EC50				
	bility Endpoint		Attribu	te	Test Stat		EC50		212		
Analysis ID		e	Attribu Control		Test Stat 0.975		EC50	>16.7	212		_
Analysis ID 09-1766-0348	Endpoint			Resp		Lower	EC50 imits Upper	>16.7 Overlap	 Decision	riteria	
Analysis ID 09-1766-0348 09-5347-6586	Endpoint 96h Survival Rat		Control	Resp	0.975	Lower 0.9	EC50 imits Upper >>	>16.7 Overlap Yes	Decision Passes C	riteria	
Analysis ID 09-1766-0348 09-5347-6586 96h Survival Conc-mg/L	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code		Control	Resp	0.975 0.975	Lower 0.9	EC50 imits Upper >>	>16.7 Overlap Yes	Decision Passes C	riteria	%Effect
Analysis ID 09-1766-0348 09-5347-6586 96h Survival Conc-mg/L	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary	e	Control Control	Resp Resp	0.975 0.975	Lower 0.9 0.9	EC50 imits Upper >> >>	>16.7 Overlap Yes Yes	Decision Passes C Passes C	 riteria riteria	%Effect 0.00%
Analysis ID 09-1766-0348 09-5347-6586 96h Survival Conc-mg/L 0 8.35	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code	e Count	Control Control Mean	Resp Resp 95% LCL	0.975 0.975 95% UCL	Lower 0.9 0.9 Min	EC50 imits Upper >> >> Max	>16.7 Overlap Yes Yes Std Err	Decision Passes C Passes C Std Dev	riteria riteria CV%	
Analysis ID 09-1766-0348 09-5347-6586 96h Survival Conc-mg/L 0 8.35	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code	e Count 4	Control Control Mean 0.9750	Resp Resp 95% LCL 0.8954	0.975 0.975 95% UCL 1.0550	Lower 0.9 0.9 Min 0.9000	EC50 imits Upper >> >> Max 1.0000	>16.7 Overlap Yes Yes Std Err 0.0250	Decision Passes C Passes C Std Dev 0.0500	riteria riteria CV% 5.13%	
Analysis ID 09-1766-0348 09-5347-6586 96h Survival Conc-mg/L 0 8.35 16.7	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N	e Count 4 4	Control Control Mean 0.9750 1.0000	Resp Resp 95% LCL 0.8954 1.0000	0.975 0.975 95% UCL 1.0550 1.0000	Lower 0.9 0.9 Min 0.9000 1.0000	EC50 imits Upper >> Max 1.0000 1.0000 1.0000	>16.7 Overlap Yes Yes Std Err 0.0250 0.0000 0.0000	Decision Passes C Passes C Std Dev 0.0500 0.0000	rriteria rriteria CV% 5.13% 	0.00% -2.56% -2.56%
Analysis ID 09-1766-0348 09-5347-6586 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N	e Count 4 4	Control Control Mean 0.9750 1.0000	Resp Resp 95% LCL 0.8954 1.0000	0.975 0.975 95% UCL 1.0550 1.0000	Lower 0.9 0.9 Min 0.9000 1.0000	EC50 imits Upper >> Max 1.0000 1.0000 1.0000	>16.7 Overlap Yes Yes Std Err 0.0250 0.0000 0.0000	Decision Passes C Passes C Std Dev 0.0500 0.0000	rriteria rriteria CV% 5.13% 	0.00% -2.56% -2.56%
Analysis ID 09-1766-0348 09-5347-6586 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail	e Count 4 4 4	Control Control Mean 0.9750 1.0000 1.0000	Resp Resp 95% LCL 0.8954 1.0000 1.0000	0.975 0.975 95% UCL 1.0550 1.0000 1.0000	Lower 0.9 0.9 Min 0.9000 1.0000	EC50 imits Upper >> Max 1.0000 1.0000 1.0000	>16.7 Overlap Yes Yes Std Err 0.0250 0.0000 0.0000	Decision Passes C Passes C Std Dev 0.0500 0.0000	rriteria rriteria CV% 5.13% 	0.00% -2.56% -2.56%
Analysis ID 09-1766-0348 09-5347-6586	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code	e Count 4 4 4 8 Rep 1	Control Control Mean 0.9750 1.0000 1.0000 Rep 2	Resp Resp 95% LCL 0.8954 1.0000 1.0000 Rep 3	0.975 0.975 95% UCL 1.0550 1.0000 1.0000 Rep 4	Lower 0.9 0.9 Min 0.9000 1.0000	EC50 imits Upper >> Max 1.0000 1.0000 1.0000	>16.7 Overlap Yes Yes Std Err 0.0250 0.0000 0.0000	Decision Passes C Passes C Std Dev 0.0500 0.0000	rriteria rriteria CV% 5.13% 	0.00% -2.56% -2.56%
Analysis ID 09-1766-0348 09-5347-6586 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0 8.35	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code	e Count 4 4 4 4 8 Rep 1 0.9000	Control Control 0.9750 1.0000 1.0000 Rep 2 1.0000	Resp Resp 95% LCL 0.8954 1.0000 1.0000 Rep 3 1.0000 1.0000	0.975 0.975 95% UCL 1.0550 1.0000 1.0000 Rep 4 1.0000	Lower 0.9 0.9 Min 0.9000 1.0000	EC50 imits Upper >> Max 1.0000 1.0000 1.0000	>16.7 Overlap Yes Yes Std Err 0.0250 0.0000 0.0000	Decision Passes C Passes C Std Dev 0.0500 0.0000	rriteria rriteria CV% 5.13% 	0.00% -2.56% -2.56%
Analysis ID 09-1766-0348 09-5347-6586 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0 8.35 16.7	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code	e <u>Count</u> 4 4 4 4 <u>Rep 1</u> 0.9000 1.0000	Control Control 0.9750 1.0000 1.0000 Rep 2 1.0000 1.0000	Resp Resp 95% LCL 0.8954 1.0000 1.0000 Rep 3 1.0000 1.0000	0.975 0.975 95% UCL 1.0550 1.0000 1.0000 Rep 4 1.0000 1.0000	Lower 0.9 0.9 Min 0.9000 1.0000	EC50 imits Upper >> Max 1.0000 1.0000 1.0000	>16.7 Overlap Yes Yes Std Err 0.0250 0.0000 0.0000	Decision Passes C Passes C Std Dev 0.0500 0.0000	rriteria rriteria CV% 5.13% 	0.00% -2.56% -2.56%
Analysis ID 09-1766-0348 09-5347-6586 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code N	e <u>Count</u> 4 4 4 4 <u>Rep 1</u> 0.9000 1.0000	Control Control 0.9750 1.0000 1.0000 Rep 2 1.0000 1.0000	Resp Resp 95% LCL 0.8954 1.0000 1.0000 Rep 3 1.0000 1.0000	0.975 0.975 95% UCL 1.0550 1.0000 1.0000 Rep 4 1.0000 1.0000	Lower 0.9 0.9 Min 0.9000 1.0000	EC50 imits Upper >> Max 1.0000 1.0000 1.0000	>16.7 Overlap Yes Yes Std Err 0.0250 0.0000 0.0000	Decision Passes C Passes C Std Dev 0.0500 0.0000	rriteria rriteria CV% 5.13% 	0.00% -2.56% -2.56%
Analysis ID 09-1766-0348 09-5347-6586 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code N Rate Binomials	e Count 4 4 4 4 Rep 1 0.9000 1.0000 1.0000	Control Control 0.9750 1.0000 1.0000 Rep 2 1.0000 1.0000	Resp Resp 95% LCL 0.8954 1.0000 1.0000 1.0000 1.0000 1.0000	0.975 0.975 95% UCL 1.0550 1.0000 1.0000 1.0000 1.0000	Lower 0.9 0.9 Min 0.9000 1.0000	EC50 imits Upper >> Max 1.0000 1.0000 1.0000	>16.7 Overlap Yes Yes Std Err 0.0250 0.0000 0.0000	Decision Passes C Passes C Std Dev 0.0500 0.0000	rriteria rriteria CV% 5.13% 	0.00% -2.56% -2.56%
Analysis ID 09-1766-0348 09-5347-6586 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0 8.35 16.7	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code N Rate Binomials Code	e Count 4 4 4 4 Rep 1 0.9000 1.0000 1.0000 Rep 1	Control Control 0.9750 1.0000 1.0000 1.0000 1.0000 Rep 2 Rep 2	Resp Resp 95% LCL 0.8954 1.0000 1.0000 1.0000 1.0000 1.0000 Rep 3	0.975 0.975 95% UCL 1.0550 1.0000 1.0000 1.0000 1.0000 1.0000 Rep 4	Lower 0.9 0.9 Min 0.9000 1.0000	EC50 imits Upper >> Max 1.0000 1.0000 1.0000	>16.7 Overlap Yes Yes Std Err 0.0250 0.0000 0.0000	Decision Passes C Passes C Std Dev 0.0500 0.0000	rriteria rriteria CV% 5.13% 	0.00% -2.56% -2.56%

PASS Analyst:___ MQA: 0

Fathead Minr	now §	96-h Acute S	urvival Te	st			_			Aquat	ic Bioassay & (Consulting	Labs, Inc
Analysis ID:	09-5	5347-6586	End	lpoint: 96h	n Survival Ra	ate			CE	۲IS Versi	on: CETISv1	.9.7	
Analyzed:	21 (Oct-20 15:32		-	nparametric-					tus Leve	l: 1		
Edit Date:	21 (Oct-20 15:30	MD	5 Hash: 4D4	4EE5657710	C4BA0CE	E57E	3E0E4B88	EAF Edi	tor ID:	000-189-	126-0	
Batch ID:	13-6	6522-3425	Tes	t Type: Sur	vival (96h)				Ana	lyst:			
Start Date:	22 8	Sep-20 13:22			A/821/R-02-0	012 (200	2)		Dilu	ient:	Laboratory Wat	er	
Ending Date:					nephales pro		,		Bri		Not Applicable		
Test Length:		-	Tax		inopterygii						Aquatic Biosyst	ems, CO	Age:
Sample ID:	02-8	3796-6967	Coc	de: TR	U0920.262a	fml	-		Pro	ject:			
Sample Date:					mple Water					-	Bioassay Repo	t	
Receipt Date				S (PC):							Lake Weymout		Earth Tec
Sample Age:				• •	isseli Techno	ologies			014				
Data Transfo	rm		Alt Hyp					NOEL	LOEL	TOEL	. TU	MSDu	PMSD
Angular (Corr	_)	C > T				-	16.7	>16.7			0.0472	4.84%
										_			
Steel Many-C Control		Conc-mg		Tool Stat	Critical	Tico	DE	P-Type	P-Value	Deele	sion(α:5%)		
Negative Con	vs	8.35	1/1	20	11	Ties 1	0F 6	CDF	0.8569		Bignificant Effec	+	
ivegative Con	uol	8.35		20 20	11	1	ю 6	CDF	0.8569		Significant Effec		
T. 4.1	1.1114			20			5		0.0000	14011-0			
Test Accepta	bility		TAC L										
Attribute	_	Test Stat		Upper	Overlap	Decisi	_		_	-			
Control Resp		0.975	0.9	>>	Yes	Passe	s Cr	iteria		_		_	_
ANOVA Table	е												
Source		Sum Squa	ares	Mean Sq	uare	DF		F Stat	P-Value	Decis	sion(α:5%)		
Between	-	0.0044266		0.002213		2		1	0.4053		Significant Effect	t	
Error		0.0199195		0.002213		9					5		
Total		0.0243461	1			11		-					
ANOVA Assu	impti	ons Tests											
Attribute	an pe	Test				Test S	tat	Critical	P-Value	Deci	sion(α:1%)		
Variance			nuality of Va	ariance Test		Test o	iai	ontioar	1 - Value		erminate	-	
Vallance				ariance Test		9		8.022	0.0071		ual Variances		
				of Variance		3 1		8.022	0.4053		l Variances		
Distribution			-Darling A2			2.222		3.878	<1.0E-0		Normal Distribut	ion	
			o Skewnes:			3.23		2.576	0.0012		Normal Distribut		
			ov-Smirnov			0.4167	,	0.2801	<1.0E-0		Normal Distribut		
		-	Vilk W Norn			0.6334		0.8025	0.0002		Normal Distribut		
96h Survival	Rate	Summarv					-						
Conc-mg/L		Code	Count	Mean	95% LCL	95% L	ICL	Median	Min	Max	Std Err	CV%	%Effec
0		N	4	0.9750	0.8954	1.0000	_	1.0000	0.9000	1.000		5.13%	0.00%
8.35			4	1.0000	1.0000	1.0000		1.0000	1.0000	1.000		0.00%	-2.56%
16.7			4	1.0000	1.0000	1.0000		1.0000	1.0000	1.000		0.00%	-2.56%
Angular (Co	rrect	ed) Transfor	med Sum	marv		-							
Conc-mg/L		Code	Count	Mean	95% LCL	. 95% L	ICI	Median	Min	Max	Std Err	CV%	%Effec
0	_	N	4	1.3710	1.2420	1.501		1.4120	1.2490	1.412		5.94%	0.00%
		IN			1.2420			1.4120	1.2490	1.41		5.94% 0.00%	-2.97%
8.35 16.7			4	1.4120 1.4120		1.412(1.412)		1.4120	1.4120	1.41		0.00%	-2.97%
	-		4	1.4120	1.4120	1.4120		1.4120	1.4120	1.4 1/		0.00 /0	-2.31 /0
96h Survival	l Rate	e Detail											
Conc-mg/L	_	Code	Rep 1	Rep 2	Rep 3	Rep 4				_		-	
0		N	0.0000	1 0000	1 0000	1 000	2						

.						
0	N	0.9000	1.0000	1.0000	1.0000	
8.35		1.0000	1.0000	1.0000	1.0000	
16.7		1.0000	1.0000	1.0000	1.0000	

QA:_

Fathead Minnow 96-h Acute Survival Test

Fathead Minn	now 96-h Acute Surv	vival Test		Aquatic Bi	oassay & Consulting Labs, Inc.
Analysis ID:	09-5347-6586	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.9.7
Analyzed:	21 Oct-20 15:32	Analysis:	Nonparametric-Control vs Treatments	Status Level:	1
Edit Date:	21 Oct-20 15:30	MD5 Hash:	4D4EE565771C4BA0CE57BE0E4B88EAF	Editor ID:	000-189-126-0

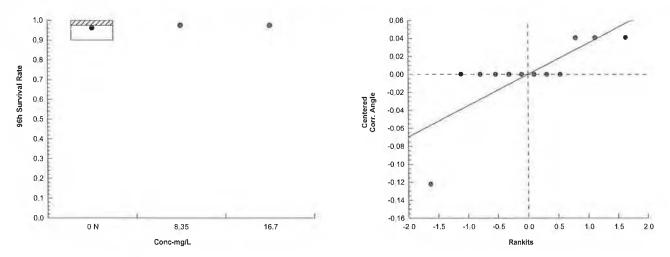
Angular (Corrected) Transformed Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	
0	N	1.2490	1.4120	1.4120	1.4120	
8.35		1.4120	1.4120	1.4120	1.4120	
16.7		1.4120	1.4120	1.4120	1.4120	

96h Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	9/10	10/10	10/10	10/10
8.35		10/10	10/10	10/10	10/10
16.7		10/10	10/10	10/10	10/10

Graphics



QA: Analyst:

CETIS Analytical Report

 Report Date:
 21 Oct-20 15:33 (p 1 of 2)

 Test Code/ID:
 TRU0920.262afml / 19-6450-8286

Fathead Mi	nnow 96	-h Acute Si	urvival Tes	t				Aqua	atic Bi	oassay & Consulting	g Labs, In
Analysis ID Analyzed:		766-0348 ct-20 15:32	Anal		96h Survival Ra Linear Interpola	ition (ICPIN)		CETIS Vers Status Lev		CETISv1.9.7 1	
Edit Date:	21 0	ct-20 15:30	MD5	Hash:	4D4EE5657710	C4BA0CE57BE0E	4B88EAF	Editor ID:		000-189-126-0	
Batch ID:	13-65	522-3425	Test	Type:	Survival (96h)			Analyst:			
Start Date:	22 Se	ep-20 13:22	Prot	ocol:	EPA/821/R-02-	012 (2002)		Diluent:	Labo	oratory Water	
Ending Dat	e: 26 S	ep-20 13:35	Spec	cies:	Pimephales pro	omelas		Brine:	Not /	Applicable	
Test Lengt	n: 4d 0	h	Тахо	n:	Actinopterygii			Source:	Aqua	atic Biosystems, CO	Age:
Sample ID:	02-87	96-6967	Cod	e:	TRU0920.262a	fml		Project:			
Sample Dat	e: 17 Se	ep-20 09:44	Mate	rial:	Sample Water			Source:	Bioa	ssay Report	
Receipt Da	e: 17 S	ep-20 09:44	CAS	(PC):				Station:	Lake	e Weymouth Raw with	Earth Teo
Sample Ag	e: 5d 4	h (20.8 °C)	Clier	nt:	Trussell Techne	ologies					
Linear Inter	polatio	n Options									
X Transfor	n Y	Transform	See	k	Resamples	Exp 95% CL	Method				
Linear	L	near	0		280	Yes	Two-Point	Interpolation	1		
Test Accep	tability	Criteria	TAC L	mits							
Attribute		Test Stat	Lower	Uppe	r Overlap	Decision					
Control Res	р	0.975	0.9	>>	Yes	Passes Criteria					
Point Estin	nates										
Level m	g/L	95% LCL	95% UCL								
	6.7										
EC15 >1	6.7										
EC20 >1	6.7										
EC25 >1	6.7										
EC40 >1	6.7										

96h Survival Ra	ate Summary			Isotonic Variate							
Conc-mg/L	Code	Count	Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	4	0.9750	1.0000	0.9000	1.0000	5.13%	0.00%	39/40	0.9917	0.00%
8.35		4	1.0000	1.0000	1.0000	1.0000	0.00%	-2.56%	40/40	0.9917	0.00%
16.7		4	1.0000	1.0000	1.0000	1.0000	0.00%	-2.56%	40/40	0.9917	0.00%

96h Survival Rate Detail

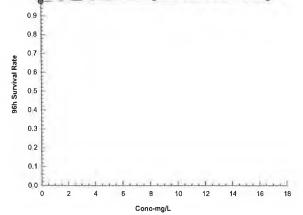
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9000	1.0000	1.0000	1.0000
8.35		1.0000	1.0000	1.0000	1.0000
16.7		1.0000	1.0000	1.0000	1.0000

96h Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	9/10	10/10	10/10	10/10
8.35		10/10	10/10	10/10	10/10
16.7		10/10	10/10	10/10	10/10

QA: Analyst:

Test Code/ID: TRU0920.262afml Fathead Minnow 96-h Acute Survival Test Aquatic Bioassay & Consulti Analysis ID: 09-1766-0348 Endpoint: 96h Survival Rate CETIS Version: CETISv1.9.7	
	ng 2003, mo.
Analyzed: 21 Oct-20 15:32 Analysis: Linear Interpolation (ICPIN) Status Level: 1	
Edit Date: 21 Oct-20 15:30 MD5 Hash: 4D4EE565771C4BA0CE57BE0E4B88EAF Editor ID: 000-189-126-0	
Graphics	



Analyst: _____QA: ____

Report Date:

21 Oct-20 15:33 (p 1 of 3) Test Code/ID: TRU0920.262afml / 19-6450-8286

Fathead Minnow 96-h Acute Survival Test

Aquatic	Bioassay	&	Consulting	Labs,	Inc.

Batch ID: Start Date:	13-6522-3425 22 Sep-20 13:22	2 Р	rotocol:	Survival (96h) EPA/821/R-02-	,		Di		boratory Wat	er	
•	26 Sep-20 13:35		pecies:	Pimephales pro	omelas				t Applicable		A
Test Length:	40 011		axon:	Actinopterygii				ource: Aq	uatic Biosyst	lenis, CO	Age:
Sample ID:	02-8796-6967		ode:	TRU0920.262a	ıfml			oject:	_		
	17 Sep-20 09:44		laterial:	Sample Water					bassay Repo		- 4 -
-	17 Sep-20 09:44		AS (PC):				St	ation: La	ke Weymout	h Raw with	Earth Lec
Sample Age:	5d 4h (20.8 °C)	C	lient:	Trussell Techn	ologies				_		
Alkalinity (Ca	CO3)-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
0	N	3	60	60	60	60	60	0	0	0.00%	0
8.35		3	108	108	108	108	108	0	0	0.00%	0
Overall		6	84	56.41	111.6	60	108	10.73	26.29	31.30%	0 (0%)
Conductivity-	∙µmhos										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
0	N	3	337.7	332.5	342.8	336	340	0.6939	2.082	0.62%	0
8.35		3	1107	1098	1117	1103	1110	1.262	3.786	0.34%	0
16.7		3	1101	1099	1103	1100	1102	0.3333	1	0.09%	0
Overali		9	848.7	554.1	1143	336	1110	127.8	383.3	45.16%	0 (0%)
Dissolved Ox	(ygen-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
0	N	3	7.4	6.655	8.145	7.1	7.7	0.1	0.3	4.05%	0
8.35		3	7.667	6.441	8.892	7.1	8	0.1644	0.4933	6.43%	0
16.7		3	7.5	6.639	8.361	7.1	7.7	0.1155	0.3464	4.62%	0
Overall		9	7.522	7.248	7.796	7.1	8	0.1188	0.3563	4.74%	0 (0%)
Hardness (Ca	aCO3)-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
0	N	3	85	85	85	85	85	0	0	0.00%	0
8.35		3	315	315	315	315	315	0	0	0.00%	0
Overall		6	200	67.8	332.2	85	315	51.43	126	62.99%	0 (0%)
pH-Units											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Мах	Std Err	Std Dev	CV%	QA Coun
0	N	3	8	7.57	8.43	7.9	8.2	0.05773	0.1732	2.17%	0
8.35		3	7.9	7.652	8.148	7.8	8	0.03333	0.1	1.27%	0
16.7		3	7.867	7.723	8.01	7.8	7.9	0.01924	0.05772	0.73%	0
Overall		9	7.922	7.83	8.015	7.8	8.2	0.04006	0.1202	1.52%	0 (0%)
Temperature	-°C				-						
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Cour
0	N	3	24	24	24	24	24	0	0	0.00%	0
8.35		3	24.13		24.71	24	24.4	0.07698	0.2309	0.96%	0
											0
16.7		3	24.17	23.45	24.88	24	24.5	0.09623	0.2887	1.19%	0

QA: Analyst:

 Report Date:
 21 Oct-20 15:33 (p 2 of 3)

 Test Code/ID:
 TRU0920.262afml / 19-6450-8286

Fathead Minnow 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		60					
8.35				108					
0	N	2		60	-				
8.35		_		108					
0	N	3		60				-	
8.35		Ŭ		108					
Conductivity-µr	nhos								
Conc-mg/L	Code	Read	Time	Measure	04	Diff-%	Inst ID	Analyst	Notos
0	N	1	Time	337		D111-70	matio	Analyst	Hotes
8.35				1103					
16.7				1102					
0	N	2	_	336					_
8.35		-		1109					
16.7				1103					
0	N	3		340					
8.35	IN	U		1110					
16.7				1100					
Dissolved Oxyg	aen-ma/L								
Conc-mg/L	Code	Read	Time	Measure	٥A	Diff-%	Inst ID	Analyst	Notes
0	N	1	THE	7.7	4.4	D-11-70	matio	Analyst	110163
8.35		,		7.9					
16.7				7.7					
0	N	2		7.4	-	_			
8.35		2		8					
16.7				7.7					
0	N	3		7.1			_		
8.35	IN	0		7.1					
16.7				7.1					
Hardness (CaC	O3)-ma/l								
Conc-mg/L	Code	Read	Time	Measure	04	Diff-%	Inst ID	Analyst	Notes
0	N	1	inne	85	Q/A	U111-70	matib	Analyst	NULUES
8.35		100		315					
0	N	2		85					
8.35	IN	2		85 315					
	N1	2	_						
0 8.35	Ν	3		85 315					
				312					
pH-Units									
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	Ν	1		8.2					
8.35				7.8					
16.7			_	7.8					_
0	Ν	2		7.9					
8.35				8					
16.7				7.9					
0	N	3		7.9					
8.35				7.9					
16.7				7.9					

Analyst:

àA:

U~

Fathead Minnow 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C								
Conc-mg/L	Code	Read	Time	Measure QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		24				
8.35				24				
16.7				24				
0	N	2		24				
8.35				24.4				
16.7				24.5				
0	N	3		24				
8.35				24				
16.7				24				

000-189-126-0



October 22, 2020

Mr. David Hokanson Trussell Technologies 232 N. Lake Avenue Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms EPA-821-R-02-012.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Trussell Technologies
SAMPLE ID.:	Lake Weymouth Raw with EarthTec
DATE RECEIVED:	17 Sept – 20
ABC LAB NO.:	TRU0920.262

ACUTE CERIODAPHNIA SURVIVAL BIOASSAY

% Survival

= 100 % Survival in 16.7mg/l Sample

EC50 = >16.7 mg/l

y truly, You Scott Johnson Laboratory Director

								leport Date: est Code/II		62acer / 16-	-0627-1890
Ceriodaphnia	96-h Acute Surv	vival Test						Aquat	ic Bioassay & C	Consulting	Labs, Inc.
Batch ID:	17-4635-5680			Survival (96h)				nalyst:			
Start Date:	22 Sep-20 13:22		tocol:	EPA/821/R-02-0			_		Laboratory Wate	er	
-	26 Sep-20 13:35	-	cies:	Ceriodaphnia du	ubia		E		Not Applicable		
Test Length:	4d 0h	Tax	on:	Branchiopoda			5	Source:	Aquatic Biosyste	ems, CO	Age:
Sample ID:	16-1980-9739	Cod	le:	TRU0920.262ad	cer		F	Project:			
Sample Date:	17 Sep-20 09:44	Mat	erial:	Sample Water			5	Source:	Bioassay Repor	t	
Receipt Date:	17 Sep-20 09:44	CAS	6 (PC):				5	Station:	Lake Weymouth	n Raw with E	Earth Tec
Sample Age:	5d 4h (20.8 °C)	Clie	nt:	Trussell Techno	ologies						
Multiple Com	parison Summa	ry									
Analysis ID	Endpoint		Comp	arison Method			/ NOEL	LOEL	TOEL	PMSD	
19-3074-8622	96h Survival Rat	te	Steel	Many-One Rank	Sum Test		16.7	>16.7			
Point Estimat	te Summary										
Analysis ID	Endpoint		Point	Estimate Metho	bd		/ Level	mg/L	95% LCL	95% UCL	
18-6039-6023	96h Survival Rat	te	Linea	r Interpolation (IC	CPIN)		EC10	>16.7	***	***	
							EC15	>16.7		***	
							EC20	>16.7			
							EC25	>16.7			
							EC40	>16.7			
							EC50	>16.7			
Test Accepta	bility					TAC	EC50	>16.7			
	bility Endpoint		Attrib	oute	Test Stat						
Analysis ID	-	te		oute	Test Stat		Limits				
Analysis ID 18-6039-6023	Endpoint		Contr			Lower	Limits Uppe	r Overl	ap Decision	riteria	
Analysis ID 18-6039-6023 19-3074-8622	Endpoint 96h Survival Rat		Contr	ol Resp	1	Lower	Limits Uppe >>	r Overl Yes	ap Decision Passes C	riteria	
Analysis ID 18-6039-6023 19-3074-8622 96h Survival	Endpoint 96h Survival Rat 96h Survival Rat		Contr	ol Resp ol Resp	1	Lower 0.9 0.9	Limits Uppe >>	r Overl Yes	ap Decision Passes C Passes C rr Std Dev	riteria	%Effect
Analysis ID 18-6039-6023 19-3074-8622 96h Survival Conc-mg/L	Endpoint 96h Survival Rai 96h Survival Rai Rate Summary	te	Contr Contr	ol Resp ol Resp 95% LCL	1 1	Lower 0.9 0.9	Limits Uppe >> >>	r Overl Yes Yes Std E	ap Decision Passes C Passes C Frr Std Dev	riteria riteria	0.00%
Analysis ID 18-6039-6023 19-3074-8622	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code	te Count	Contr Contr Mean	ol Resp ol Resp 95% LCL 0 1.0000	1 1 95% UCL	Lower 0.9 0.9 Min	Limits Uppe >> >>	r Over Yes Yes Std E	Passes C Passes C Passes C Passes C Passes C Std Dev 00 0.0000	riteria riteria CV%	%Effect 0.00% 0.00%
Analysis ID 18-6039-6023 19-3074-8622 96h Survival Conc-mg/L 0	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code	te Count 4	Contr Contr Mean 1.000	ol Resp ol Resp 95% LCL 0 1.0000 0 1.0000	1 1 95% UCL 1.0000	Lower 0.9 0.9 Min 1.0000	Limits Uppe >> >> Max 1.000	r Overl Yes Yes Std E 00 0.000	Decision Passes C Passes C Passes C Std Dev 00 0.0000 00 0.0000	riteria riteria CV%	0.00%
Analysis ID 18-6039-6023 19-3074-8622 96h Survival Conc-mg/L 0 8.35 16.7	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N	te Count 4 4	Contr Contr Mean 1.000 1.000	ol Resp ol Resp 95% LCL 0 1.0000 0 1.0000	1 1 95% UCL 1.0000 1.0000	Lower 0.9 0.9 Min 1.0000 1.0000	Limits Uppe >> >> Max 1.000 1.000	r Overl Yes Yes Std E 00 0.000 00 0.000	Decision Passes C Passes C Passes C Std Dev 00 0.0000 00 0.0000	riteria riteria CV%	0.00% 0.00% 0.00%
Analysis ID 18-6039-6023 19-3074-8622 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N	te Count 4 4	Contr Contr Mean 1.000 1.000	ol Resp ol Resp 95% LCL 0 1.0000 0 1.0000 0 1.0000	1 1 95% UCL 1.0000 1.0000	Lower 0.9 0.9 Min 1.0000 1.0000	Limits Uppe >> >> Max 1.000 1.000	r Overl Yes Yes Std E 00 0.000 00 0.000	Decision Passes C Passes C Passes C 00 00 00 00 00 00 00 00 00 00 00 00 00 00	riteria riteria CV%	0.00% 0.00% 0.00%
Analysis ID 18-6039-6023 19-3074-8622 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail	te Count 4 4 4	Contr Contr 1.000 1.000 Rep 2 1.000	ol Resp ol Resp 95% LCL 00 1.0000 00 1.0000 00 1.0000 2 Rep 3 00 1.0000	1 95% UCL 1.0000 1.0000 1.0000 Rep 4 1.0000	Lower 0.9 0.9 Min 1.0000 1.0000	Limits Uppe >> >> Max 1.000 1.000	r Overl Yes Yes Std E 00 0.000 00 0.000	Decision Passes C Passes C Passes C 00 00 00 00 00 00 00 00 00 00 00 00 00 00	riteria riteria CV%	0.00% 0.00% 0.00%
Analysis ID 18-6039-6023 19-3074-8622 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code	Count 4 4 4 Rep 1	Contr Contr Mean 1.000 1.000 Rep 2	ol Resp ol Resp 95% LCL 00 1.0000 00 1.0000 00 1.0000 2 Rep 3 00 1.0000	1 95% UCL 1.0000 1.0000 1.0000 Rep 4	Lower 0.9 0.9 Min 1.0000 1.0000	Limits Uppe >> >> Max 1.000 1.000	r Overl Yes Yes Std E 00 0.000 00 0.000	Decision Passes C Passes C Passes C 00 00 00 00 00 00 00 00 00 00 00 00 00 00	riteria riteria CV%	0.00% 0.00% 0.00%
Analysis ID 18-6039-6023 19-3074-8622 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0 8.35	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code	te Count 4 4 4 4 8 Rep 1 1.0000	Contr Contr 1.000 1.000 Rep 2 1.000	ol Resp ol Resp 0 1.0000 0 1.0000 0 1.0000 0 1.0000 2 Rep 3 0 1.0000 0 1.0000	1 95% UCL 1.0000 1.0000 1.0000 Rep 4 1.0000	Lower 0.9 0.9 Min 1.0000 1.0000	Limits Uppe >> >> Max 1.000 1.000	r Overl Yes Yes Std E 00 0.000 00 0.000	Decision Passes C Passes C Passes C 00 00 00 00 00 00 00 00 00 00 00 00 00 00	riteria riteria CV%	0.00% 0.00% 0.00%
Analysis ID 18-6039-6023 19-3074-8622 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0 8.35 16.7	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code	te <u>Count</u> 4 4 4 4 <u>Rep 1</u> 1.0000 1.0000	Contr Contr 1.000 1.000 1.000 Rep 2 1.000	ol Resp ol Resp 0 1.0000 0 1.0000 0 1.0000 0 1.0000 2 Rep 3 0 1.0000 0 1.0000	1 95% UCL 1.0000 1.0000 1.0000 Rep 4 1.0000 1.0000	Lower 0.9 0.9 Min 1.0000 1.0000	Limits Uppe >> >> Max 1.000 1.000	r Overl Yes Yes Std E 00 0.000 00 0.000	Decision Passes C Passes C Passes C 00 00 00 00 00 00 00 00 00 00 00 00 00 00	riteria riteria CV%	0.00% 0.00% 0.00%
Analysis ID 18-6039-6023 19-3074-8622 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code N	te <u>Count</u> 4 4 4 4 <u>Rep 1</u> 1.0000 1.0000	Contr Contr 1.000 1.000 1.000 Rep 2 1.000	ol Resp ol Resp 0 1.0000 0 1.0000 0 1.0000 0 1.0000 2 Rep 3 0 1.0000 0 1.0000 0 1.0000	1 95% UCL 1.0000 1.0000 1.0000 Rep 4 1.0000 1.0000	Lower 0.9 0.9 Min 1.0000 1.0000	Limits Uppe >> >> Max 1.000 1.000	r Overl Yes Yes Std E 00 0.000 00 0.000	Decision Passes C Passes C Passes C 00 00 00 00 00 00 00 00 00 00 00 00 00 00	riteria riteria CV%	0.00% 0.00% 0.00%
Analysis ID 18-6039-6023 19-3074-8622 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0 8.35 16.7	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code N Rate Binomials	te Count 4 4 4 4 Rep 1 1.0000 1.0000 1.0000	Contr Contr 1.000 1.000 1.000 1.000 1.000 1.000	ol Resp ol Resp 0 1.0000 0 1.0000 0 1.0000 0 1.0000 2 Rep 3 0 1.0000 0 1.0000 0 1.0000	1 95% UCL 1.0000 1.0000 1.0000 Rep 4 1.0000 1.0000 1.0000	Lower 0.9 0.9 Min 1.0000 1.0000	Limits Uppe >> >> Max 1.000 1.000	r Overl Yes Yes Std E 00 0.000 00 0.000	Decision Passes C Passes C Passes C 00 00 00 00 00 00 00 00 00 00 00 00 00 00	riteria riteria CV%	0.00% 0.00% 0.00%
Analysis ID 18-6039-6023 19-3074-8622 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L 0 8.35 16.7 96h Survival Conc-mg/L	Endpoint 96h Survival Rat 96h Survival Rat Rate Summary Code N Rate Detail Code N Rate Binomials Code	te Count 4 4 4 4 Rep 1 1.0000 1.0000 1.0000 Rep 1	Contr Contr 1.000 1.000 1.000 1.000 1.000 1.000 Rep 3	ol Resp ol Resp 0 1.0000 0 1.0000 0 1.0000 0 1.0000 2 Rep 3 0 1.0000 0 1.0000 2 Rep 3	1 1 95% UCL 1.0000 1.0000 Rep 4 1.0000 1.0000 1.0000 Rep 4	Lower 0.9 0.9 Min 1.0000 1.0000	Limits Uppe >> >> Max 1.000 1.000	r Overl Yes Yes Std E 00 0.000 00 0.000	Decision Passes C Passes C Passes C 00 00 00 00 00 00 00 00 00 00 00 00 00 00	riteria riteria CV%	0.00% 0.00% 0.00%

21 Oct-20 15:37 (p 1 of 2) Report Date: Test Code/ID: TRU0920.262acer / 16-0627-1890

									_	Test	code/iL	· · · ·	100020.20		5-0027-108
Ceriodaphnia	96-h Acute	Survival	Test								Aquati	ic Bioa	assay & C	onsulting	Labs, Inc
Analysis ID:	19-3074-862	22	Endpo	int: 96h	Survival Ra	te				CETI	S Versie	on:	CETISv1.	9.7	
Analyzed:	21 Oct-20 1	5:36	Analys	is: Nor	parametric-	Control	vs T	reatments		Statu	s Level	:	1		
Edit Date:	21 Oct-20 1	5:36			E5D7DCCA	34813	-07FI	FE0218C5	D2D0	Edito	r ID:		000-189-1	26-0	
Batch ID:	17-4635-568	30	Test T	ype: Sur	vival (96h)					Analy	/st:				
Start Date:	22 Sep-20 1	3:22	Protoc	ol: EP/	4/821/R-02-0	012 (20	02)			Dilue	nt: l	Labora	atory Wate	r	
Ending Date:	26 Sep-20 1	3:35	Specie	es: Cer	iodaphnia d	ubia				Brine	e: 1	Not Ap	plicable		
Test Length:	4d Oh		Taxon	: Bra	nchiopoda					Sour	ce: /	Aquati	c Biosyste	ms, CO	Age:
Sample ID:	16-1980-973	39	Code:	TR	U0920.262a	cer				Proje	ect:				
Sample Date:	17 Sep-20 0	9:44	Materi	al: Sar	nple Water					Sour	ce:	Bioass	say Report		
Receipt Date:	17 Sep-20 0	9:44	CAS (F	PC):						Stati	on: I	Lake V	Neymouth	Raw with	Earth Tec
Sample Age:	-		Client	-	ssell Techno	ologies									
Data Transfor	m	Alt	Нур			_		NOEL	LOE	L	TOEL	-	τυ		
Angular (Corre		C >						16.7	>16.						
Steel Many-O	ne Rank Su	n Test													
Control		-mg/L	-	Fest Stat	Critical	Ties	DF	P-Type	P-Va	lue	Decis	ion(a:	5%)		
Negative Cont				18	11	1	6	CDF	0.66				ant Effect		
. loguaro com	16.7			18	11	1	6	CDF	0.66			-	ant Effect		
Test Acceptal	nility Criteria					1942	-		-	-					
			TAC Lim		Overlan	Deal									
Attribute Control Resp	Test 5	0.9		Upper >>	Overlap Yes	Decis Pass		iteria			_			_	
							55 01		_						_
ANOVA Table															
Source		Squares		Mean Sq	uare	DF		F Stat	P-Va	alue	Decis				
Between	0			0		2					Indete	ermina	te		
Error Total	0			0	_	9 11		-							
ANOVA Assu	motions Tor	te					-								
		1.5				Test	Stat	Critical	P-Va	alua	Decio	lon/a	. 4 0/)		
Attribute Variance	Test	tt Equalit	ty of Varia	neo Tost		Test	Stat	Gritical	P-V.	aiue		sion(α: ermina			
Distribution			V Normali									ermina			
96h Survival										-					
			unt	Moon	05% 1.01	0.5%		Modian	Min		Mox		Std Err	CV%	% Effoc
Conc-mg/L	Code			Mean	95% LCL	95%	_	Median	Min 1.00		1 000		Std Err		%Effec 0.00%
8.35	Ν	4 4		1.0000 1.0000	1.0000 1.0000	1.000		1.0000 1.0000	1.00 1.00		1.000		0.0000	0.00% 0.00%	0.00%
8.35 16.7		4		1.0000	1.0000	1.000		1.0000	1.00		1.000		0.0000	0.00%	0.00%
				_	1.0000	1.000		1.0000	1.00		1.000		0.0000	0.0070	0.0070
Angular (Cor															
Conc-mg/L	Code			Mean	95% LCL				Min	_	Max		Std Err	CV%	%Effec
0	Ν	4		1.3450	1.3450	1.346		1.3450	1.34		1.345		0.0000	0.00%	0.00%
8.35		4		1.3450	1.3450	1.346		1.3450	1.34		1.345		0.0000	0.00%	0.00%
16.7		4	_	1.3450	1.3450	1.346	50	1.3450	1.34	150	1.345	0	0.0000	0.00%	0.00%
96h Survival	Rate Detail														
Conc-mg/L	Code			Rep 2	Rep 3	Rep						_	_		
0	Ν			1.0000	1.0000	1.000									
8.35				1.0000	1.0000	1.000									
16.7		1.0	0000	1.0000	1.0000	1.000	00			_	_				
Angular (Cor	rected) Tran	sformed	Detail												
Conc-mg/L	Code	Re	ep 1	Rep 2	Rep 3	Rep	4				_			_	
0	N	1.3	3450	1.3450	1.3450	1.34	50								
8.35		1.3	3450	1.3450	1.3450	1.34	50								
16.7		1.:	3450	1.3450	1.3450	1.34	50								
														i je di s	D
000-189-126-0	I					CETIS	S™ v′	1.9.7.7				A	Analyst:	\sim	QA:

CETIS Ana	alytical Repo	ort					Report Date: Test Code/ID:	21 Oct-20 TRU0920.262acer	15:37 (p 2 of 2) / 16-0627-1890
Ceriodaphnia	a 96-h Acute Surv	vival Te	est				Aquatic B	ioassay & Consul	ting Labs, Inc.
Analysis ID: Analyzed: Edit Date:	19-3074-8622 21 Oct-20 15:36 21 Oct-20 15:36		Analysis:	96h Survival F Nonparametrio 9E2E5D7DCC	c-Control vs	Freatments FE0218C5D2D0	CETIS Version: Status Level: Editor ID:	CETISv1.9.7 1 000-189-126-0	
96h Survival	Rate Binomials								
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4				
0	N	5/5	5/5	5/5	5/5				
8.35		5/5	5/5	5/5	5/5				
16.7		5/5	5/5	5/5	5/5				
Graphics									
1.0 9.9 8.0 6.0 0.5 0.4 0.4 0.4 0.3 0.2 0.1	•		•	0	Į	10 08 08 05 03			a 1
0.0 🗠	0 N		8 35	16.7		-20 -15	-10 -05 00	0.5 1.0 1.	5 2.0
		Conc-	mg/L				Rankit	8	

P Analyst: QA:_

21 Oct-20 15:37 (p 1 of 2) Report Date: Test Code/ID: TRU0920.262acer / 16-0627-1890

Ceriodaphnia 96-h Acute Survival Test

Ceriodaphnia	96-h Acute Survival	Test		Aqua	tic Bi	oassay & Consulting	Labs, Inc
Analysis ID: Analyzed: Edit Date:	18-6039-6023 21 Oct-20 15:36 21 Oct-20 15:36	Analysis:	96h Survival Rate Linear Interpolation (ICPIN) 9E2E5D7DCCA34813F07FFE0218C5D2D0	CETIS Vers Status Leve Editor ID:		CETISv1.9.7 1 000-189-126-0	
	17-4635-5680 22 Sep-20 13:22 26 Sep-20 13:35 4d 0h	Test Type: Protocol: Species: Taxon:	Survival (96h) EPA/821/R-02-012 (2002) Ceriodaphnia dubia Branchiopoda	Analyst: Diluent: Brine: Source:	Not A	ratory Water \pplicable tic Biosystems, CO	Age:
Receipt Date:	16-1980-9739 17 Sep-20 09:44 17 Sep-20 09:44 5d 4h (20.8 °C)	Code: Material: CAS (PC): Client:	TRU0920.262acer Sample Water Trussell Technologies	Project: Source: Station:		ssay Report Weymouth Raw with E	Earth Tec

X Transform	Y Transform	See	ed Re	esamples	Exp 95% CL	Method
Linear	Linear	0	28	0	Yes	Two-Point Interpolation
Test Acceptabil	lity Criteria	TAC I	_imits			
Attribute	Test Stat	Lower	Upper	Overlap	Decision	
Control Resp	1	0.9	>>	Yes	Passes Criteria	

Point Estimates

Level	mg/L	95% LCL	95% UCL	
EC10	>16.7			
EC15	>16.7		577	
EC20	>16.7		27.7	
EC25	>16.7			
EC40	>16.7			
EC50	>16.7			

96h Survival Rate Summary

96h Survival Ra	ate Summary			Isotonic Variate							
Conc-mg/L	Code	Count	Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	20/20	1.0000	0.00%
8.35		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	20/20	1.0000	0.00%
16.7		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	20/20	1.0000	0.00%

96h Survival Rate Detail

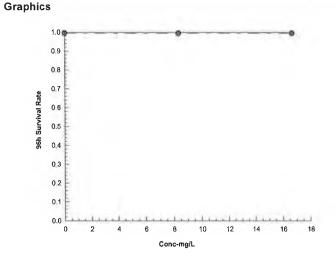
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
8.35		1.0000	1.0000	1.0000	1.0000
16.7		1.0000	1.0000	1.0000	1.0000

96h Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	5/5	5/5	5/5	5/5
8.35		5/5	5/5	5/5	5/5
16.7		5/5	5/5	5/5	5/5

Analyst:____ QA:

CETIS Ana	alytical Report			Report Date: Test Code/ID:	21 Oct-20 15:37 (p 2 of 2) TRU0920.262acer / 16-0627-1890			
Ceriodaphnia	a 96-h Acute Surviva	nl Test		Aquatic Bioassay & Consulting Labs, Inc				
Analysis ID:	18-6039-6023	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.9.7			
Analyzed:	21 Oct-20 15:36	Analysis:	Linear Interpolation (ICPIN)	Status Level:	1			
Edit Date:	21 Oct-20 15:36	MD5 Hash:	9E2E5D7DCCA34813F07FFE0218C5D2D0	Editor ID:	000-189-126-0			
Cranhias								



Analyst:_____QA:____

CETIS Measurement Report

Report Date: 21 Oct-20 15:37 (p 1 of 3)

Ceriodaphnia 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

		_			_						
Batch ID:	17-4635-5680			Survival (96h)				nalyst:			
Start Date:	22 Sep-20 13:2		Protocol:	EPA/821/R-02-	. ,				aboratory Wat	ter	
-	26 Sep-20 13:3		Species:	Ceriodaphnia d	lubia				ot Applicable		
Test Length:	4d 0h		Taxon:	Branchiopoda			S	ource: A	quatic Biosyst	tems, CO	Age:
Sample ID:	16-1980-9739		Code:	TRU0920.262a	acer		roject:				
Sample Date:	17 Sep-20 09:4	14	Material:	Sample Water			S	ource: B	ioassay Repo	rt	
Receipt Date:	17 Sep-20 09:4	\$4	CAS (PC):				St	tation: L	ake Weymout	h Raw with	Earth Tec
Sample Age:	5d 4h (20.8 °C	;)	Client:	Trussell Techn	ologies						
Alkalinity (Ca	CO3)-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	3	60	60	60	60	60	0	0	0.00%	0
8.35		3	108	108	108	108	108	0	0	0.00%	0
Overall		6	84	56.41	111.6	60	108	10.73	26.29	31.30%	0 (0%)
Conductivity	-µmhos										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	3	337.7	332.5	342.8	336	340	0.6939	2.082	0.62%	0
8.35		3	1107	1098	1117	1103	1110	1.262	3.786	0.34%	0
16.7		3	1101	1099	1103	1100	1102	0.3333	1	0.09%	0
Overall		9	848.7	554.1	1143	336	1110	127.8	383.3	45.16%	0 (0%)
Dissolved Ox	kygen-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
0	N	3	7.4	6.655	8.145	7.1	7.7	0.1	0.3	4.05%	0
8.35		3	7.667	6.441	8.892	7.1	8	0.1644	0.4933	6.43%	0
16.7		3	7.5	6.639	8.361	7.1	7.7	0.1155	0.3464	4.62%	0
Overall		9	7.522	7.248	7.796	7.1	8	0.1188	0.3563	4.74%	0 (0%)
Hardness (Ca	aCO3)-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
0	N	3	85	85	85	85	85	0	0	0.00%	0
8.35		3	315	315	315	315	315	0	0	0.00%	0
Overall		6	200	67.8	332.2	85	315	51.43	126	62.99%	0 (0%)
pH-Units											
Conc-mg/L	Code	Count	t Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
0	Ν	3	8	7.57	8.43	7.9	8.2	0.05773	3 0.1732	2.17%	0
8.35		3	7.9	7.652	8.148	7.8	8	0.03333		1.27%	0
16.7		3	7.867	7.723	8.01	7.8	7.9	0.01924		0.73%	0
Overall		9	7.922	7.83	8.015	7.8	8.2	0.0400	6 0.1202	1.52%	0 (0%)
Temperature	-°C										
Conc-mg/L	Code	Count	t Mean	95% LCL	95% UCL	Min	Max	Std Er	Std Dev	CV%	QA Cour
0	N	3	24	24	24	24	24	0	0	0.00%	0
8.35		3	24.13	23.56	24.71	24	24.4	0.0769	8 0.2309	0.96%	0
16.7		3	24.17	23.45	24.88	24	24.5	0.0962	3 0.2887	1.19%	0
Overall		9	24.1	23.95	24.25	24	24.5	0.0666	7 0.2	0.83%	0 (0%)

Analyst:__ QA:

21 Oct-20 15:37 (p 2 of 3) Report Date: TRU0920.262acer / 16-0627-1890 Test Code/ID:

Ceriodaphnia 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
N	2	-			_	_		
	2							
N	2			-				
IN	3							
			108				-	
ihos								
Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
							,	
NI	2			_			_	
N	2							
N	3							
			1110					
			1100					
en-ma/l								
	Dee -	Time c	M	~		Inct ID	Amalicat	Notos
		iime		QA	υπ-%	inst ID	Analyst	NOLES
IN	1							
N	2							
			7.7					
N	3		7.1					
			7.1					
			7.1					
()2) ma/l								
		Time		QA	Diff-%	Inst ID	Analyst	Notes
N	7							
	_							
N	2							
			315					
N	3		85					
			315					
	_							
		Time		QA	Diff-%	Inst ID	Analyst	Notes
N	1							
N	2		7.9					
			8					
			7.9					
N	3		7.9					
1.1								
			7.9					
	N N N N N N N N en-mg/L Code N N N O3)-mg/L Code N N N N N N N N N N N N N N N N N N N	N 1 N 2 N 3 ihos Read N 1 N 2 N 3 en-mg/L Read N 1 N 2 N 3 en-mg/L Read N 1 N 2 N 3 O3)-mg/L Read N 1 N 2 N 3 O3)-mg/L Read N 1 N 2 N 3 O3 N N 1 N 2 N 3 Code Read N 1 N 3 Code Read N 1 N 2 N 1 N 2 N 1	N 1 N 2 N 3 inhos Time Code Read Time N 1 N 2 N 3 en-mg/L Code Read Time N 3 en-mg/L Code Read Time N 1 N 1 N 2 N 3 O3)-mg/L Code Read Time N 1 N 2 N 3 Time N N 2 N 3 O3)-mg/L Code Read Time N 1 N 2 N 3 Time N N 1 N 1 N 1 N 1 N 1 N 1 N 1 N 1 N 1 N 1 N 2 N	N 1 60 N 2 60 N 3 60 N 3 60 N 3 60 nos 108 108 Code Read Time Measure N 1 337 1103 1102 N 2 336 1102 N 2 336 1109 1101 1102 N 2 336 1109 1101 N 3 340 1101 1 100 1101 N 3 340 1110 N 3 340 1110 N 1 7.7 7.7 N 2 7.4 8 7.7 N 2 7.4 S 315 315 N 1 85 315 315 315 N 2 <td>N 1 60 108 N 2 60 108 N 3 60 108 N 3 60 108 N 3 60 108 N 3 60 108 State Filter Measure QA N 1 337 1103 102 N 2 336 1109 100 N 2 336 1109 100 N 3 340 1110 100 en-mg/L Measure QA N 1 7.7 7.9 7.7 N 2 7.4 8 7.7 8 7.1 N 2 7.4 8 8 7.7 N 3 7.1 7.1 7.1 O3)-mg/L Measure QA N 1 85 315 315 N 2 315 7.8 315 N 3 85 315 315 N 1 8.2 7.8 7.8 7.9 N <t< td=""><td>N 1 60 108 N 2 60 108 N 3 60 108 Image: Noise of the second state of the</td><td>N 1 60 108 1 60 108 N 2 60 108 1 <th1< th=""> <th1< th=""> <th1< th=""></th1<></th1<></th1<></td><td>N 1 60 108 N 2 60 108 N 3 60 108 N 3 60 108 Inos Code Read Time Measure QA Diff-% Inst ID Analyst N 1 337 1103 1102 1 337 1103 1102 Inst ID Analyst N 2 336 1109 1101 1 3 Analyst N 3 340 1110 1 Analyst N 3 340 1110 Analyst N 3 7.7 Inst ID Analyst N 3 7.7 Inst ID Analyst N 1 7.7 N 2 7.4 8 7.7 N 3 7.1 7.1 O3)-mg/L 2 85 315 1 Analyst N 1 85 315 1 Analyst N 2 85 315 <</td></t<></td>	N 1 60 108 N 2 60 108 N 3 60 108 N 3 60 108 N 3 60 108 N 3 60 108 State Filter Measure QA N 1 337 1103 102 N 2 336 1109 100 N 2 336 1109 100 N 3 340 1110 100 en-mg/L Measure QA N 1 7.7 7.9 7.7 N 2 7.4 8 7.7 8 7.1 N 2 7.4 8 8 7.7 N 3 7.1 7.1 7.1 O3)-mg/L Measure QA N 1 85 315 315 N 2 315 7.8 315 N 3 85 315 315 N 1 8.2 7.8 7.8 7.9 N <t< td=""><td>N 1 60 108 N 2 60 108 N 3 60 108 Image: Noise of the second state of the</td><td>N 1 60 108 1 60 108 N 2 60 108 1 <th1< th=""> <th1< th=""> <th1< th=""></th1<></th1<></th1<></td><td>N 1 60 108 N 2 60 108 N 3 60 108 N 3 60 108 Inos Code Read Time Measure QA Diff-% Inst ID Analyst N 1 337 1103 1102 1 337 1103 1102 Inst ID Analyst N 2 336 1109 1101 1 3 Analyst N 3 340 1110 1 Analyst N 3 340 1110 Analyst N 3 7.7 Inst ID Analyst N 3 7.7 Inst ID Analyst N 1 7.7 N 2 7.4 8 7.7 N 3 7.1 7.1 O3)-mg/L 2 85 315 1 Analyst N 1 85 315 1 Analyst N 2 85 315 <</td></t<>	N 1 60 108 N 2 60 108 N 3 60 108 Image: Noise of the second state of the	N 1 60 108 1 60 108 N 2 60 108 1 <th1< th=""> <th1< th=""> <th1< th=""></th1<></th1<></th1<>	N 1 60 108 N 2 60 108 N 3 60 108 N 3 60 108 Inos Code Read Time Measure QA Diff-% Inst ID Analyst N 1 337 1103 1102 1 337 1103 1102 Inst ID Analyst N 2 336 1109 1101 1 3 Analyst N 3 340 1110 1 Analyst N 3 340 1110 Analyst N 3 7.7 Inst ID Analyst N 3 7.7 Inst ID Analyst N 1 7.7 N 2 7.4 8 7.7 N 3 7.1 7.1 O3)-mg/L 2 85 315 1 Analyst N 1 85 315 1 Analyst N 2 85 315 <

 Report Date:
 21 Oct-20 15:37 (p 3 of 3)

 Test Code/ID:
 TRU0920.262acer / 16-0627-1890

Ceriodaphnia 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C				
Conc-mg/L	Code	Read	Time	Measure QA Diff-% Inst ID Analyst Notes
0	N	1		24
8.35				24
16.7				24
0	N	2		24
8.35				24.4
16.7				24.5
0	N	3		24
8.35				24
16.7				24

000-189-126-0

QA:



October 21, 2020

Mr. David Hokanson Trussell Technologies 232 N. Lake Ave Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed acute bioassay report. The test was conducted under the guidelines prescribed in "Methods for Measuring the Acute Toxicity of Effluents and Receiving water to Freshwater and Marine Organisms" (Fourth Edition) EPA/600/ 4-90/027F, August 1993. The results were as follows:

CLIENT:Trussell TechnologiesSAMPLE I.D.:Lake Weymouth Raw Earthtec 8.35mg/lDATE RECEIVED:09/10/20ABC LAB. NO.:TRU0920.262

NPDES PERCENT SURVIVAL BIOASSAY RAINBOW TROUT

PERCENT SURVIVAL = 0% Survival in 8.35/mg/l Sample

TUa = >1.00 @ 8.35mg/l

Johnson ott boratory Director

AQUATIC BIOASSAY AND CONSULTING LABORATORIES, INC. 29 North Olive Street Ventura, CA 93001 (805) 643-5621

NPDES Percent Survival Bioassay for Effluents and Stormwater

SAMPLE INFORMATION

and the second sec			
CLIENT:	Trussell Technologies	Date: 09/10/20	
SAMPLE I.D.:	Lake Weymouth Raw Ea	rt LAB # TRU0920.262	

WATER QUALITY

DILUTION WAT Reconst. Fresh	AERATION Single Bubble Air						
CONTROL HARDNESS	CONTROL ALKALINITY						
Beg: 94 mg/l End: 101 mg/l	Beg: 63 mg/l End: 68 mg/l						
SAMPLE HARDNESS	SAMPLE ALKALINITY						
Beg: 370 mg/l End: 380 mg/l	Beg: 116 mg/l End: 126 mg/l						

ORGANISM INFORMATION

SPECIES:	Oncorhynchus mykiss	DATE REC'D:	09/15/20
COMMON NAME:	Rainbow Trout		
SOURCE:	Thomas Fish Co.		
CARRIER:	California Overnight	NO. FISH / TANK	10

										TES	ST DA	ATA								
	I	NITIAL		24	HOU	RS		48	HOU	RS		72	HOU	RS		- 96	HOU	RS		
DATE: TIME:		09/22/20 1500)			09/23/20 1450)			09/24/20 1550	0		()9/25/20 1500	0		()9/26/20 1550	3	
CONC.	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy.	Temp. dg.C	pН	#Fish
0 (Con.)	10.0	13.3	7.4	10	10.6	13.8	6.9	10	10.5	13.8	6.9	10	10.5	13.8	6.8	10	10.3	13.8	6.9	10
0 (Con.)	10.1	13.3	7.4	10	10.9	13.8	6.9	10	10.4	13.8	6.9	10	10.6	13.8	6.9	10	10.4	13.8	6.9	10
50.1mg/1	10.2	13.5	7.4	10	10.6	13.8	7.4	0				0				0				0
50.1mg/1	10.1	13.5	7.4	10	10.5	13.9	7.5	0				0				0				0

FINAL DATA					
TOTAL	FISH SURVIVAL				
0 (Con.)	10				
0 (Con.)	10				
50.1mg/l	0				
50.1mg/l	0				

FINAL	RESULTS
PERCENT SURVIVAL = TUa =	0% Survival in 8.35/mg/l Sample >1.00 (a) 8.35mg/l

Date 10/22/14

Joe Freas Senior Toxicologist

n



October 21, 2020

Mr. David Hokanson Trussell Technologies 232 N. Lake Ave Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed acute bioassay report. The test was conducted under the guidelines prescribed in "Methods for Measuring the Acute Toxicity of Effluents and Receiving water to Freshwater and Marine Organisms" (Fourth Edition) EPA/600/ 4-90/027F, August 1993. The results were as follows:

CLIENT:Trussell TechnologiesSAMPLE I.D.:Lake Weymouth Raw Earthtec 16.7mg/lDATE RECEIVED:09/10/20ABC LAB. NO.:TRU0920.262

NPDES PERCENT SURVIVAL BIOASSAY RAINBOW TROUT

PERCENT SURVIVAL = 0% Survival in 16.7/mg/l Sample

TUa = >1.00 @ 16.7mg/l

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AQUATIC BIOASSAY AND CONSULTING LABORATORIES, INC. 29 North Olive Street Ventura, CA 93001 (805) 643-5621

NPDES Percent Survival Bioassay for Effluents and Stormwater

 SAMPLE INFORMATION

 CLIENT:
 Trussell Technologies
 Date: 09/10/20

 SAMPLE I.D.:
 Lake Weymouth Raw Eart LAB # TRU0920.262

WATER OUALI'I	ĽY
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HILL DIE YE	
DILUTION WAT Reconst. Fresh	AERATION Single Bubble Air
CONTROL HARDNESS	CONTROL ALKALINITY
Beg: 94 mg/l End: 101 mg/l	Beg: 63 mg/l End: 68 mg/l
SAMPLE HARDNESS	SAMPLE ALKALINITY
Beg: 315 mg/l End: 300 mg/l	Beg: 108 mg/l End: 115 mg/l

ORGANISM INFORMATION

SPECIES:	Oncorhynchus mykiss	DATE REC'D:	09/15/20
COMMON NAME:	Rainbow Trout		
SOURCE:	Thomas Fish Co.		
CARRIER:	California Overnight	NO. FISH / TANK	10

	TEST	DATA		
IDC			70	110

	I	NITIAL	,	24	HOUI	RS		48	HOUI	RS		72	HOU	RS		96	HOU	RS	_	
DATE: TIME:	()9/22/2(1500)		(09/23/20 1450)			09/24/20 1550)		()9/25/20 1500)		1)9/26/20 1550	-	
	Dis.	Temp.	pН	#Fish	Dis.	Temp.	pН	#Fish	Dis.	Temp.	pН	#Fish	Dis.	Temp.	pH	#Fish	Dis.	Temp.	pH	#Fish
CONC.	Oxy.	dg.Č			Oxy.	dg.Č			Oxy.	dg.Č			Oxy.	dg.C			Oxy.	dg.C		1.1
0 (Con.)	10.0	13.3	7.4	10	10.6	13.8	6.9	10	10.5	13.8	6.9	10	10.5	13.8	6.8	10	10.3	13.8	6.9	10
0 (Con.)	10.1	13.3	7.4	10	10.9	13.8	6.9	10	10.4	13.8	6.9	10	10.6	13.8	6.9	10	10.4	13.8	6.9	10
50.1mg/1	8.9	13.4	7.4	10	10.6	13.7	7.5	0				0				0				0
50.1mg/1	9.8	13.4	7.4	10	10.5	13.8	7.5	0				0				0				0

	FINAL I	DATA	
1	TOTAL	FISH SURVIVAL	
	0 (Con.)	10	
	0 (Con.)	10	
1	50.1mg/l	0	
ļ	50.1mg/l	0	

 FINAL RESULTS

 PERCENT SURVIVAL =
 0% Survival in 16.7/mg/l Sample

 TUa =
 >1.00 (@) 16.7mg/l

Senior Toxicologist Joe Freas,

Date 10/12

			-	-				
Liana Olivas						-		
Project Mgr. David Hokanson		Y	_					
P.O. #		ki cit	City	a				
		To: Y	ist Toxi	<u>a phi</u>				
		e. ad	yk	000	_			
Sample ID	Volume/ Number	Acute	0 N Acute	Ceri				Comments
Lake Neynauth Raw	28 4	2	2				2	EarthTec doses each
			-					
			-	1				
							-	
			_					
			-					
		Relinqu	Jised B	Y:(signature)				Date: Time:
07 / 11 / V	-		;					, !
Date:	Time: 9:44	Receiv	ed By: ₍	'signature)				Date: Time:
Upon sample reciept record the following results: Temp (°C) $\frac{1}{100}$ $\frac{3}{2}$ NH ₃ (mg/L) $\frac{1}{100}$ Cl (mg/L):								
Actuation Biogenesis and Conscultion Laboratorion								
	d By (signature) d By (signature) de Prauve Sample ID Ney routh Ney routh	d By (signature) d By (signature) Sample ID Neyrouth, Row Date: Time: q/17/20 Pate: Time: Pr (P-N) _ CO _) Cl (mg/L): _ CO _)	Mgr. d By (signature) Sample ID Ney Molume/ Ney Molume/ Number N	Mgr. d By (signature) Sample ID Volume/ Sample ID Number Number Number Number I Cl (mg/L): CO	Mgr. d By (signature) Sample ID Neyrouth, Row Date: Time: q/17/20 q:14 Date: Time: q/17/20 q:14 Received Cl (mg/L): LOJ	Mgr. d By (signature) Sample ID Neyrouthy Row Date: Time: 9/17/20 9:44 Date: Time: 9/17/20 9:44 Date: Time: 9/17/20 9:44 Date: Time: 9/17/20 9:44	Mgr. d By (signature) Sample ID Volume/ Sample ID Number Number Number Number I Cl (mg/L): CO	Migr. d By (signature) d By (signature) d Py

Aquatic Bioassay and Consulting Laboratories 29 N. Olive Street Ventura, CA 93001 Phone: (805) 643-5621 Fax: (805) 643-2930

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Appendix E – Weymouth WTP Influent 2020 (Re-sample) Toxicity Test Report



October 28, 2020

Mr. David Hokanson Trussell Technologies 232 N. Lake Avenue Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms EPA-821-R-02-012.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Trussell Technologies
SAMPLE ID.:	Weymouth Resample with EarthTec
DATE RECEIVED:	1 Oct - 20
ABC LAB NO.:	TRU1020.001

ACUTE FATHEAD MINNOW SURVIVAL BIOASSAY

% Survival

1 = 100 % Survival in 3.0 mg/l Sample

EC50 = >3.0 mg/l

Yours very truly, oott Johnson

CETIS Summary Report

 Report Date:
 27 Oct-20 15:42 (p 1 of 1)

 Test Code/ID:
 TRU1020.001afml / 09-5343-0416

Aquatic Bioassay & Consulting Labs, Inc.

Fathead Minnow 96-h Acute Survival Test

Batch ID:	03-5918-3368	Test Type:	Survival (96h)	Analyst:		
Start Date:	13 Oct-20 14:10	Protocol:	EPA/821/R-02-012 (2002)	Diluent:	Laboratory Water	
Ending Date:	17 Oct-20 12:55	Species:	Pimephales promelas	Brine:	Not Applicable	
Test Length:	95h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CO	Age:
Sample ID:	18-2122-7453	Code:	TRU1020.001afml	Project:		
Sample Date:	30 Sep-20 15:00	Material:	Sample Water	Source:	Bioassay Report	
Receipt Date:	01 Oct-20 10:28	CAS (PC):		Station:	Weymouth Resample with	Earth Tec
Sample Age:	12d 23h (7.3 °C)	Client:	Trussell Technologies			

Single Comparison Summary

Analysis ID	Endpoint		Compari	son Method			P-Value	Comparis	son Result		5
12-8029-7781	96h Survival R	ate	Wilcoxon	Rank Sum T	wo-Sample	Test	1.0000	3mg/L pas	ssed 96h su	rvival rate	_
Test Accepta	bility					ТАС	Limits				
Analysis ID	Endpoint		Attribute		Test Stat	Lower	Upper	Overlap	Decision		
12-8029-7781	31 96h Survival Rate		Control Resp		1	0.9	>>	Yes	Passes C	riteria	
96h Survival	Rate Summary										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	inen)	0.00%
3		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000		0.00%
96h Survival	Rate Detail						MD	5: 7FE7613	65B732DC	2AD0B61FE	AB25F3F5
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4						
0	N	1.0000	1.0000	1.0000	1.0000						
3		1.0000	1.0000	1.0000	1.0000						
96h Survival	Rate Binomial	5									
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4						
0	N	10/10	10/10	10/10	10/10						
3		10/10	10/10	10/10	10/10						

Analyst: ______QA:____A

 Report Date:
 27 Oct-20 15:41 (p 1 of 2)

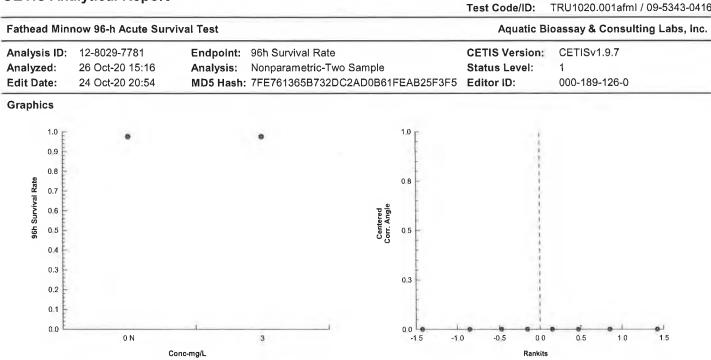
 Test Code/ID:
 TRU1020.001afml / 09-5343-0416

Fathead Minn	ow 96-h Acute S	urvival Te	st							Aquatio	Bio	assay & C	Consulting	Labs, Inc
Analysis ID:	12-8029-7781	End	point:	96h Surviva	al Ra	te			CETI	S Versio	n:	CETISv1.	.9.7	
Analyzed:	26 Oct-20 15:16	Ana	alysis:	Nonparame	etric-	Two Sample	•		Statu	s Level:		1		
Edit Date:	24 Oct-20 20:54	MD	5 Hash:	7FE761365	B73	2DC2AD0B	51FEAB25F	-3F5	Edito	r ID:		000-189-	126-0	
Batch ID:	03-5918-3368	Tes	t Type:	Survival (9	Sh)				Analy	/st:				
Start Date:	13 Oct-20 14:10	Pro	tocol:	EPA/821/R	-02-0)12 (2002)			Dilue	nt: L	abor	atory Wate	er	
Ending Date:	17 Oct-20 12:55	Spe	ecies:	Pimephale	s pro	melas			Brine	a: N	lot A	pplicable		
Fest Length:	95h	Тах	ion:	Actinoptery	gii				Sour	ce: A	quat	tic Biosyste	ems, CO	Age:
Sample 1D:	18-2122-7453	Co	de:	TRU1020.0)01af	ml			Proje	ect:				
Sample Date:	30 Sep-20 15:00) Ma	terial:	Sample Wa	ater				Sour	ce: B	lioas	say Repor	t	
Receipt Date:	01 Oct-20 10:28	CA	S (PC):						Stati	on: V	Veyn	nouth Res	ample with	Earth Tec
Sample Age:	12d 23h (7.3 °C	clie	ent:	Trussell Te	chno	logies								
Data Transfor	m	Alt Hyp					Comparis	on R	esult					
Angular (Corre	cted)	C > T					3mg/L pas	ssed 9	6h su	rvival rate	e en	dpoint		
Wilcoxon Rar	ik Sum Two-Sar	nple Test												
Control	vs Conc-mg	J/L	Test S	Stat Critic	al	Ties DF	P-Type	P-V	alue	Decisio	on(a	::5%)		
Negative Cont			18			1 6	Exact	1.00	_			cant Effect		
Test Acceptal	oility Criteria	TAC	_imits											
Attribute	Test Stat		Upper	r Overl	ap	Decision								
Control Resp	1	0.9	>>	Yes		Passes Cr	iteria							
ANOVA Table														
Source	Sum Squ	ares	Mean	Square		DF	F Stat	P-V	alue	Decisi	onic	r.5%)		
oouroc	oun oqu	uico		oquale	_	1	1 Otat	1 - 4	alue	Indeter				
Between	0		0											
	0 0		0 0			6				maoroi				
Error				_	_		+			indeter				
Error Total	0					6	+							
Error Total ANOVA Assur	0 0 mptions Tests					6 7	Critical	P-V	alue					
Error Total ANOVA Assur Attribute	0 0 mptions Tests Test	Ratio F Tes	0			6	Critical	P-V	alue	Decisi	on(c	a:1%)		
Error Total ANOVA Assur Attribute Variance	0 0 mptions Tests Test Variance F	Ratio F Tes	0 st	st		6 7	- Critical	P-V	alue		on(c	n:1%) ate		
Error Total ANOVA Assur Attribute Variance Distribution	0 0 mptions Tests Test Variance F Shapiro-W		0 st	st		6 7	Critical	P-V	alue	Decisi Indeter	on(c	n:1%) ate		
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary	Vilk W Norr	0 st nality Te			6 7 Test Stat		_		Decisi Indeter Indeter	on(c	a:1%) ate ate	CV%	%Effect
Attribute Variance Distribution 96h Survival Conc-mg/L	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary Code	Vilk W Norr Count	0 st nality Te: Mean	95%		6 7 Test Stat 95% UCL	Median	Min		Decisi Indeter Indeter Max	on(c rmin rmin	ate ate Std Err	CV%	%Effect
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary	Vilk W Norr	0 st nality Te	95% 0 1.000	0	6 7 Test Stat		_	000	Decisi Indeter Indeter	on(c rmina rmina	a:1%) ate ate	CV% 0.00% 0.00%	%Effect 0.00% 0.00%
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary Code N	Vilk W Norr Count 4 4	0 st nality Te: <u>Mean</u> 1.000 1.000	95% 0 1.000	0	6 7 Test Stat 95% UCL 1.0000	Median 1.0000	Min 1.00	000	Decisi Indeter Indeter Max 1.0000	on(c rmina rmina	a:1%) ate ate Std Err 0.0000	0.00%	0.00%
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary Code N	Vilk W Norr Count 4 4 med Sum	0 st nality Te 1.000 1.000 nary	95% 0 1.000 0 1.000	0	6 7 Test Stat 95% UCL 1.0000 1.0000	Median 1.0000 1.0000	Min 1.00 1.00) 200 200	Decisi Indeter Indeter Max 1.0000 1.0000	on(c rmina rmina	ate ate Std Err 0.0000 0.0000	0.00% 0.00%	0.00% 0.00%
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code	Vilk W Norr Count 4 4 med Sumi Count	0 st nality Te: 1.000 1.000 mary Mean	95% 0 1.000 0 1.000 95%	0 0 L CL	6 7 Test Stat 95% UCL 1.0000 1.0000 95% UCL	Median 1.0000 1.0000 Median	Min 1.00 1.00	0 000 000	Decisi Indeter Indeter Max 1.0000 1.0000 Max	on(c rmina rmina)	a:1%) ate ate <u>Std Err</u> 0.0000 0.0000 Std Err	0.00% 0.00% CV%	0.00% 0.00% %Effec
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary Code N	Vilk W Norr Count 4 4 med Sum Count 4	0 st nality Te: 1.000 1.000 mary Mean 1.412	95% 0 1.000 0 1.000 95% 0 1.412	0 0 L CL	6 7 Test Stat 95% UCL 1.0000 1.0000 95% UCL 1.4120	Median 1.0000 1.0000 Median 1.4120	Min 1.00 1.00 Mir 1.4	0 000 000	Decisi Indeter Indeter Max 1.0000 1.0000 Max 1.4120	on(c rmina rmina)	x:1%) ate ate 0.0000 0.0000 Std Err 0.0000	0.00% 0.00% CV% 0.00%	0.00% 0.00% %Effect 0.00%
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N	Vilk W Norr Count 4 4 med Sumi Count	0 st nality Te: 1.000 1.000 mary Mean	95% 0 1.000 0 1.000 95% 0 1.412	0 0 L CL	6 7 Test Stat 95% UCL 1.0000 1.0000 95% UCL	Median 1.0000 1.0000 Median	Min 1.00 1.00 Mir 1.4	0 000 000	Decisi Indeter Indeter Max 1.0000 1.0000 Max	on(c rmina rmina)	a:1%) ate ate <u>Std Err</u> 0.0000 0.0000 Std Err	0.00% 0.00% CV%	0.00% 0.00% %Effect
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3 96h Survival	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N	Vilk W Norr Count 4 4 med Sumi Count 4 4	0 st mality Te: Mean 1.000 1.000 mary Mean 1.412 1.412	95% 0 1.000 0 1.000 95% 0 1.412 0 1.412	0 0 L CL 0	6 7 Test Stat 95% UCL 1.0000 1.0000 95% UCL 1.4120 1.4120	Median 1.0000 1.0000 Median 1.4120	Min 1.00 1.00 Mir 1.4	0 000 000	Decisi Indeter Indeter Max 1.0000 1.0000 Max 1.4120	on(c rmina rmina)	x:1%) ate ate 0.0000 0.0000 Std Err 0.0000	0.00% 0.00% CV% 0.00%	0.00% 0.00% %Effec 0.00%
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 96h Survival Conc-mg/L	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N Rate Detail Code	Vilk W Norr Count 4 4 med Sum Count 4 4 Rep 1	0 st mality Te: Mean 1.000 1.000 mary Mean 1.412 1.412 1.412	95% 0 1.000 0 1.000 95% 0 1.412 0 1.412 2 Rep	0 0 L CL 0 20	6 7 Test Stat 95% UCL 1.0000 1.0000 95% UCL 1.4120 1.4120 1.4120 Rep 4	Median 1.0000 1.0000 Median 1.4120	Min 1.00 1.00 Mir 1.4	0 000 000	Decisi Indeter Indeter Max 1.0000 1.0000 Max 1.4120	on(c rmina rmina)	x:1%) ate ate 0.0000 0.0000 Std Err 0.0000	0.00% 0.00% CV% 0.00%	0.00% 0.00% %Effec 0.00%
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3 96h Survival Conc-mg/L 0	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N	Vilk W Norr Count 4 4 4 med Sum Count 4 4 4 Rep 1 1.0000	0 st nality Te: <u>Mean</u> 1.000 1.000 mary <u>Mean</u> 1.412 1.412 1.412 1.412	95% 0 1.000 0 1.000 95% 0 1.412 0 1.412 2 Rep 0 1.000	0 0 L CL 0 0 0 3	6 7 Test Stat 95% UCL 1.0000 1.0000 95% UCL 1.4120 1.4120 1.4120 Rep 4 1.0000	Median 1.0000 1.0000 Median 1.4120	Min 1.00 1.00 Mir 1.4	0 000 000	Decisi Indeter Indeter Max 1.0000 1.0000 Max 1.4120	on(c rmina rmina)	x:1%) ate ate 0.0000 0.0000 Std Err 0.0000	0.00% 0.00% CV% 0.00%	0.00% 0.00% %Effect 0.00%
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N Rate Detail Code N	Vilk W Norr <u>Count</u> 4 4 4 4 <u>Count</u> 4 4 4 <u>Rep 1</u> 1.0000 1.0000	0 st mality Te: Mean 1.000 1.000 mary Mean 1.412 1.412 .412	95% 0 1.000 0 1.000 95% 0 1.412 0 1.412 2 Rep 0 1.000	0 0 L CL 0 0 0 3	6 7 Test Stat 95% UCL 1.0000 1.0000 95% UCL 1.4120 1.4120 1.4120 Rep 4	Median 1.0000 1.0000 Median 1.4120	Min 1.00 1.00 Mir 1.4	0 000 000	Decisi Indeter Indeter Max 1.0000 1.0000 Max 1.4120	on(c rmina rmina)	x:1%) ate ate 0.0000 0.0000 Std Err 0.0000	0.00% 0.00% CV% 0.00%	0.00% 0.00% %Effec 0.00%
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr 6 3 96h Survival Conc-mg/L 0 3 Angular (Corr	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N Rate Detail Code N	Vilk W Norr 4 4 med Sum Count 4 4 4 1.0000 1.0000 med Detai	0 st nality Te: Mean 1.000 1.000 mary Mean 1.412 1.412 1.412 1.000 1.000 1.000	95% 0 1.000 0 1.000 95% 0 1.412 0 1.412 2 Rep 0 1.000 0 1.000	0 0 LCL 0 0 0 3 0 0	6 7 Test Stat 95% UCL 1.0000 1.0000 95% UCL 1.4120 1.4120 1.4120	Median 1.0000 1.0000 Median 1.4120	Min 1.00 1.00 Mir 1.4	0 000 000	Decisi Indeter Indeter Max 1.0000 1.0000 Max 1.4120	on(c rmina rmina)	x:1%) ate ate 0.0000 0.0000 Std Err 0.0000	0.00% 0.00% CV% 0.00%	0.00% 0.00% %Effec 0.00%
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N Rate Detail Code N	Vilk W Norr 4 4 med Sum Count 4 4 4 1.0000 1.0000 med Detai Rep 1	0 st nality Te: Mean 1.000 1.000 mary Mean 1.412 1.412 1.412 1.000 1.000 1.000 1.000	95% 0 1.000 95% 0 1.412 0 1.412 2 Rep 0 1.000 2 Rep	0 0 1 0 0 0 3 0 0 3 3	6 7 Test Stat 95% UCL 1.0000 1.0000 95% UCL 1.4120 1.4120 1.4120 1.4000 1.0000 1.0000	Median 1.0000 1.0000 Median 1.4120	Min 1.00 1.00 Mir 1.4	0 000 000	Decisi Indeter Indeter Max 1.0000 1.0000 Max 1.4120	on(c rmina rmina)	x:1%) ate ate 0.0000 0.0000 Std Err 0.0000	0.00% 0.00% CV% 0.00%	0.00% 0.00% %Effec 0.00%
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N Rate Detail Code N	Vilk W Norr Count 4 4 4 med Sumn Count 4 4 4 4 1.0000 1.0000 rmed Detai <u>Rep 1</u> 1.4120	0 st mality Te: Mean 1.000 1.000 mary Mean 1.412 1.412 1.412 1.000 1.000 1.000 1.000	95% 0 1.000 95% 0 1.412 0 1.412 2 Rep 0 1.000 2 Rep 0 1.412	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6 7 Test Stat 95% UCL 1.0000 1.0000 95% UCL 1.4120 1.4120 1.4120 1.0000 1.0000 1.0000	Median 1.0000 1.0000 Median 1.4120	Min 1.00 1.00 Mir 1.4	0 000 000	Decisi Indeter Indeter Max 1.0000 1.0000 Max 1.4120	on(c rmina rmina)	x:1%) ate ate 0.0000 0.0000 Std Err 0.0000	0.00% 0.00% CV% 0.00%	0.00% 0.00% %Effec 0.00%
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N Rate Detail Code N	Vilk W Norr 4 4 med Sum Count 4 4 4 1.0000 1.0000 med Detai Rep 1	0 st nality Te: Mean 1.000 1.000 mary Mean 1.412 1.412 1.412 1.000 1.000 1.000 1.000	95% 0 1.000 95% 0 1.412 0 1.412 2 Rep 0 1.000 2 Rep 0 1.412	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6 7 Test Stat 95% UCL 1.0000 1.0000 95% UCL 1.4120 1.4120 1.4120 1.4000 1.0000 1.0000	Median 1.0000 1.0000 Median 1.4120	Min 1.00 1.00 Mir 1.4	0 000 000	Decisi Indeter Indeter Max 1.0000 1.0000 Max 1.4120	on(c rmina rmina)	x:1%) ate ate 0.0000 0.0000 Std Err 0.0000	0.00% 0.00% CV% 0.00%	0.00% 0.00% %Effec 0.00%
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N Rate Detail Code N	Vilk W Norr Count 4 4 4 med Sumn Count 4 4 4 4 1.0000 1.0000 rmed Detai <u>Rep 1</u> 1.4120	0 st mality Te: Mean 1.000 1.000 mary Mean 1.412 1.412 1.412 1.000 1.000 1.000 1.000	95% 0 1.000 95% 0 1.412 0 1.412 2 Rep 0 1.000 2 Rep 0 1.412	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6 7 Test Stat 95% UCL 1.0000 1.0000 95% UCL 1.4120 1.4120 1.4120 1.0000 1.0000 1.0000	Median 1.0000 1.0000 Median 1.4120	Min 1.00 1.00 Mir 1.4	0 000 000	Decisi Indeter Indeter Max 1.0000 1.0000 Max 1.4120	on(c rmina rmina)	x:1%) ate ate 0.0000 0.0000 Std Err 0.0000	0.00% 0.00% CV% 0.00%	0.00% 0.00% %Effec 0.00%
Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3	0 0 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N Rate Detail Code N rected) Transfor	Vilk W Norr Count 4 4 4 med Sumn Count 4 4 4 4 1.0000 1.0000 rmed Detai <u>Rep 1</u> 1.4120	0 st mality Te: Mean 1.000 1.000 mary Mean 1.412 1.412 1.412 1.000 1.000 1.000 1.000	95% 0 1.000 95% 0 1.412 0 1.412 2 Rep 0 1.000 0 1.000 2 Rep 0 1.412 2 Rep 0 1.412 2 Rep	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6 7 Test Stat 95% UCL 1.0000 1.0000 95% UCL 1.4120 1.4120 1.4120 1.0000 1.0000 1.0000	Median 1.0000 1.0000 Median 1.4120	Min 1.00 1.00 Mir 1.4	0 000 000	Decisi Indeter Indeter Max 1.0000 1.0000 Max 1.4120	on(c rmina rmina)	x:1%) ate ate 0.0000 0.0000 Std Err 0.0000	0.00% 0.00% CV% 0.00%	0.00% 0.00% %Effec 0.00%

Analyst:____

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QA:__



 Report Date:
 27 Oct-20 15:41 (p 2 of 2)

 Test Code/ID:
 TRU1020.001afml / 09-5343-0416

Analyst:

QA:

000-189-126-0

 Report Date:
 27 Oct-20 15:42 (p 1 of 2)

 Test Code/ID:
 TRU1020.001afml / 09-5343-0416

Fathead Minnow 96-h Acute Survival Test

		0 P 5 S	est Type: rotocol: pecies: axon:	Survival (96h) EPA/821/R-02- Pimephales pro Actinopterygii	` '		Dil Br	ine: No	aboratory Wat ot Applicable quatic Biosyst		Age:
	18-2122-7453		ode:	TRU1020.001a	fml			oject:			
Sample Date:	•		laterial:	Sample Water					oassay Repo		
Receipt Date: Sample Age:			AS (PC):	Trussell Techn	ologies		St	ation: W	eymouth Res	ample with	Earth Tec
Alkalinity (CaC	:03)-mg/L	-									
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	3	60	60	60	60	60	0	0	0.00%	0
3		3	113	113	113	113	113	0	0	0.00%	0
Overall		6	86.5	56.04	117	60	113	11.85	29.03	33.56%	0 (0%)
Conductivity-µ	imhos										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
0	Ν	3	352	321.8	382.2	338	360	4.055	12.17	3.46%	0
3		3	1025	1017	1032	1022	1028	1.018	3.055	0.30%	0
Overall		6	688.3	301.6	1075	338	1028	150.4	368.5	53.54%	0 (0%)
Dissolved Oxy	/gen-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	3	7.633	7.49	7.777	7.6	7.7	0.01924	0.05773	0.76%	0
3		3	7.4	6.743	8.057	7.2	7.7	0.08819	0.2646	3.58%	0
Overall		6	7.517	7.292	7.741	7.2	7.7	0.08724	0.2137	2.84%	0 (0%)
Hardness (Ca	CO3)-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
0	N	3	85	85	85	85	85	0	0	0.00%	0
3		3	238	238	238	238	238	0	0	0.00%	0
Overall		6	161.5	73.56	249.4	85	238	34.21	83.8	51.89%	0 (0%)
pH-Units											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Мах	Std Err	Std Dev	CV%	QA Coun
0	N	3	7.7	7.699	7.701	7.7	7.7	0	0	0.00%	0
3		3	7.7	7.699	7.701	7.7	7.7	0	0	0.00%	0
Overall		6	7.7	7.7	7.7	7.7	7.7	0	0	0.00%	0 (0%)
Temperature-	°C										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
0	N	3	24	24	24	24	24	0	0	0.00%	0
3		3	24	24	24	24	24	0	0	0.00%	0
Overall		6	24	24	24	24	24	0	0	0.00%	0 (0%)

Analyst:_____QA:___

Fathead Minnow 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

Fathead Minnov									Aquatic Bioassay & Consulting Labs, In
Alkalinity (CaCC	03)-mg/L								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	Ν	1		60			-		
3		1.1.1.1		113					
0	Ν	2		60					
3		-		113					
0	Ν	3		60					
3				113					
Conductivity-µr	nhos								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		358					
3				1024					
0	N	2		360					
3				1028					
0	N	3		338					
3				1022					
Dissolved Oxy	gen-mg/L								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.6		2/11 /0	morie	, maryst	
3		1.6		7.7					
0	N	2		7.7	-				
3				7.3					
0	N	3		7.6					
3				7.2					
Hardness (CaC	O3)-ma/L								
Conc-mg/L	Code	Read	Time	Measure	٥A	Diff-%	Inst ID	Analyst	Notes
0	N	1	THIL	85	SIGN	DIII-70	matib	Analyst	Notes
3				238					
0	N	2	_	85					
3				238					
0	N	3		85					
3				238					
pH-Units									
		-			<i></i>				
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	NOTES
0 3	N	1		7.7 7.7					
	N	2			_	_			
0 3	Ν	2		7.7 7.7					
0	N	3				_			
3	14	3		7.7 7.7					
				1.1					
Temperature-°									
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		24					
3				24					
0	Ν	2		24					
3				24	_				
0	N	З		24					
3				24					

000-189-126-0

0 Analyst:

QA:



October 28, 2020

Mr. David Hokanson Trussell Technologies 232 N. Lake Avenue Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms EPA-821-R-02-012.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT: SAMPLE ID.: DATE RECEIVED: ABC LAB NO.: Trussell Technologies Weymouth Resample with EarthTec 1 Oct – 20 TRU1020.001

ACUTE CERIODAPHNIA SURVIVAL BIOASSAY

% Survival = 0 % Survival in 3.0 mg/l Sample

EC50 = < 3.0 mg/l

You y truly. Scott Johnson Laboratory Director

CETIS Summary Report

Report Date: Test Code/ID: TRU1020.001acer / 08-8822-4116

Aquatic Bioassay & Consulting Labs, Inc.

27 Oct-20 15:42 (p 1 of 1)

Ceriodaphnia 96-h Acute Survival Test

Batch ID:	00-9934-3961	Test Type:	Survival (96h)	Analyst:		
Start Date:	13 Oct-20 14:10	Protocol:	EPA/821/R-02-012 (2002)	Diluent:	Laboratory Water	
Ending Date:	17 Oct-20 12:55	Species:	Ceriodaphnia dubia	Brine:	Not Applicable	
Test Length:	95h	Taxon:	Branchiopoda	Source:	Aquatic Biosystems, CO	Age:
Sample ID:	00-5310-5516	Code:	TRU1020.001acer	Project:		
Sample Date:	30 Sep-20 15:00	Material:	Sample Water	Source:	Bioassay Report	
Receipt Date:	: 01 Oct-20 10:28	CAS (PC):		Station:	Weymouth Resample with	Earth Teo
Sample Age;	12d 23h (7.3 °C)	Client:	Trussell Technologies			

Single Comparison Summary

Analysis ID	Endpoint		Compari	son Method			P-Value	Comparis	son Result		9
10-1520-9557	96h Survival R	ate	Wilcoxon	Rank Sum T	wo-Sample	Test	0.0143	3mg/L failed 96h survival rate			(*
Test Accepta	ability					TAC	Limits				
Analysis ID	Endpoint		Attribute		Test Stat	Lower	Upper	Overlap	Decision		
10-1520-9557	7 96h Survival R	ate	Control R	lesp	1	0.9	>>	Yes	Passes C	riteria	
96h Survival	Rate Summary										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000		0.00%
3		4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
96h Survival	Rate Detail						MD	5: A855D6A	45B6135CE	1F9C8F16	971C8225F
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4						
0	Ν	1.0000	1.0000	1.0000	1.0000						
3		0.0000	0.0000	0.0000	0.0000						
96h Survival	Rate Binomials	;									
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4						
0	N	5/5	5/5	5/5	5/5						
		0/5	0/5	0/5	0/5						



 Report Date:
 27 Oct-20 15:42 (p 1 of 2)

 Test Code/ID:
 TRU1020.001acer / 08-8822-4116

Ceriodaphnia				_							
,	10-1520-9557		•	Survival Ra				IS Versio		.9.7	
Analyzed:	24 Oct-20 21:00		•	nparametric-	•			tus Level:	1		
Edit Date:	24 Oct-20 20:59	MD	5 Hash: A8	55D6A5B613	5CE1F9C8F	16971C82	25F Edi	tor ID:	000-189-	126-0	
Batch ID:	00-9934-3961	Tes	t Type: Sur	rvival (96h)			Ana	lyst:			
Start Date:	13 Oct-20 14:10			A/821/R-02-0)12 (2002)		Dilu	ient: L	aboratory Wat	er	
Ending Date:	17 Oct-20 12:55	Spe	ecies: Cei	riodaphnia du	ubia		Brin	ne: N	ot Applicable		
Test Length:	95h	Тах	on: Bra	anchiopoda			Sou	irce: A	quatic Biosyst	ems, CO	Age:
Sample ID:	00-5310-5516	Cod	le: TR	U1020.001a	cer		Pro	ject:			
•	30 Sep-20 15:00			mple Water				-	ioassay Repoi	rt	
•	01 Oct-20 10:28		S (PC):	···F·- ··-·-·					Veymouth Res		Earth Tec
	12d 23h (7.3 °C			issell Techno	loaies					F	
_											
Data Transfor		Alt Hyp				Comparis			un alum a lum k	_	_
Angular (Corre	cted)	C > T				3mg/L faile	ed 96n sur	vival rate e	enapoint	_	
Vilcoxon Ran	nk Sum Two-San	nple Test									
Control	vs Conc-mg	/L	Test Stat	Critical		P-Type	P-Value		on(a:5%)		
Negative Cont	rol 3*		10		0 6	Exact	0.0143	Signific	ant Effect		
Test Acceptat	oility Criteria	TAC	_imits								
Attribute	Test Stat		Upper	Overlap	Decision						
Control Resp	1	0.9	>>	Yes	Passes Cr	iteria					
ANOVA Table											
ANOVA Table											
•						E 01 1			1. 50()		
	Sum Squa	ares	Mean Sq	uare	DF	F Stat	P-Value		on(a:5%)		
Source Between	2.50777	ares	2.50777	uare	1	F Stat	P-Value	Decisi Indeter			
Between Error	2.50777 0	ares		uare	1 6	F Stat	P-Value				
Between Error	2.50777	ares	2.50777	uare	1	F Stat	P-Value				
Between Error Total	2.50777 0	ares	2.50777	uare	1 6	F Stat	P-Value				
Between Error Total ANOVA Assur	2.50777 0 2.50777	ares	2.50777	uare	1 6	-0	P-Value P-Value	Indeter			
Between Error Total ANOVA Assur Attribute	2.50777 0 2.50777 mptions Tests Test	ares	2.50777 0	uare	1 6 7	-0		Indeter Decisi	minate		
Between Error Total ANOVA Assur Attribute Variance	2.50777 0 2.50777 mptions Tests Test Variance F		2.50777 0	uare	1 6 7	-0		Indeter Decisi	minate on(α:1%)		
Between Error Total ANOVA Assur Attribute Variance Distribution	2.50777 0 2.50777 mptions Tests Test Variance F	Ratio F Tes	2.50777 0		1 6 7	-0		Indeter Decisi	minate on(α:1%) minate		
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary	Ratio F Tes /ilk W Norr	2.50777 0 st nality Test		1 6 7 Test Stat	- Critical		Indeter Decisi	minate on(α:1%) minate	CV%	%Effec
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code	Ratio F Tes /ilk W Norr Count	2.50777 0 st nality Test Mean	95% LCL	1 6 7 Test Stat 95% UCL	Critical Median	P-Value Min	Indeter Decisi Indeter Indeter Max	minate on(α:1%) minate minate Std Err		
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary	Ratio F Tes /ilk W Norr	2.50777 0 st nality Test		1 6 7 Test Stat	- Critical	P-Value	Indeter Decisi Indeter Indeter	minate on(α:1%) minate minate Std Err	CV% 0.00%	0.00%
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code N	Ratio F Tes /ilk W Norr Count 4 4	2.50777 0 st nality Test <u>Mean</u> 1.0000 0.0000	95% LCL 1.0000	1 6 7 Test Stat 95% UCL 1.0000	Critical Median 1.0000	P-Value <u>Min</u> 1.0000	Indeter Decisi Indeter Indeter Max 1.0000	minate on(α:1%) minate minate Std Err	0.00%	0.00%
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code N	Ratio F Tes /ilk W Norr Count 4 4 med Sumr	2.50777 0 st nality Test <u>Mean</u> 1.0000 0.0000 mary	95% LCL 1.0000 0.0000	1 6 7 Test Stat 95% UCL 1.0000 0.0000	Critical Median 1.0000 0.0000	P-Value Min 1.0000 0.0000	Indeter Decisi Indeter Indeter 1.0000 0.0000	on(α:1%) minate minate Std Err 0 0.0000 0 0.0000	0.00%	0.00%
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code	Ratio F Tes /ilk W Norr <u>Count</u> 4 4 med Sumr Count	2.50777 0 st nality Test <u>Mean</u> 1.0000 0.0000 mary <u>Mean</u>	95% LCL 1.0000 0.0000 95% LCL	1 6 7 Test Stat 95% UCL 1.0000 0.0000 95% UCL	Critical Median 1.0000 0.0000 Median	P-Value Min 1.0000 0.0000 Min	Indeter Decisi Indeter Indeter 1.0000 0.0000 Max	minate on(α:1%) minate minate Std Err 0 0.0000 0 0.0000 Std Err	0.00% CV%	0.00% 100.00 ⁴ %Effec
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code N	Ratio F Tes /ilk W Norr 4 4 med Sumr Count 4	2.50777 0 at nality Test <u>Mean</u> 1.0000 0.0000 mary <u>Mean</u> 1.3450	95% LCL 1.0000 0.0000 95% LCL 1.3450	1 6 7 Test Stat 95% UCL 1.0000 0.0000 95% UCL 1.3460	Critical Median 1.0000 0.0000 Median 1.3450	P-Value Min 1.0000 0.0000 Min 1.3450	Indeter Decisi Indeter Indeter 1.0000 0.0000 Max 1.3450	on(α:1%) minate minate minate Std Err 0 0.0000 Std Err 0 0.0000 Std Err 0 0.0000	0.00% CV% 0.00%	0.00% 100.009 %Effec 0.00%
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code	Ratio F Tes /ilk W Norr <u>Count</u> 4 4 med Sumr Count	2.50777 0 st nality Test <u>Mean</u> 1.0000 0.0000 mary <u>Mean</u>	95% LCL 1.0000 0.0000 95% LCL	1 6 7 Test Stat 95% UCL 1.0000 0.0000 95% UCL	Critical Median 1.0000 0.0000 Median	P-Value Min 1.0000 0.0000 Min	Indeter Decisi Indeter Indeter 1.0000 0.0000 Max	on(α:1%) minate minate minate Std Err 0 0.0000 Std Err 0 0.0000 Std Err 0 0.0000	0.00% CV%	0.00% 100.009 %Effec 0.00%
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N	Ratio F Tes /ilk W Norr 4 4 med Sumr Count 4	2.50777 0 at nality Test <u>Mean</u> 1.0000 0.0000 mary <u>Mean</u> 1.3450	95% LCL 1.0000 0.0000 95% LCL 1.3450	1 6 7 Test Stat 95% UCL 1.0000 0.0000 95% UCL 1.3460	Critical Median 1.0000 0.0000 Median 1.3450	P-Value Min 1.0000 0.0000 Min 1.3450	Indeter Decisi Indeter Indeter 1.0000 0.0000 Max 1.3450	on(α:1%) minate minate minate Std Err 0 0.0000 Std Err 0 0.0000 Std Err 0 0.0000	0.00% CV% 0.00%	0.00% 100.00 %Effec 0.00%
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3 96h Survival	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N	Ratio F Tes /ilk W Norr 4 4 med Sumr Count 4	2.50777 0 at nality Test <u>Mean</u> 1.0000 0.0000 mary <u>Mean</u> 1.3450	95% LCL 1.0000 0.0000 95% LCL 1.3450	1 6 7 Test Stat 95% UCL 1.0000 0.0000 95% UCL 1.3460	Critical Median 1.0000 0.0000 Median 1.3450	P-Value Min 1.0000 0.0000 Min 1.3450	Indeter Decisi Indeter Indeter 1.0000 0.0000 Max 1.3450	on(α:1%) minate minate minate Std Err 0 0.0000 Std Err 0 0.0000 Std Err 0 0.0000	0.00% CV% 0.00%	0.00% 100.009 %Effec 0.00%
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3 96h Survival Conc-mg/L	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N	Ratio F Tes /ilk W Norr 4 4 med Sum Count 4 4	2.50777 0 st nality Test <u>Mean</u> 1.0000 0.0000 mary <u>Mean</u> 1.3450 0.2255	95% LCL 1.0000 0.0000 95% LCL 1.3450 0.2255	1 6 7 Test Stat 95% UCL 1.0000 0.0000 95% UCL 1.3460 0.2256	Critical Median 1.0000 0.0000 Median 1.3450	P-Value Min 1.0000 0.0000 Min 1.3450	Indeter Decisi Indeter Indeter 1.0000 0.0000 Max 1.3450	on(α:1%) minate minate minate Std Err 0 0.0000 Std Err 0 0.0000 Std Err 0 0.0000	0.00% CV% 0.00%	0.00% 100.009 %Effec 0.00%
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3 96h Survival Conc-mg/L	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N Rate Detail Code	Ratio F Tes /ilk W Norr 4 4 med Sumr Count 4 4 Rep 1	2.50777 0 st mality Test <u>Mean</u> 1.0000 0.0000 mary <u>Mean</u> 1.3450 0.2255 <u>Rep 2</u>	95% LCL 1.0000 0.0000 95% LCL 1.3450 0.2255 Rep 3	1 6 7 Test Stat 95% UCL 1.0000 0.0000 95% UCL 1.3460 0.2256 Rep 4	Critical Median 1.0000 0.0000 Median 1.3450	P-Value Min 1.0000 0.0000 Min 1.3450	Indeter Decisi Indeter Indeter 1.0000 0.0000 Max 1.3450	on(α:1%) minate minate minate Std Err 0 0.0000 Std Err 0 0.0000 Std Err 0 0.0000	0.00% CV% 0.00%	0.00% 100.00 %Effec 0.00%
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N Rate Detail Code	Ratio F Tes /ilk W Norr 4 4 4 med Sumr 6 Count 4 4 4 4 Rep 1 1.0000 0.0000	2.50777 0 st mality Test Mean 1.0000 0.0000 mary Mean 1.3450 0.2255 Rep 2 1.0000 0.0000	95% LCL 1.0000 0.0000 95% LCL 1.3450 0.2255 Rep 3 1.0000	1 6 7 Test Stat 95% UCL 1.0000 0.0000 95% UCL 1.3460 0.2256 Rep 4 1.0000	Critical Median 1.0000 0.0000 Median 1.3450	P-Value Min 1.0000 0.0000 Min 1.3450	Indeter Decisi Indeter Indeter 1.0000 0.0000 Max 1.3450	on(α:1%) minate minate minate Std Err 0 0.0000 Std Err 0 0.0000 Std Err 0 0.0000	0.00% CV% 0.00%	0.00% 100.00 %Effec 0.00%
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3 Angular (Corr	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N Rate Detail Code N	Ratio F Tes /ilk W Norr 4 4 4 med Sumr 6 0unt 4 4 4 1.0000 0.0000 med Detai	2.50777 0 at mality Test Mean 1.0000 0.0000 mary Mean 1.3450 0.2255 Rep 2 1.0000 0.0000	95% LCL 1.0000 0.0000 95% LCL 1.3450 0.2255 Rep 3 1.0000 0.0000	1 6 7 Test Stat 95% UCL 1.0000 0.0000 95% UCL 1.3460 0.2256 Rep 4 1.0000 0.0000	Critical Median 1.0000 0.0000 Median 1.3450	P-Value Min 1.0000 0.0000 Min 1.3450	Indeter Decisi Indeter Indeter 1.0000 0.0000 Max 1.3450	on(α:1%) minate minate minate Std Err 0 0.0000 Std Err 0 0.0000 Std Err 0 0.0000	0.00% CV% 0.00%	0.00% 100.009 %Effec 0.00%
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3 Angular (Corr	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N Rate Detail Code N	Ratio F Tes /ilk W Norr 4 4 med Sum Count 4 4 4 1.0000 0.0000 med Detai Rep 1	2.50777 0 at nality Test Mean 1.0000 0.0000 mary Mean 1.3450 0.2255 Rep 2 1.0000 0.0000 I Rep 2	95% LCL 1.0000 0.0000 95% LCL 1.3450 0.2255 Rep 3 1.0000 0.0000 Rep 3	1 6 7 Test Stat 95% UCL 1.0000 0.0000 95% UCL 1.3460 0.2256 Rep 4 1.0000 0.0000 Rep 4	Critical Median 1.0000 0.0000 Median 1.3450	P-Value Min 1.0000 0.0000 Min 1.3450	Indeter Decisi Indeter Indeter 1.0000 0.0000 Max 1.3450	on(α:1%) minate minate minate Std Err 0 0.0000 Std Err 0 0.0000 Std Err 0 0.0000	0.00% CV% 0.00%	0.00% 100.00 %Effec 0.00%
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N Rate Detail Code N	Ratio F Tes /ilk W Norr 4 4 4 med Sumr 6 0unt 4 4 4 1.0000 0.0000 med Detai	2.50777 0 at mality Test Mean 1.0000 0.0000 mary Mean 1.3450 0.2255 Rep 2 1.0000 0.0000	95% LCL 1.0000 0.0000 95% LCL 1.3450 0.2255 Rep 3 1.0000 0.0000	1 6 7 Test Stat 95% UCL 1.0000 0.0000 95% UCL 1.3460 0.2256 Rep 4 1.0000 0.0000	Critical Median 1.0000 0.0000 Median 1.3450	P-Value Min 1.0000 0.0000 Min 1.3450	Indeter Decisi Indeter Indeter 1.0000 0.0000 Max 1.3450	on(α:1%) minate minate minate Std Err 0 0.0000 Std Err 0 0.0000 Std Err 0 0.0000	0.00% CV% 0.00%	0.00% 100.00 %Effec 0.00%
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N Rate Detail Code N rected) Transfor Code N	Ratio F Tes /ilk W Norr 4 4 med Sum Count 4 4 4 <u>Rep 1</u> 1.3450	2.50777 0 at nality Test Mean 1.0000 0.0000 mary Mean 1.3450 0.2255 Rep 2 1.0000 0.0000 I Rep 2 1.3450	95% LCL 1.0000 0.0000 95% LCL 1.3450 0.2255 Rep 3 1.0000 0.0000 Rep 3 1.3450	1 6 7 Test Stat 95% UCL 1.0000 0.0000 95% UCL 1.3460 0.2256 Rep 4 1.0000 0.0000 Rep 4 1.3450	Critical Median 1.0000 0.0000 Median 1.3450	P-Value Min 1.0000 0.0000 Min 1.3450	Indeter Decisi Indeter Indeter 1.0000 0.0000 Max 1.3450	on(α:1%) minate minate minate Std Err 0 0.0000 Std Err 0 0.0000 Std Err 0 0.0000	0.00% CV% 0.00%	0.00% 100.009 %Effec 0.00%
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3 96h Survival	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N Rate Detail Code N rected) Transfor Code N Rate Detail Code N	Ratio F Tes /ilk W Norr 4 4 4 med Sumr 6 Count 4 4 4 7 1.0000 0.0000 med Detai Rep 1 1.3450 0.2255	2.50777 0 at mality Test Mean 1.0000 0.0000 mary Mean 1.3450 0.2255 Rep 2 1.0000 0.0000 I Rep 2 1.3450 0.2255	95% LCL 1.0000 0.0000 95% LCL 1.3450 0.2255 Rep 3 1.0000 0.0000 Rep 3 1.3450 0.2255	1 6 7 Test Stat 95% UCL 1.0000 0.0000 95% UCL 1.3460 0.2256 Rep 4 1.0000 0.0000 Rep 4 1.3450 0.2255	Critical Median 1.0000 0.0000 Median 1.3450	P-Value Min 1.0000 0.0000 Min 1.3450	Indeter Decisi Indeter Indeter 1.0000 0.0000 Max 1.3450	on(α:1%) minate minate minate Std Err 0 0.0000 Std Err 0 0.0000 Std Err 0 0.0000	0.00% CV% 0.00%	0.00% 100.009 %Effec 0.00%
Between Error Total ANOVA Assur Attribute Variance Distribution 96h Survival Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3 96h Survival Conc-mg/L 0 3 Angular (Corr Conc-mg/L 0 3	2.50777 0 2.50777 mptions Tests Test Variance F Shapiro-W Rate Summary Code N rected) Transfor Code N Rate Detail Code N rected) Transfor Code N	Ratio F Tes /ilk W Norr 4 4 med Sum Count 4 4 4 <u>Rep 1</u> 1.3450	2.50777 0 at nality Test Mean 1.0000 0.0000 mary Mean 1.3450 0.2255 Rep 2 1.0000 0.0000 I Rep 2 1.3450	95% LCL 1.0000 0.0000 95% LCL 1.3450 0.2255 Rep 3 1.0000 0.0000 Rep 3 1.3450	1 6 7 Test Stat 95% UCL 1.0000 0.0000 95% UCL 1.3460 0.2256 Rep 4 1.0000 0.0000 Rep 4 1.3450	Critical Median 1.0000 0.0000 Median 1.3450	P-Value Min 1.0000 0.0000 Min 1.3450	Indeter Decisi Indeter Indeter 1.0000 0.0000 Max 1.3450	on(α:1%) minate minate minate Std Err 0 0.0000 Std Err 0 0.0000 Std Err 0 0.0000	0.00% CV% 0.00%	100.009 %Effec

NQA: P Analyst:___

CETIS	S An	alytical Report					Report Date: Test Code/ID:	27 Oct-20 15:42 (p 2 of 2) TRU1020.001acer / 08-8822-4116
Cerioda	aphni	a 96-h Acute Surviva	l Test				Aquatic B	ioassay & Consulting Labs, Inc.
Analysi Analyzo Edit Da	ed:	10-1520-9557 24 Oct-20 21:00 24 Oct-20 20:59	Endpoint: Analysis: MD5 Hash:	96h Survival Rate Nonparametric-T A855D6A5B6135	wo Sample	6971C8225F	CETIS Version: Status Level: Editor ID:	CETISv1.9.7 1 000-189-126-0
Graphi	cs							
	1.0	•				1.0	1	
/al Rate	0.8 0.7					08		
96h Survival Rate	0.6 0.5				Centered Corr. Angle	0.5 -		
	0.4				0			
	0.2 0.1					0.3		
	0.0	0 N	а	3		0.0 -1 5	-10 -05 0.0	• • • • • • • • • • • • • • • • • • •
		c	onc-mg/L				Rankits	5

~ QA: P Analyst:

CETIS Measurement Report

Report Date: 27 Oct-20 15:42 (p 1 of 2)

Ceriodaphnia 96-h Acute Survival Test

Test Code/ID: TRU1020.001acer / 08-8822-4116 Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: Start Date:	00-9934-3961 13 Oct-20 14:10) F	Protocol:	Survival (96h) EPA/821/R-02-			Di		aboratory Wat	er	
Ending Date: Test Length:	17 Oct-20 12:55 95h		Species: Taxon:	Ceriodaphnia d Branchiopoda	lubia				lot Applicable Aquatic Biosyst	tems, CO	Age:
Sample ID:	00-5310-5516		Code:	TRU1020.001a	icer			oject:			
•	30 Sep-20 15:0		Material:	Sample Water					Bioassay Repo		
•	01 Oct-20 10:28		CAS (PC):				St	ation: V	Veymouth Res	sample with	Earth Tec
Sample Age:	12d 23h (7.3 °(C) (Client:	Trussell Techn	ologies						
Alkalinity (Ca	CO3)-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL			Мах	Std Err		CV%	QA Count
0	N	3	60	60	60	60	60	0	0	0.00%	0
3		3	113	113	113	113	113	0	0	0.00%	0
Overall	_	6	86.5	56.04	117	60	113	11.85	29.03	33.56%	0 (0%)
Conductivity-	µmhos										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err		CV%	QA Coun
0	N	3	352	321.8	382.2	338	360	4.055	12.17	3.46%	0
3		3	1025	1017	1032	1022	1028	1.018	3.055	0.30%	0
Overall		6	688.3	301.6	1075	338	1028	150.4	368.5	53.54%	0 (0%)
Dissolved Ox	ygen-mg/L										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL		Max	Std Err	Std Dev	CV%	QA Count
0	N	3	7.633	7.49	7.777	7.6	7.7	0.01924		0.76%	0
3		3	7.4	6.743	8.057	7.2	7.7	0.0881		3.58%	0
Overall		6	7.517	7.292	7.741	7.2	7.7	0.0872	4 0.2137	2.84%	0 (0%)
Hardness (Ca	iCO3)-mg/L										
Conc-mg/L	Code	Count		95% LCL	95% UCL	Min	Мах	Std Er		CV%	QA Coun
0	N	3	85	85	85	85	85	0	0	0.00%	0
3		3	238	238	238	238	238	0	0	0.00%	0
Overall		6	161.5	73.56	249.4	85	238	34.21	83.8	51.89%	0 (0%)
pH-Units											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Er	r Std Dev	CV%	QA Coun
0	N	3	7.7	7.699	7.701	7.7	7.7	0	0	0.00%	0
3		3	7.7	7.699	7.701	7.7	7.7	0	0	0.00%	0
Overall		6	7.7	7.7	7.7	7.7	7.7	0	0	0.00%	0 (0%)
Temperature	-°C										
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Мах	Std Er	r Std Dev	CV%	QA Coun
0	N	3	24	24	24	24	24	0	0	0.00%	0
3		3	24	24	24	24	24	0	0	0.00%	0
Overall		6	24	24	24	24	24	0	0	0.00%	0 (0%)

Analyst: _____ QA: ____

Ceriodaphnia 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

Alkalinity (CaC	03)-mg/L								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0 3	N	1		60 113					
0	N	2		60	_				
3				113					
0	N	3		60					
3				113					
Conductivity-µ	mhos								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		358					
3				1024					
0	Ν	2		360					
3				1028					
0 3	N	3		338 1022					
Dissolved Oxy	gen-mg/L								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.6					
3				7.7					
0	N	2	_	7.7					
3				7.3					
0	N	3		7.6					
3				7.2					
Hardness (CaC	:03)-mg/L								
Conc-mg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		85					
3				238			_		
0	Ν	2		85					
3		_		238				_	
0	N	3		85					
				238					
3									
pH-Units									
	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
pH-Units Conc-mg/L 0	Code N	Read	Time	7.7	QA	Diff-%	Inst ID	Analyst	Notes
pH-Units Conc-mg/L 0 3	N	1	Time	7.7 7.7	QA	Diff-%	Inst ID	Analyst	Notes
pH-Units Conc-mg/L 0 3 0			Time	7.7 7.7 7.7	QA	Diff-%	Inst ID	Analyst	Notes
pH-Units Conc-mg/L 0 3 0 3	N N	1	Time	7.7 7.7 7.7 7.7 7.7	QA	Diff-%	Inst ID	Analyst	Notes
pH-Units Conc-mg/L 0 3 0 3 0	N	1	Time	7.7 7.7 7.7 7.7 7.7 7.7	QA	Diff-%	Inst ID	Analyst	Notes
pH-Units Conc-mg/L 0 3 0 3 0	N N	1	Time	7.7 7.7 7.7 7.7 7.7	QA	Diff-%	Inst ID	Analyst	Notes
pH-Units Conc-mg/L 0 3 0 3 0 3 0 3	N N N	1	Time	7.7 7.7 7.7 7.7 7.7 7.7	QA	Diff-%	Inst ID	Analyst	Notes
pH-Units Conc-mg/L 0 3 0 3 0 3 0 3 7 Emperature-°	N N N	1	Time	7.7 7.7 7.7 7.7 7.7 7.7		Diff-%		Analyst	
pH-Units Conc-mg/L 0 3 0 3 0 3 3 Temperature-° Conc-mg/L 0	N N N	1 2 3		7.7 7.7 7.7 7.7 7.7 7.7 7.7 7.7 Measure 24					
pH-Units Conc-mg/L 0 3 0 3 0 3 0 3 7 emperature-° Conc-mg/L	N N C Code	1 2 3 Read		7.7 7.7 7.7 7.7 7.7 7.7 7.7 7.7 Measure					
pH-Units Conc-mg/L 0 3 0 3 0 3 0 3 7 emperature-° Conc-mg/L 0	N N C Code	1 2 3 Read		7.7 7.7 7.7 7.7 7.7 7.7 7.7 7.7 Measure 24 24 24					
pH-Units Conc-mg/L 0 3 0 3 0 3 3 7 emperature-° Conc-mg/L 0 3	N N N C Code N	1 2 3 <u>Read</u> 1		7.7 7.7 7.7 7.7 7.7 7.7 7.7 7.7 Measure 24 24					
pH-Units Conc-mg/L 0 3 0 3 0 3 0 3 Temperature-° Conc-mg/L 0 3 0	N N N C Code N	1 2 3 <u>Read</u> 1		7.7 7.7 7.7 7.7 7.7 7.7 7.7 7.7 Measure 24 24 24					

Analyst: _____ QA:____



October 27, 2020

Mr. David Hokanson Trussell Technologies 232 N. Lake Ave Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed acute bioassay report. The test was conducted under the guidelines prescribed in "Methods for Measuring the Acute Toxicity of Effluents and Receiving water to Freshwater and Marine Organisms" (Fourth Edition) EPA/600/ 4-90/027F, August 1993. The results were as follows:

CLIENT:	Trussell Technologies
SAMPLE I.D.:	Weymouth Besample Earthtec 3.0mg/1
DATE RECEIVED:	09/10/20
ABC LAB. NO.:	TRU1020.001

NPDES PERCENT SURVIVAL BIOASSAY RAINBOW TROUT

PERCENT SURVIVAL = 65% Survival in 3.0/mg/l Sample

TUa = 0.91 @ 3.0mg/l

ery truly, Johnson ory Director

AQUATIC BIOASSAY AND CONSULTING LABORATORIES, INC. 29 North Olive Street Ventura, CA 93001 (805) 643-5621

NPDES Percent Survival Bioassay for Effluents and Stormwater

	SAMPLE INFORMATION
CLIENT:	Trussell Technologies Date: 09/10/20
SAMPLE I.D.:	Weymouth Besample Eartl LAB # TRU1020.001

WATER QUALITY

the second secon	
DILUTION WATI Reconst. Fresh	AERATION Single Bubble Air
CONTROL HARDNESS	CONTROL ALKALINITY
Beg: 94 mg/l End: 100 mg/l	Beg: 63 mg/l End: 66 mg/l
SAMPLE HARDNESS	SAMPLE ALKALINITY
Beg: 238 mg/l End: 250 mg/l	Beg: 113 mg/l End: 116 mg/l

ORGANISM INFORMATION

SPECIES:	Oncorhynchus mykiss	DATE REC'D:	10/08/20
COMMON NAME:	Rainbow Trout		
SOURCE:	Thomas Fish Co.		
CARRIER:	California Overnight	NO. FISH / TANK	10

										TES	ST DA	TA								
]	NITIAI		24	HOU	RS		48	HOU	RS		72	HOU	RS		96	HOU	RS		
DATE: TIME:		10/15/20 1400)			10/16/20 1500)			10/17/20 1450)			1400	0			0/19/20 1400	ð	
CONC.	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy.	Temp. dg.C	pН	#Fish	Dis. Oxy	Temp. dg.C	pН	#Fish	Dis. Oxy.	Temp. dg.C	pН	#Fish
0 (Con.)	9.9	13.8	6.8	10	10.1	13.9	6.5	10	9.9	13.8	6.5	10	9.9	13.7	6.5	10	9.9	13.6	6.7	10
0 (Con.)	9.8	13.8	6.8	10	9.9	13.8	6.7	10	9.8	13.8	6.6	10	9.9	13.6	6.7	10	9.9	13.7	6.8	10
50.1mg/l	9.8	13.6	7.0	10	10.1	13.7	6.7	10	10.0	13.8	6.4	6	10.0	13.6	6.2	6	9.9	13.7	6.7	6
50.1mg/1	9.6	13.6	7.0	10	9.9	13.7	6.6	10	10.1	13.8	6.5	7	10.0	13.6	6.4	7	10.0	13.7	6.5	7

	FINAL I	ОАТА
	TOTAL	FISH SURVIVAL
	0 (Con.)	10
Į	0 (Con.)	10
	50.1mg/l 50.1mg/l	6
	50.1mg/l	7

FINAL	RESULTS
PERCENT SURVIVAL =	65% Survival in 3.0/mg/l Sample
TUa =	0.91 (a) 3.0mg/l

Joe Freas, Senior Toxicologist

201/20 Date 10

	CHAIN OF CUSTODY RECORD	ODY RECORD	
Client:	Project Name/Number:	Analysis	
1	Liame, Clives	2	
	Project Mgr. Davici	1 + 1 4 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 +	
Pasadana CA Alla	P.O. #		
Phone Number: ((い) うそら と)ちつ	Sampled By (signature)	ite T bearl ite T Myk erise	
	Sample ID Volume/	Acu Fat	Com
1/30/20 00 V LK uid	Wey menth Resempte 30		Earth Ter JCZ
			= 018 10 - CH
Relinquised By:(signature)	Date: Time:	Relinquised By:(signature)	Date: Time:
Received By: (signature)	Date: T	Received By:(signature)	Date: Time:
Upon sample reciept record the following results: Temp (°C) 7.3 NH_3 (mg/L) $\angle O$./	g results: .00 (<u>(0.)</u> CI (mg/L): 0.1		

Carring

Aquatic Bioassay and Consulting Laboratories 29 N. Olive Street Ventura, CA 93001 Phone: (805) 643-5621 Fax: (805) 643-2930



Appendix F – Weymouth WTP Influent 2021 Toxicity Test Report



September 8, 2021

Mr. David Hokanson Trussell Technologies 232 N. Lake Avenue Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms EPA-821-R-02-012.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Trussell Technologies
SAMPLE ID.:	Weymouth WTP Infl. with EarthTec QZ
DATE RECEIVED:	1 July – 21
ABC LAB NO.:	TRU0721.006

RAINBOW TROUT SURVIVAL BIOASSAY

% Survival = CON = 100.00% 3.0uL/L = 100.00% 8.35uL/L = 0.00% 16.7uL/L = 0.00%

EC50 = 5.675 ul/l

Yours very/truly, Scott Johnson

Laboratory Director

	mmary Repo	ort					•	ort Date:		8 Sep-21 13:		
Fish 96-h Acu	Ite Survival Test						Tes	t Code/IE Aqua	tic Bioassay 8	0721.006 / 1		-
Batch ID:	19-9127-3820		Test Type:	Survival (96h)			Δna		Joe Freas			-
Start Date:	07 Jul-21 16:00		Protocol:	EPA/821/R-02	-012 (2002)			-	Laboratory Wat	or		
Ending Date:	11 Jul-21 14:00		Species:	Oncorhynchus			Brin		Not Applicable			
Test Length:			Taxon:	Actinopterygii	myniaa		Sou		Aquatic Biosyst	ems, CO	Age:	
Sample ID:	07-2433-7579	(Code:	TRU0721.006			Proj					
Sample Date:	01 Jul-21 11:30	P	Aaterial:	Sample Water			Sou		Bioassay Repor	+		
Receipt Date:	01 Jul-21 11:30	C	CAS (PC):				Stat		Weymouth WT			
Sample Age:			lient:	Trussell Techn	ologies		•••••		vveymodar vv n	imacin		
Single Compa	rison Summary											
Analysis ID	Endpoint		Comp	arison Method			P-Value	Comp	arison Result			
01-7403-9603	96h Survival Rate	e	Steel N	/lany-One Rank	Sum Test		0.5000	3µL/L j	passed 96h sur	vival rate		1
Point Estimate	e Summary											
Analysis ID	Endpoint		Point	Estimate Meth	od	\checkmark	Level	μL/L	95% LCL	95% UCL		
19-6588-7535	96h Survival Rate	е	Linear	Interpolation (IC	PIN)		EC10	3.535	3.535	3,535		1
							EC15	3.803	3.803	3.803		
							EC20	4.07	4.07	4.07		
							EC25	4.338	4.338	4.338		
							EC40	5.14	5.14	5.14		
_							EC50	5.675	5.675	5.675		
Test Acceptab	bility					TAC L		5.675	5.675	5.675	_	-
Analysis ID	Endpoint		Attribu		Test Stat	Lower		5.675 Overla		5.675		
Analysis ID 01-7403-9603	Endpoint 96h Survival Rate		Contro	l Resp	Test Stat		imits					
Analysis ID 01-7403-9603	Endpoint			l Resp		Lower	imits Upper	Overla	p Decision	riteria		
Analysis ID 01-7403-9603 19-6588-7535	Endpoint 96h Survival Rate		Contro	l Resp	1	Lower 0,9	imits Upper >>	Overla Yes	p Decision Passes C	riteria		
Analysis ID 01-7403-9603 19-6588-7535 96h Survival R Conc-µL/L	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code	Count	Contro Contro Mean	I Resp I Resp 95% LCL	1 1 95% UCL	Lower 0,9 0.9 Min	imits Upper >> >>	Overla Yes Yes Std Err	p Decision Passes C Passes C r Std Dev	riteria	%Effec	:t
Analysis ID 01-7403-9603 19-6588-7535 96h Survival R Conc-µL/L	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary	Count 4	Contro Contro Mean 1.0000	I Resp I Resp 95% LCL 1.0000	1 1 95% UCL 1,0000	Lower 0,9 0.9 Min 1,0000	imits Upper >> >> Max 1,0000	Overla Yes Yes Std Err	p Decision Passes C Passes C r Std Dev 0.0000	riteria riteria	%Effec 0.00%	:t
Analysis ID 01-7403-9603 19-6588-7535 96h Survival R Conc-µL/L	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code	Count 4 4	Contro Contro Mean 1.0000 1.0000	I Resp I Resp 95% LCL 1.0000 1.0000	1 1 95% UCL 1.0000 1.0000	Lower 0.9 0.9 Min 1.0000 1.0000	imits Upper >> >> Max 1.0000 1.0000	Overla Yes Yes Std Err 0.0000 0.0000	p Decision Passes C Passes C r Std Dev 0.0000 0.0000	riteria riteria CV%	0.00% 0.00%	
Analysis ID 01-7403-9603 19-6588-7535 96h Survival F Conc-µL/L 3 3.35	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code	Count 4 4 4	Contro Contro Mean 1.0000 1.0000 0.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000	1 1 95% UCL 1.0000 1.0000 0.0000	Lower 0,9 0.9 Min 1,0000 1.0000 0,0000	imits Upper >> >> Max 1.0000 1.0000 0.0000	Overla Yes Yes Std Err 0.0000 0.0000 0.0000	p Decision Passes C Passes C r Std Dev 0.0000 0.0000 0.0000 0.0000	riteria riteria CV%	0.00% 0.00% 100.00	%
Analysis ID D1-7403-9603 19-6588-7535 96h Survival R Conc-µL/L 0 3 3.35 16.7	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N	Count 4 4	Contro Contro Mean 1.0000 1.0000	I Resp I Resp 95% LCL 1.0000 1.0000	1 1 95% UCL 1.0000 1.0000	Lower 0.9 0.9 Min 1.0000 1.0000	imits Upper >> >> Max 1.0000 1.0000	Overla Yes Yes Std Err 0.0000 0.0000	p Decision Passes C Passes C r Std Dev 0.0000 0.0000 0.0000 0.0000	riteria riteria CV%	0.00% 0.00%	%
Analysis ID D1-7403-9603 19-6588-7535 96h Survival R Conc-µL/L 3 3.35 16.7 96h Survival R	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N	Count 4 4 4 4	Contro Contro Mean 1.0000 1.0000 0.0000 0.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000	1 95% UCL 1.0000 1.0000 0.0000 0.0000	Lower 0,9 0.9 Min 1,0000 1.0000 0,0000	imits Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Overla Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	p Decision Passes C Passes C r Std Dev 0.0000 0.0000 0.0000 0.0000	riteria riteria CV% 	0.00% 0.00% 100.00 100.00	%
Analysis ID 11-7403-9603 19-6588-7535 96h Survival R Conc-µL/L 3 3.35 16.7 16h Survival R Conc-µL/L	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code	Count 4 4 4 4 4 8 Rep 1	Contro Contro Mean 1.0000 0.0000 0.0000 Rep 2	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3	1 95% UCL 1.0000 1.0000 0.0000 0.0000 Rep 4	Lower 0,9 0.9 Min 1,0000 1.0000 0,0000	imits Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Overla Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	p Decision Passes C Passes C r Std Dev 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	riteria riteria CV% 	0.00% 0.00% 100.00 100.00	%
Analysis ID 01-7403-9603 19-6588-7535 96h Survival R Conc-µL/L 3.35 6.7 16h Survival R Conc-µL/L	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N	Count 4 4 4 4 4 8 Rep 1 1.0000	Contro Contro Mean 1.0000 0.0000 0.0000 0.0000 Rep 2 1.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000	1 1 95% UCL 1.0000 0.0000 0.0000 Rep 4 1.0000	Lower 0,9 0.9 Min 1,0000 1.0000 0,0000	imits Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Overla Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	p Decision Passes C Passes C r Std Dev 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	riteria riteria CV% 	0.00% 0.00% 100.00 100.00	%
Analysis ID D1-7403-9603 19-6588-7535 26h Survival R Conc-µL/L 3 3.35 6.7 16h Survival R Conc-µL/L 3 3	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code	Count 4 4 4 4 4 8 Rep 1 1.0000 1.0000	Contro Contro Mean 1.0000 0.0000 0.0000 0.0000 Rep 2 1.0000 1.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 1.0000	1 1 95% UCL 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000	Lower 0,9 0.9 Min 1,0000 1.0000 0,0000	imits Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Overla Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	p Decision Passes C Passes C r Std Dev 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	riteria riteria CV% 	0.00% 0.00% 100.00 100.00	%
Analysis ID 01-7403-9603 19-6588-7535 96h Survival R Conc-µL/L 3 3.35 6.7 16h Survival R Conc-µL/L 3 3 3 3 3 3 3 3 3 3 3 3 3	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code	Count 4 4 4 4 4 4 1.0000 1.0000 1.0000 0.0000	Contro Contro Mean 1.0000 0.0000 0.0000 Rep 2 1.0000 1.0000 0.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 1.0000 0.0000	1 1 95% UCL 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000 0.0000	Lower 0,9 0.9 Min 1,0000 1.0000 0,0000	imits Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Overla Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	p Decision Passes C Passes C r Std Dev 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	riteria riteria CV% 	0.00% 0.00% 100.00 100.00	%
Analysis ID 01-7403-9603 19-6588-7535 96h Survival R Conc-µL/L 3 3.35 6.7 16h Survival R Conc-µL/L 3 3 3 3 3 3 3 3 3 3 3 3 3	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code	Count 4 4 4 4 4 8 Rep 1 1.0000 1.0000	Contro Contro Mean 1.0000 0.0000 0.0000 0.0000 Rep 2 1.0000 1.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 1.0000	1 1 95% UCL 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000	Lower 0,9 0.9 Min 1,0000 1.0000 0,0000	imits Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Overla Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	p Decision Passes C Passes C r Std Dev 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	riteria riteria CV% 	0.00% 0.00% 100.00 100.00	%
Analysis ID 11-7403-9603 19-6588-7535 96h Survival R Conc-µL/L 3 3.35 6.7 6h Survival R Conc-µL/L 3 6.7 6h Survival R 6.7	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code N Rate Binomials	Count 4 4 4 4 4 4 1.0000 1.0000 1.0000 0.0000	Contro Contro Mean 1.0000 0.0000 0.0000 Rep 2 1.0000 1.0000 0.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 1.0000 0.0000	1 1 95% UCL 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000 0.0000	Lower 0,9 0.9 Min 1,0000 1.0000 0,0000	imits Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Overla Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	p Decision Passes C Passes C r Std Dev 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	riteria riteria CV% 	0.00% 0.00% 100.00 100.00	%
Analysis ID 11-7403-9603 19-6588-7535 196h Survival R Conc-µL/L 3 6.7 6h Survival R Conc-µL/L 6h Survival R Conc-µL/L	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code N Rate Binomials Code	Count 4 4 4 4 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000	Contro Contro Mean 1.0000 0.0000 0.0000 Rep 2 1.0000 0.0000 0.0000 0.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 1.0000 0.0000 0.0000 0.0000	1 1 95% UCL 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 Rep 4	Lower 0,9 0.9 Min 1,0000 1.0000 0,0000	imits Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Overla Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	p Decision Passes C Passes C r Std Dev 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	riteria riteria CV% 	0.00% 0.00% 100.00 100.00	%
Analysis ID 11-7403-9603 19-6588-7535 26h Survival R Conc-µL/L 3 3 3 3 5 6.7 26h Survival R Conc-µL/L 5 6 6 7 6 6 6 7 6 6 7 6 6 7 6 6 7 6 6 7 6 6 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code N Rate Binomials	Count 4 4 4 4 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	Contro Contro Mean 1.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	1 1 95% UCL 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	Lower 0,9 0.9 Min 1,0000 1.0000 0,0000	imits Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Overla Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	p Decision Passes C Passes C r Std Dev 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	riteria riteria CV% 	0.00% 0.00% 100.00 100.00	%
Analysis ID 01-7403-9603 19-6588-7535 96h Survival R Conc-µL/L 0 3 3.35 16.7 96h Survival R Conc-µL/L 0 3 3.35 16.7 17.7 1	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code N Rate Binomials Code	Count 4 4 4 4 4 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	Contro Contro Mean 1.0000 0.0000 0.0000 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	1 1 95% UCL 1.0000 1.0000 0.0000 0.0000 1.0000 1.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	Lower 0,9 0.9 Min 1,0000 1.0000 0,0000	imits Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Overla Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	p Decision Passes C Passes C r Std Dev 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	riteria riteria CV% 	0.00% 0.00% 100.00 100.00	%
01-7403-9603 19-6588-7535 96h Survival F Conc-µL/L 0 3 3.35 16.7 96h Survival R Conc-µL/L 0 3 3.35 16.7	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code N Rate Binomials Code	Count 4 4 4 4 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	Contro Contro Mean 1.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	1 1 95% UCL 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	Lower 0,9 0.9 Min 1,0000 1.0000 0,0000	imits Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Overla Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	p Decision Passes C Passes C r Std Dev 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	riteria riteria CV% 	0.00% 0.00% 100.00 100.00	%

1 arc Analyst:___

		ort	_		_				eport Date		J0721.006	3:31 (p 1 o / 18-8018-4
Fish 96-h Acu	ite Survival Test	t							Aqu	atic Bioassay	& Consulti	ng Labs, l
Analysis ID:	01-7403-9603		indpoint:	96h Survival F	Rate			CE	TIS Vers	ion: CETIS	/1.9.7	
Analyzed:	08 Sep-21 13:18		nalysis:	Nonparametric					atus Leve	el: 1		
Edit Date:	08 Sep-21 13:07			3A0D5E0FE4	0D419F8	BDEC	03F511260	D3FC Ed	litor ID:	007-979	9-628-1	
Batch ID:	19-9127-3820			Survival (96h)					alyst:	Joe Freas		
Start Date:	07 Jul-21 16:00 11 Jul-21 14:00		rotocol:	EPA/821/R-02		02)			uent:	Laboratory Wa		
Test Length:			pecies: axon:	Oncorhynchus Actinopterygii	s mykiss				ine:	Not Applicable		
		_	_	Actinopterygi		_	_		urce:	Aquatic Biosys	stems, CO	Age:
Sample ID:	07-2433-7579		ode:	TRU0721.006				Pr	oject:			
-	01 Jul-21 11:30		laterial:	Sample Water					urce:	Bioassay Repo		
	01 Jul-21 11:30		AS (PC):	T . NT .				Sta	ation:	Weymouth W1	P Influent	
Sample Age:	00 411		lient:	Trussell Techr	nologies							
Data Transfor		Alt Hy	р				Compari	son Resul	t			
Angular (Corre	cted)	C > T					3µL/L pas	sed 96h si	Irvival rate	endpoint		
Steel Many-O	ne Rank Sum Te	st										
Control	vs Conc-µL	/L	Test S	tat Critical	Ties	DF	P-Type	P-Value	Decis	ion(α:5%)		
Negative Contro	ol 3		18	12	1		CDF	0.5000		Significant Effect	:t	
Test Acceptab	oility Criteria	TA/	Limits								-	
Attribute	Test Stat		Upper	Overlap	Decisi	on						
Control Resp	1	0.9	>>	Yes	Passes		eria	-				-
ANOVA Table		_										
Source	Sum Squa	ares		Square	DF	_	F Stat	P-Value		ion(α:5%)		
Between Error	0		0		1				Indete	rminate		
Total	0		0		6	-						
ANOVA Assum	notions Tests									-	_	
Attribute	Test				Test St	tot .	Critical	DV-h-s				
Variance	Variance R	atio E Te	st		Test St	lat	Critical	P-Value		ion(α:1%) rminate	_	
Distribution	Shapiro-W									rminate		
96h Survival R		-							indete			
		Count	Maan	05% 1.01	0.50/ 110							
Conc-µL/L	Code	Count	Mean	95% LCL	95% UC	CL I	Median	Min	Max	Std Err	CV%	%Effect
3	N	4 4	1.0000	1.0000 1.0000	1.0000			1.0000 1.0000	1.0000		0.00%	0.00%
, 3.35		4	0.0000	0.0000	0.0000			0.0000	1.0000		0.00%	0.00% 100.00%
6.7		4	0.0000	0.0000	0.0000			0.0000	0.0000			100.00%
Angular (Corre	cted) Transform	ned Sum				-						100.007
Conc-µL/L	Code	Count	Mean	95% LCL	95% UC		Median	Min	Mari	64d E	CN /0/	0/ ====
)	N	4	1.4120	1.4120	1.4120		Tudi	Min 1.4120	Max 1.4120	Std Err 0.0000	CV%	%Effect
3		4	1.4120	1 4120	1.4120			1.4120	1.4120		0.00%	0.00% 0.00%
3.35		4	0.1588	0.1588	0.1588			0.1588	0.1588		0.00%	88,76%
6.7		4	0.1588	0.1588	0.1588			0.1588	0.1588		0.00%	88.76%
6h Survival R	ate Detail		_									
Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4							
	N	1.0000	1 0000	1.0000	1.0000							
5		1.0000	1.0000	1,0000	1.0000							
		0.0000	0,0000	0.0000	0.0000							
.35		0.0000	0.0000	0.0000	0.0000							

CETIS Ana	alytical Repo	ort				Report Date: Test Code/ID:	08 Sep-21 13:31 (p 2 of 2) TRU0721.006 / 18-8018-4475
Fish 96-h Acu	ute Survival Test					Aquatic B	lioassay & Consulting Labs, Inc.
Analysis ID:	01-7403-9603	En	dpoint: 9	6h Survival R	ate	CETIS Version:	CETISv1.9.7
Analyzed:	08 Sep-21 13:18	An	alysis: N	lonparametric	-Control vs Treatments	Status Level:	1
Edit Date:	08 Sep-21 13:07	ME)5 Hash: 3	A0D5E0FE40	D419F8BDE03F5112603FC	Editor ID:	007-979-628-1
Angular (Cor	rected) Transform	ned Detail					
Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4		
0	N	1.4120	1.4120	1.4120	1.4120		
3		1.4120	1.4120	1.4120	1.4120		

0.1588

0_1588

Analyst: 11

QA-1____

8.35

16.7

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0.1588

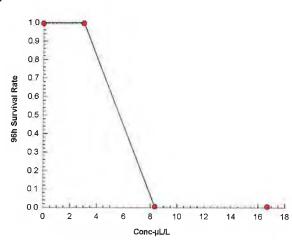
0.1588

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	S Ana	lytical Repo	ort						Report Date Fest Code/			8 Sep-21 13 J0721.006 /	
Fish 9	6-h Acu	te Survival Test		_								& Consultin	
Analy	sis ID:	19-6588-7535	En	dpoint:	96h Survival R	ate			ETIS Vers		CETIS		3,
Analy		08 Sep-21 13:18		alysis:	Linear Interpola				Status Leve		1	1.9.7	
Edit D		08 Sep-21 13:07		-	3A0D5E0FE40	. ,	03F51126		Editor ID:		007-979	9-628-1	
Batch	ID:	19-9127-3820	Те	st Type:	Survival (96h)			4	Analyst:	loe	Freas		
Start D	Date:	07 Jul-21 16:00		otocol:	EPA/821/R-02	-012 (2002)			Diluent:		pratory Wa	ter	
Endin	q Date:	11 Jul-21 14:00	Sp	ecies:	Oncorhynchus	```			Brine:		Applicable		
	ength:			xon:	Actinopterygii	,			Source:		atic Biosys	tems, CO	Age:
Sampl	le ID:	07-2433-7579	Co	de:	TRU0721 006			P	Project:				
		01 Jul-21 11:30		terial:	Sample Water				Source:	Bioa	ssay Repo	rt	
•		01 Jul-21 11:30		S (PC):					station:		• •	P Influent	
•	le Age:			ent:	Trussell Techn	ologies				,		1 mildent	
Linear	Interpo	lation Options											
X Tran	Isform	Y Transform	Se	ed	Resamples	Exp 95%	CL Met	thod					
Linear		Linear	0		280	Yes	Two	-Point Int	erpolation	_			
Test A	cceptab	ility Criteria	TAC	Limits									
Attribu	ıte	Test Stat	Lower	Upper	Overlap	Decision							
Control	l Resp	1	0.9	>>	Yes	Passes Cri	iteria						
Point E	Estimate	s											
Level	μL/L	95% LCL	95% UCL										
Level EC10	μL/L 3.535		95% UCL					_					-
EC10	<u> </u>	3.535		-				_		-			
EC10 EC15	3.535	3.535	3,535										
EC10 EC15 EC20	3.535 3.803	3.535 3.803	3,535 3,803										_
EC10 EC15 EC20 EC25 EC40	3.535 3.803 4.07 4.338 5.14	3.535 3.803 4.07 4.338 5.14	3,535 3,803 4.07										
EC10 EC15 EC20 EC25 EC40 EC50	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338										
EC10 EC15 EC20 EC25 EC40 EC50	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338 5.14	3,535 3,803 4.07 4,338 5.14			Calcul	lated Varia	ate(A/B)				Isotor	nic Variate
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338 5.14 5.675 Rate Summary Code	3.535 3.803 4.07 4.338 5.14 5.675 Count	Mean	Median	Min	Max	CV%	%Effe	_	A/B	Mean	nic Variate %Effect
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-1	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338 5.14 5.675 Count 4	Mean 1.0000	1.0000	Min 1.0000	Max 1.0000	CV%	0.00%	6	40/40	_	%Effect 0.00%
EC10 EC15 EC20 EC25 EC40 EC50 P6h Su Conc - 1 O	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338 5.14 5.675 Rate Summary Code	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4	Mean 1.0000 1.0000	1.0000 1.0000	Min 1.0000 1.0000	Max 1.0000 1.0000	CV%	0.00%	6 6	40/40 40/40	Mean 1.0000 1.0000	%Effect 0.00% 0.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc ₁ D 3 3.35	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338 5.14 5.675 Rate Summary Code	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4	Mean 1.0000 1.0000 0.0000	1.0000 1.0000 0.0000	Min 1.0000 1.0000 0.0000	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.0	6 6 0%	40/40 40/40 0/40	Mean 1.0000 1.0000 0.0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su 0 3 3.35 16.7	3.535 3.803 4.07 4.338 5.14 5.675 Irvival R	3.535 3.803 4.07 4.338 5.14 5.675 tate Summary Code N	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4	Mean 1.0000 1.0000	1.0000 1.0000 0.0000	Min 1.0000 1.0000	Max 1.0000 1.0000	CV% 0.00% 0.00%	0.00%	6 6 0%	40/40 40/40	Mean 1.0000 1.0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-1 D 3 3.35 16.7 96h Su	3.535 3.803 4.07 4.338 5.14 5.675 irvival R	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4	Mean 1.0000 1.0000 0.0000 0.0000	1.0000 1.0000 0.0000 0.0000	Min 1.0000 1.0000 0.0000 0.0000	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.0	6 6 0%	40/40 40/40 0/40	Mean 1.0000 1.0000 0.0000	%Effect 0.00% 0.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-1 3 3.35 16.7 96h Su Conc-1	3.535 3.803 4.07 4.338 5.14 5.675 irvival R	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N ate Detail Code	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 8 Rep 1	Mean 1.0000 1.0000 0.0000 0.0000 Rep 2	1.0000 1.0000 0.0000 0.0000 Rep 3	Min 1.0000 1.0000 0.0000 0.0000 Rep 4	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.0	6 6 0%	40/40 40/40 0/40	Mean 1.0000 1.0000 0.0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-1 D 3 3.35 16.7 96h Su	3.535 3.803 4.07 4.338 5.14 5.675 irvival R	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 Rep 1 1.0000	Mean 1.0000 0.0000 0.0000 Rep 2 1.0000	1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000	Min 1.0000 1.0000 0.0000 0.0000 0.0000 Rep 4 1.0000	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.0	6 6 0%	40/40 40/40 0/40	Mean 1.0000 1.0000 0.0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc- 1 3.35 I6.7 96h Su Conc- 1 3.35	3.535 3.803 4.07 4.338 5.14 5.675 irvival R	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N ate Detail Code	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 Rep 1 1.0000 1.0000	Mean 1.0000 0.0000 0.0000 Rep 2 1.0000 1.0000	1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 1.0000	Min 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.0	6 6 0%	40/40 40/40 0/40	Mean 1.0000 1.0000 0.0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-1 3 3.35 I6.7 96h Su Conc-1 3 3.35	3.535 3.803 4.07 4.338 5.14 5.675 irvival R	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N ate Detail Code	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 Rep 1 1.0000	Mean 1.0000 0.0000 0.0000 Rep 2 1.0000	1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 1.0000 0.0000	Min 1.0000 1.0000 0.0000 0.0000 0.0000 Rep 4 1.0000	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.0	6 6 0%	40/40 40/40 0/40	Mean 1.0000 1.0000 0.0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc- 1 3 3 .35 I6.7 96h Su Conc- 1 3 3 .35 I6.7 96h Su 2 6 5 6 7 1 1 1 1 1 1 1 1 1 1	3.535 3.803 4.07 4.338 5.14 5.675 irvival R iL/L	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N ate Detail Code	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 4 4 4 5.000 1.0000 1.0000 0.0000	Mean 1.0000 0.0000 0.0000 Rep 2 1.0000 1.0000 0.0000	1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 1.0000 0.0000	Min 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000 0.0000	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.0	6 6 0%	40/40 40/40 0/40	Mean 1.0000 1.0000 0.0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su 20nc-1 3 3.35 6.7 96h Su 3 3.35 6.7	3.535 3.803 4.07 4.338 5.14 5.675 rrvival R JL/L	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N ate Detail Code N	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 4 4 4 1.0000 1.0000 0.0000 0.0000	Mean 1.0000 0.0000 0.0000 Rep 2 1.0000 1.0000 0.0000 0.0000	1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 1.0000 0.0000 0.0000	Min 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000 0.0000 0.0000 0.0000	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.0	6 6 0%	40/40 40/40 0/40	Mean 1.0000 1.0000 0.0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su 20nc-1 3 3.35 I6.7 96h Su 20nc-1 3 3.35 I6.7 96h Su 20nc-1 3 3.35 I6.7	3.535 3.803 4.07 4.338 5.14 5.675 rrvival R JL/L	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N ate Detail Code N ate Detail code	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 4 4 4 5.000 1.0000 1.0000 0.0000	Mean 1.0000 0.0000 0.0000 Rep 2 1.0000 1.0000 0.0000	1.0000 1.0000 0.0000 Rep 3 1.0000 1.0000 0.0000 0.0000 Rep 3	Min 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000 0.0000	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.0	6 6 0%	40/40 40/40 0/40	Mean 1.0000 1.0000 0.0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su 20nc-1 3 3.35 I6.7 96h Su 20nc-1 3 3.35 6.7 6 6 7	3.535 3.803 4.07 4.338 5.14 5.675 rrvival R JL/L	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N ate Detail Code N ate Detail Code N	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 4 4 4 4 1.0000 1.0000 0.0000 0.0000 0.0000 Rep 1	Mean 1.0000 0.0000 0.0000 Rep 2 1.0000 1.0000 0.0000 0.0000 Rep 2	1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 1.0000 0.0000 0.0000	Min 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.0	6 6 0%	40/40 40/40 0/40	Mean 1.0000 1.0000 0.0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su 20nc - 1 3 .35 I6.7 96h Su 3 .35 6.7 96h Su 3 .35 6.7	3.535 3.803 4.07 4.338 5.14 5.675 rrvival R JL/L	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N ate Detail Code N ate Binomials Code N	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 4 4 4 4 4 4 7 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000	Mean 1.0000 0.0000 0.0000 Rep 2 1.0000 0.0000 0.0000 Rep 2 10/10	1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 1.0000 0.0000 0.0000 Rep 3 10/10	Min 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.0	6 6 0%	40/40 40/40 0/40	Mean 1.0000 1.0000 0.0000	%Effect 0.00% 0.00% 100.00%

CETIS Ana	alytical Report		Report Date: Test Code/ID:	08 Sep-21 13:31 (p 2 of 2) TRU0721.006 / 18-8018-4475	
Fish 96-h Acu	ute Survival Test			Aquatic E	Bioassay & Consulting Labs, Inc.
Analysis ID:	19-6588-7535	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1 9.7
Analyzed:	08 Sep-21 13:18	Analysis:	Linear Interpolation (ICPIN)	Status Level:	1
Edit Date:	08 Sep-21 13:07	MD5 Hash:	3A0D5E0FE40D419F8BDE03F5112603FC	Editor ID:	007-979-628-1

Graphics





en-mg/L		Protocol: Species: Taxon: Code: Material: CAS (PC): Client:	Survival (96h) EPA/821/R-02 Oncorhynchus Actinopterygii TRU0721.006 Sample Water Trussell Techn 95% LCL	mykiss			Analyst: Diluent: Brine: Source: Project: Source:	Itic Bioassay & Joe Freas Laboratory Wat Not Applicable Aquatic Biossay Bioassay Repoi	& Consultir eer eems, CO	18-8018-447 ng Labs, Inc. Age:
7 Jul-21 16:00 1 Jul-21 14:00 44h 7-2433-7579 1 Jul-21 11:30 1 Jul-21 11:30 d 4h D3)-mg/L Code N	Count 1 1	Protocol: Species: Taxon: Code: Material: CAS (PC): Client: Mean	EPA/821/R-02 Oncorhynchus Actinopterygii TRU0721.006 Sample Water Trussell Techn	mykiss			Diluent: Brine: Source: Project: Source:	Laboratory Wat Not Applicable Aquatic Biosyst Bioassay Repor	ems, CO	Age:
1 Jul-21 11:30 1 Jul-21 11:30 d 4h D3)-mg/L Code N	Count 1 1	Material: CAS (PC): Client: Mean	Sample Water Trussell Techn	ologies			Source:			
Code N	1 1		95% LCL							
N	1 1		95% LCL							
	1	125		95% UCL	Min	Max	Std Er	Std Dev	CV%	QA Coun
					125	125		0		0
	1	125		Rett.	125	125		0		0
	100	125			125	125		0		0
an ma/l	1	125			125	125		0		0
an ma/l	4	125	125	125	125	125	0	0	0.00%	0 (0%)
cuality/L										
Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Cour
N	5	10.22	9.875	10.56	9.9	10.5	0.0555	0.2775	2.72%	0
	5	10.2	10.08	10.32	10.1	10.3	0.02	0.1	0.98%	0
	2	10.05	8.144	11.96	9.9	10.2	0.1061	0.2121	2.11%	0
	2	10.05	8.144	11_96	9.9	10.2	0_1061	0.2121	2.11%	0
	14	10.16	10.05	10.28	9.9	10.5	0 05305	5 0.1985	1.95%	0 (0%)
03)-mg/L										
Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Coun
N	1	300			300	300		0		0
	1	330			330	330		0		0
	1	323		***	323	323	***	0		0
	3	317,7	278.7	356_7	300	330	9.062	15.7	4.94%	0 (0%)
Code	Count	Mean	95% LCL	95% UCL	Min	Max		Std Dev	CV%	QA Count
		7.98					0.0555		3,48%	0
						8.2	0.06419	0.3209	4.03%	0
						8	0.2121	0.4243	5.51%	0
										0
	14	7.886	7.696	8.075	7,3	8.2	0.08762	0.3278	4.16%	0 (0%)
		Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
		12.06	10.02	14.1	10.2	14	0.3282	1.641	13.61%	0
				13.66	12.8	13.9		0.4658	3.56%	0
						14	0.4243	0.8485	6.33%	0
								0.8485	6.33%	0
	Code N Code N	2 14 3)-mg/L Code Count N 1 1 1 3 3 Code Count N 5 5 2 2 2 2 14 Code Count	2 10.05 14 10.16 3)-mg/L Code Count Mean N 1 300 1 323 N 1 323 3 317.7 Code Count Mean Mean N 5 7.98 5 7.96 2 7.7 2 7.65 14 7.886 Code Count Mean Mean	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	2 10.05 8.144 11.96 9.9 10.2 14 10.16 10.05 10.28 9.9 10.5 3)-mg/L Code Count Mean 95% LCL 95% UCL Min Max N 1 300 300 300 1 323 323 323 3 317.7 278.7 356.7 300 330 K 5 7.98 7.635 8.325 7.5 8.2 S 7.96 7.562 8.358 7.4 82 2 7.65 3.203 12.1 7.3 8 14 7.886 7.696 8.075 7.3 8.2 Code Count Mean 95% LCL 95% UCL Min Max N 5 7.98 7.635 8.325 7.3 8.2 2 7.7 3.888 11.51 7.4 8	2 10.05 8.144 11.96 9.9 10.2 0.1061 14 10.16 10.05 10.28 9.9 10.5 0.05305 3)-mg/L Code Count Mean 95% LCL 95% UCL Min Max Std Err N 1 300 300 300 1 320 323 323 1 323 323 323 3 317.7 278.7 356.7 300 330 9.062 Code Count Mean 95% LCL 95% UCL Min Max Std Err N 5 7.98 7.635 8.325 7.5 8.2 0.06419 2 7.7 3.888 11.51 7.4 8 0.2121 2 7.65 3.203 12.1 7.3 8.2 0.08762	2 10.05 8.144 11.96 9.9 10.2 0.1061 0.2121 14 10.16 10.05 10.28 9.9 10.5 0.05305 0.1985 3)-mg/L Code Count Mean 95% LCL 95% UCL Min Max Std Err Std Dev N 1 300 300 300 0 1 330 330 330 0 1 323 323 323 0 3 317.7 278.7 356.7 300 330 9.062 15.7 Code Count Mean 95% LCL 95% UCL Min Max Std Err Std Dev N 5 7.98 7.635 8.325 7.5 8.2 0.06419 0.3209 2 7.65 3.203 12.1 7.3 8 0.2475 0.495	2 10.05 8.144 11.96 9.9 10.2 0.1061 0.2121 2.11% 14 10.16 10.05 10.28 9.9 10.5 0.05305 0.1985 1.95% 3)-mg/L Code Count Mean 95% LCL 95% UCL Min Max Std Err Std Dev CV% N 1 300 300 300 0 1 320 300 330 0 1 323 323 323 0 3 317.7 278.7 356.7 300 330 9.062 15.7 4.94% N 5 7.98 7.635 8.325 7.5 8.2 0.06419 0.3209 4.03% 2 7.65 3.203 12.1 7.3 8 0.2475 0.495 6.47% 2



July 21, 2021

Mr. David Hokanson Trussell Technologies 232 N. Lake Avenue Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms EPA-821-R-02-012.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Trussell Technologies
SAMPLE ID.:	Weymouth WTP Infl. with EarthTec QZ
DATE RECEIVED:	1 July – 21
ABC LAB NO.:	TRU0721.006

ACUTE FATHEAD MINNOW SURVIVAL BIOASSAY

% Survival = 97.50% Survival in 16.7 ul/l Sample

EC50 = >16.7 ul/l

Yours very truly,

A Scott Johnson Laboratory Director

CETIS Summary Report

 Report Date:
 21 Jul-21 15:02 (p 1 of 1)

 Test Code/ID:
 TRU0721.006afml / 03-7525-8897

Fathead Minn	ow 96-h Acute S	Survival Test							Aquat	tic B	ioassay & C	Consulting	Labs, Inc	2.
Batch ID: Start Date: Ending Date: Test Length:	02-4273-4213 07 Jul-21 14:50 11 Jul-21 14:10 95h	Test Ty Protoco Species Taxon:	ol: E s: F	Survival (96h) PA/821/R-02-(Pimephales pro Actinopterygii	. ,			Dilu Brir	ie:	Not	eiving Water Applicable atic Biosyste		Age: <2	24
Receipt Date:	20-8538-1072 01 Jul-21 11:30 01 Jul-21 11:30 6d 3h (12 °C)	CAS (P	Code:TRU0721.006afmlMaterial:Sample WaterCAS (PC):Trussell Technologies					Sou		Bioassay Report Weymouth WTP Infl. with E			arth Tec	Q
			_		logica	-								_
-	parison Summa						,							
Analysis ID	Endpoint			rison Method	Cum Toot		~	NOEL 16.7	>16.7		TOEL	PMSD 6.22%		5
15-1204-8978	96h Survival Ra	te S		any-One Rank	Sum Test	_	_	16.7	>16.7	_		6.22%		_
Point Estimat	e Summary													
Analysis ID	Endpoint	P	oint E	stimate Metho	bd	_	\checkmark	Level	μL/L		95% LCL	95% UCL		5
04-0318-1598	96h Survival Ra	te Li	near l	nterpolation (IC	PIN)			EC10	>16.7					1
								EC15	>16.7	,				
								EC20	>16.7	,				
								EC25	>16.7			(NAR)		
								EC40	>16.7	,				
								EC50	>16.7				_	
Test Acceptal	bility					TAC	: Li	mits						
Analysis ID	Endpoint	A	ttribut	te	Test Stat	Lower		Upper	Over	lap	Decision			
04-0318-1598	96h Survival Ra	te C	ontrol	Resp	1	0.9		>>	Yes		Passes Cr	iteria		
15-1204-8978	96h Survival Ra	te C	ontrol	Resp	1	0.9		>>	Yes		Passes Cr	riteria		
96h Survival I	Rate Summary													
Conc-µL/L	Code	Count M	ean	95% LCL	95% UCL	Min		Max	Std E	rr	Std Dev	CV%	%Effec	;t
0	D	4 1.	.0000	1.0000	1.0000	1.0000		1.0000	0.000	0	0.0000		0.00%	
3		4 1.	0000	1.0000	1.0000	1.0000		1.0000	0.000	0	0.0000		0.00%	
8.35		4 0.	9750	0.8954	1.0550	0.9000		1.0000	0.025	0	0.0500	5.13%	2.50%	
16.7		4 0.	.9750	0.8954	1.0550	0.9000		1.0000	0.025	50	0.0500	5.13%	2.50%	
96h Survival I	Rate Detail							ME	5: 766E	3A0F	6A5923632	28F685871	0ABB13E	\$
Conc-µL/L	Code	Rep 1 R	ep 2	Rep 3	Rep 4									
0	D	1.0000 1.	0000	1.0000	1.0000									
3		1.0000 1.	.0000	1.0000	1:0000									
8.35			.0000	0.9000	1.0000									
16.7			9000	1.0000	1.0000									
96h Survival I	Rate Binomials						-							-
Conc-µL/L	Code	Rep 1 R	ep 2	Rep 3	Rep 4									
0	D		D/10	10/10	10/10									
3			0/10	10/10	10/10									
3														
8.35		10/10 10	0/10	9/10	10/10									

PA35 Analyst:_____QA:___

				-	_				Code/ID	-		3-7525-889
Fathead Minn	ow 96-h Acute				_	-		_	Aquati	c Bioassay & (Labs, Inc
Analysis ID:	15-1204-8978		dpoint: 96h			_			CETIS Version: CETISv1.9.7			
Analyzed:	20 Jul-21 15:08		-	parametric					IS Level:		100.0	
Edit Date:	20 Jul-21 14:49		5 Hash: 766	BAOF6A592	2363228	-68:	58710ABB1	3B Edito	or ID:	000-189-	126-0	
Batch ID:	02-4273-4213	Tes	st Type: Sur	vival (96h)				Anal	yst:			
Start Date:	07 Jul-21 14:50		otocol: EP/	4/821/R-02-	012 (200	2)		Dilue	e nt: F	Receiving Wate	er	
Ending Date:	11 Jul-21 14:10) Sp	ecies: Pim	ephales pro	omelas			Brine	e: N	lot Applicable		
Test Length:	95h	Тах	con: Act	inopterygii				Sour	ce: A	Aquatic Biosyst	ems, CO	Age: <2
Sample ID:	20-8538-1072	Co	de: TRU	J0721.006a	fml			Proje	ect:			
Sample Date:	01 Jul-21 11:30) Ma	terial: Sar	nple Water				Sour	ce: E	Bioassay Repor	t	
Receipt Date:	01 Jul-21 11:30) CA	S (PC):					Stati	on: V	Veymouth WT	P Infl. with E	Earth Tec
Sample Age:	6d 3h (12 °C)	Cli	ent: Tru	ssell Techn	ologies							
Data Transfor	rm	Alt Hyp					NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corre		C > T					16.7	>16.7			0.06216	6.22%
Steel Many-O	ne Rank Sum 1	- est										
Control	vs Conc-µ		Test Stat	Critical	Ties	DF	P-Type	P-Value	Deciei	on(α:5%)		
Dilution Water			18	10	1	6	CDF	0.7500		gnificant Effect	t	
Dilution water	8.35		16	10	1	6	CDF	0.5065		gnificant Effect		
	16.7		16	10	1	6	CDF	0.5065		gnificant Effect		
Test Acceptal	hility Critoria				1.6		_			_	-	
	-		Limits	Ourselaw	Desisi							
Attribute	Test Sta		Upper >>	Overlap Yes	Decisi Passes	-	Itaria	_	_		_	_
Control Resp	1	0.9		res	Passes	s or	Itena			_		
ANOVA Table	•											
Source	Sum Sq		Mean Squ	lare	DF		F Stat	P-Value		on(α:5%)	_	_
Between	0.006639		0.0022133		3		0.6667	0.5885	Non-Si	gnificant Effect	t	
Error	0.039839		0.0033199)	12	_	-					
Total	0.046478	38		_	15		_	_	_			
ANOVA Assu	mptions Tests											
Attribute	Test				Test St	tat	Critical	P-Value	Decisi	on(α:1%)		
Variance	Bartlett E	iquality of V	ariance Test						Indeter	minate		
			ariance Test		6		5.953	0.0097		al Variances		
			of Variance	Test	0.6667		5.953	0.5885		Variances		
Distribution		n-Darling A2	Test		2.447		3.878	<1.0E-05		ormal Distributi		
	_ · · ·		_									
	-	no Skewnes			2.906		2.576	0.0037		ormal Distributi		
	Kolmogo	rov-Smirnov	D Test		0.375		0.2471	<1.0E-05	Non-N	ormal Distributi	ion	
	Kolmogo		D Test						Non-N		ion	
	Kolmogo	rov-Smirnov	D Test		0.375 0.677		0.2471 0.8408	<1.0E-05 9.5E-05	Non-N	ormal Distributi ormal Distributi	ion ion	
Conc-µL/L	Kolmogo Shapiro- Rate Summary Code	rov-Smirnov Wilk W Norr Count	D Test nality Test Mean	95% LCL	0.375 0.677 95% U		0.2471 0.8408 Median	<1.0E-05 9.5E-05 Min	Non-Non-Non-Non-Non-Non-Non-Non-Non-Non-	ormal Distributi ormal Distributi Std Err	ion ion CV%	
Conc-µL/L 0	Kolmogo Shapiro- Rate Summary	rov-Smirnov Wilk W Norr Count 4	D Test nality Test Mean 1.0000	1.0000	0.375 0.677 95% U 1.0000		0.2471 0.8408 Median 1.0000	<1.0E-05 9.5E-05 Min 1.0000	Non-No Non-No Max 1.0000	ormal Distributi ormal Distributi Std Err 0.0000	ion ion CV% 0.00%	0.00%
Conc-µL/L 0 3	Kolmogo Shapiro- Rate Summary Code	rov-Smirnov Wilk W Norr Count 4 4	P D Test mality Test Mean 1.0000 1.0000	1.0000 1.0000	0.375 0.677 95% U 1.0000 1.0000		0.2471 0.8408 Median 1.0000 1.0000	<1.0E-05 9.5E-05 Min 1.0000 1.0000	Non-No Non-No Max 1.0000 1.0000	ormal Distributi ormal Distributi Std Err 0.0000 0.0000	ion ion CV% 0.00% 0.00%	0.00% 0.00%
Сопс-µL/L 0 3 8.35	Kolmogo Shapiro- Rate Summary Code	rov-Smirnov Wilk W Norr Count 4 4 4	Mean 1.0000 1.0000 0.9750	1.0000 1.0000 0.8954	0.375 0.677 95% U 1.0000 1.0000 1.0000		0.2471 0.8408 Median 1.0000 1.0000 1.0000	<1.0E-05 9.5E-05 Min 1.0000 1.0000 0.9000	Non-Non-Non-Non-Non-Non-Non-Non-Non-Non-	ormal Distributi ormal Distributi Std Err 0.0000 0.0000 0.0250	ion CV% 0.00% 0.00% 5.13%	0.00% 0.00% 2.50%
Сопс-µL/L 0 3 8.35	Kolmogo Shapiro- Rate Summary Code	rov-Smirnov Wilk W Norr Count 4 4	P D Test mality Test Mean 1.0000 1.0000	1.0000 1.0000	0.375 0.677 95% U 1.0000 1.0000		0.2471 0.8408 Median 1.0000 1.0000	<1.0E-05 9.5E-05 Min 1.0000 1.0000	Non-No Non-No Max 1.0000 1.0000	ormal Distributi ormal Distributi Std Err 0.0000 0.0000 0.0250	ion ion CV% 0.00% 0.00%	0.00% 0.00%
Сопс-µL/L D 3 3.35 16.7	Kolmogo Shapiro- Rate Summary Code	rov-Smirnov Wilk W Norr Count 4 4 4 4 4	Mean 1.0000 1.0000 0.9750 0.9750	1.0000 1.0000 0.8954	0.375 0.677 95% U 1.0000 1.0000 1.0000		0.2471 0.8408 Median 1.0000 1.0000 1.0000	<1.0E-05 9.5E-05 Min 1.0000 1.0000 0.9000	Non-Non-Non-Non-Non-Non-Non-Non-Non-Non-	ormal Distributi ormal Distributi Std Err 0.0000 0.0000 0.0250	cV% 0.00% 0.00% 5.13% 5.13%	0.00% 0.00% 2.50% 2.50%
<mark>Conc-µL/L</mark> 0 3 8.35 16.7 Angular (Corr	Kolmogo Shapiro-' Rate Summary Code D rected) Transfo Code	rov-Smirnov Wilk W Norr Count 4 4 4 4 4 7 med Sumr Count	Mean 1.0000 1.0000 0.9750 0.9750 nary Mean	1.0000 1.0000 0.8954 0.8954 95% LCL	0.375 0.677 95% U 1.0000 1.0000 1.0000 95% U	CL	0.2471 0.8408 Median 1.0000 1.0000 1.0000 Median	<1.0E-05 9.5E-05 Min 1.0000 1.0000 0.9000 0.9000 0.9000 Min	Non-N- Non-N- Max 1.0000 1.0000 1.0000 Max	ormal Distributi ormal Distributi 0.0000 0.0000 0.0250 0.0250 Std Err	ion CV% 0.00% 0.00% 5.13% 5.13% CV%	0.00% 0.00% 2.50% 2.50%
Сопс-µL/L 0 3 8.35 16.7 Angular (Corr Conc-µL/L 0	Kolmogo Shapiro- Rate Summary Code D	rov-Smirnov Wilk W Norr Count 4 4 4 4 4 4 7 rmed Sumr Count 4	Mean Mean 1.0000 1.0000 0.9750 0.9750 mary Mean 1.4120	1.0000 1.0000 0.8954 0.8954 95% LCL 1.4120	0.375 0.677 95% U 1.0000 1.0000 1.0000 95% U 1.4120	CL	0.2471 0.8408 Median 1.0000 1.0000 1.0000 1.0000 Median 1.4120	<1.0E-05 9.5E-05 Min 1.0000 1.0000 0.9000 0.9000 0.9000 Min 1.4120	Non-N- Non-N- Max 1.0000 1.0000 1.0000 Max 1.4120	Std Err 0.0000 0.0000 0.0250 0.0250 Std Err 0.0250 0.0250 0.0250	ion CV% 0.00% 0.00% 5.13% 5.13% CV% 0.00%	0.00% 0.00% 2.50% 2.50% %Effect 0.00%
Сопс-µL/L 0 3 8.35 16.7 Angular (Corr Conc-µL/L 0 3	Kolmogo Shapiro-' Rate Summary Code D rected) Transfo Code	rov-Smirnov Wilk W Norr 4 4 4 4 4 4 7 med Sumr Count 4 4	Mean Mean 1.0000 1.0000 0.9750 0.9750 mary Mean 1.4120 1.4120 1.4120	1.0000 1.0000 0.8954 0.8954 95% LCL 1.4120 1.4120	0.375 0.677 95% U 1.0000 1.0000 1.0000 1.0000 95% U 1.4120 1.4120	CL	0.2471 0.8408 Median 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	<1.0E-05 9.5E-05 Min 1.0000 0.90000 0.90000 0.900000000	Non-N- Non-N- Max 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	Std Err 0.0000 0.0000 0.0250 0.0250 Std Err 0.0000 0.0250 Std Err 0.0000 0.0250 0.0000 0.0000 0.0000 0.0000 0.0000	ion ion CV% 0.00% 0.00% 5.13% 5.13% CV% 0.00% 0.00%	0.00% 0.00% 2.50% 2.50% %Effect 0.00% 0.00%
Conc-µL/L 0 3 8.35 16.7	Kolmogo Shapiro-' Rate Summary Code D rected) Transfo Code	rov-Smirnov Wilk W Norr Count 4 4 4 4 4 4 7 rmed Sumr Count 4	Mean Mean 1.0000 1.0000 0.9750 0.9750 mary Mean 1.4120	1.0000 1.0000 0.8954 0.8954 95% LCL 1.4120	0.375 0.677 95% U 1.0000 1.0000 1.0000 95% U 1.4120	CL	0.2471 0.8408 Median 1.0000 1.0000 1.0000 1.0000 Median 1.4120	<1.0E-05 9.5E-05 Min 1.0000 1.0000 0.9000 0.9000 0.9000 Min 1.4120	Non-N- Non-N- Max 1.0000 1.0000 1.0000 Max 1.4120	Std Err 0.0000 0.0250 0.0250 0.0250 0.0000 0.0000 0.0250 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	ion CV% 0.00% 0.00% 5.13% 5.13% CV% 0.00%	0.00% 2.50% 2.50% %Effect 0.00%

Analyst:_____QA:____

CETIS	Analytical	Report
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Report Date: 21 Jul-21 15:02 (p 2 of 2) Test Code/ID:

TRU0721.006afml / 03-7525-8897

Aquatic Bioassay & Consulting Labs, Inc.

Fathead Minnow 96-h Acute Survival Test

Analysis ID:	15-1204-8978	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.9.7
Analyzed:	20 Jul-21 15:08		Nonparametric-Control vs Treatments	Status Level:	1
Edit Date:	20 Jul-21 14:49	MD5 Hash:	766BA0F6A592363228F6858710ABB13B	Editor ID:	000-189-126-0

96h Survival Rate Detail

Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	1.0000
3		1.0000	1.0000	1.0000	1.0000
8.35		1.0000	1.0000	0.9000	1.0000
16.7		1.0000	0.9000	1.0000	1.0000

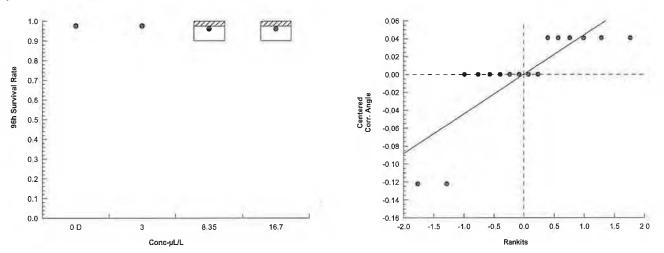
Angular (Corrected) Transformed Detail

Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.4120	1.4120	1.4120	1.4120
3		1.4120	1.4120	1.4120	1.4120
8.35		1.4120	1.4120	1.2490	1.4120
16.7		1.4120	1.2490	1.4120	1.4120

96h Survival Rate Binomials

Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	10/10	10/10	10/10
3		10/10	10/10	10/10	10/10
8.35		10/10	10/10	9/10	10/10
16.7		10/10	9/10	10/10	10/10

Graphics



 Report Date:
 21 Jul-21 15:02 (p 1 of 2)

 Test Code/ID:
 TRU0721.006afml / 03-7525-8897

										1			
Fathead N	Minno	w 96-h Acute S	urvival Te	st						Aquatic	Bioassay	& Consulting	l Labs, Inc.
Analysis I	ID: C	04-0318-1598	End	point:	96h Survival R	ate			CET	TIS Versio	n: CETIS	Sv1.9.7	
Analyzed:		20 Jul-21 15:08		lysis:	Linear Interpol		-			tus Level:	1		
Edit Date:	: 2	20 Jul-21 14:49	MD	5 Hash:	766BA0F6A59	2363228F6	858710	ABB13B	B Edi	tor ID:	000-1	89-126-0	
Batch ID:	C	02-4273-4213	Tes	t Type:	Survival (96h)				Ana	lyst:			
Start Date	e: 0)7 Jul-21 14:50	Pro	tocol:	EPA/821/R-02	-012 (2002))		Dilı	ient: Re	eceiving W	ater	
Ending D	ate: 1	11 Jul-21 14:10	Spe	cies:	Pimephales pr	omelas			Brir		ot Applicab		
Test Leng	gth: 9	95h	Тах	on:	Actinopterygii			_	Sou	Irce: Ad	quatic Bios	ystems, CO	Age: <24
Sample ID		20-8538-1072	Cod	le:	TRU0721.006a	afml			Pro	ject:			
-		01 Jul-21 11:30		erial:	Sample Water						oassay Re	-	
Receipt D	ate: 0)1 Jul-21 11:30	CAS	6 (PC):					Sta	tion: W	eymouth V	VTP Infl. with I	Earth Tec C
Sample A	ige: 6	3d 3h (12 °C)	Clie	nt:	Trussell Techn	ologies		_					
Linear Int	terpol	ation Options											
X Transfo	orm	Y Transform	See	d	Resamples	Exp 95%	% CL	Method				_	
Linear		Linear	0		280	Yes		Two-Po	int Inter	polation			
Test Acce	eptabi	lity Criteria	TAC L	imits									
Attribute		Test Stat	Lower	Uppe	r Overlap	Decision	ı						
Control Re	esp	1	0.9	>>	Yes	Passes (Criteria				-		
Point Esti	imate	s											
Level µ	JL/L	95% LCL	95% UCL										
EC10 >	>16.7												
EC15 >	>16.7												
EC20 >	>16.7												
EC25 >	>16.7												
	>16.7												
EC50 >	>16.7						_					_	
96h Survi	ival Ra	ate Summary		_		Calc	ulated	Variate(A/B)			Isotor	nic Variate
Conc-µL/I	L	Code	Count	Mean	Median	Min	Max	C	V%	%Effect	A/B	Mean	%Effect
0		D	4	1.000		1.0000	1.00		.00%	0.00%	40/40	1.0000	0.00%
3			4	1.000		1.0000	1.00		.00%	0.00%	40/40	1.0000	0.00%
8.35			4	0.975		0.9000	1.00		.13%	2.50%	39/40	0.9750	2.50%
16.7			4	0.975	0 1.0000	0.9000	1.00	00 5	.13%	2.50%	39/40	0.9750	2.50%
96h Survi	ival Ra												
Conc-µL/I	L	Code	Rep 1	Rep 2		Rep 4	_		_	_	-	_	
0		D	1.0000	1.000		1.0000							
3			1.0000	1.000		1.0000							
8.35			1.0000	1.000		1.0000							
16.7			1.0000	0.900	0 1.0000	1.0000							_
96h Survi	ival Ra	ate Binomials											
Conc-µL/I	L	Code	Rep 1	Rep 2	2 Rep 3	Rep 4					_		
-		-	10110	10112	10/10	10/10							

D

10/10

10/10

10/10

10/10

10/10

10/10

10/10

9/10

10/10

10/10

9/10

10/10

10/10

10/10

10/10

10/10

0

3 8.35

16.7

CETIS Ana	alytical Report			Report Date: Test Code/ID:	21 Jul-21 15:02 (p 2 of 2) TRU0721.006afml / 03-7525-8897		
Fathead Mini	now 96-h Acute Sur	vival Test	Aquatic Bioassay & Consulting Labs, Inc.				
Analysis ID: Analyzed: Edit Date:	04-0318-1598 20 Jul-21 15:08 20 Jul-21 14:49	Endpoint: Analysis: MD5 Hash:	96h Survival Rate Linear Interpolation (ICPIN) 766BA0F6A592363228F6858710ABB13B	CETIS Version: Status Level: Editor ID:	CETISv1.9.7 1 000-189-126-0		
Edit Date: Graphics	20 Jul-21 14:49	MD5 Hash:	766BA0F6A592363228F6858710ABB13B	Editor ID:	000-189-126-0		
1.00							
0.9		0					
0.8							
96h Survival Rate							
US US							
8 04							

~6A:_ P Analyst:____

0.3 02 01 0.0 5

2 4 6

8

Conc-µL/L

10 12

14 16 18

CETIS Measurement Report

 Report Date:
 21 Jul-21 15:02 (p 1 of 3)

 Test Code/ID:
 TRU0721.006afml / 03-7525-8897

Fathead Minn	now 96-h Acute S	Survival	Test					Aqua	tic Bioassay &	Consulting	g Labs, Inc.
Batch ID:	02-4273-4213			Survival (96h)				Analyst:			
Start Date:	07 Jul-21 14:50		rotocol:	EPA/821/R-02				Diluent:	Receiving Wat	er	
-	11 Jul-21 14:10		pecies:	Pimephales pr	omelas			Brine:	Not Applicable		
Test Length:	95h	т	axon:	Actinopterygii				Source:	Aquatic Biosys	tems, CO	Age: <24
Sample ID:	20-8538-1072	С	ode:	TRU0721.006a	afml			Project:			
•	: 01 Jul-21 11:30		laterial:	Sample Water				Source:	Bioassay Repo		
	: 01 Jul-21 11:30	С	AS (PC):					Station:	Weymouth WT	P infl. with	Earth Tec Q
Sample Age:	6d 3h (12 °C)	С	lient:	Trussell Techn	ologies						
Alkalinity (Ca	CO3)-mg/L										
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Ei	r Std Dev	CV%	QA Coun
0	D	3	120	120	120	120	120	0	0	0.00%	0
16.7		3	125	125	125	125	125	0	0	0.00%	0
Overall		6	122.5	119.6	125.4	120	125	1.118	2.739	2.24%	0 (0%)
Conductivity-	-µmhos										
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Мах	Std Ei		CV%	QA Count
0	D	3	1044	1036	1052	1042	1048		3.215	0.31%	0
3		3	1013	1004	1022	1010	1017		3.606	0.36%	0
8.35		3	1013	1009	1017	1012	1015			0.17%	0
16.7		3	1023	1010	1036	1019	1029		5.292	0.52%	0
Overall		12	1023	1015	1032	1010	1048	3.963	13.73	1.34%	0 (0%)
Dissolved Ox	(ygen-mg/L										
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Ei		CV%	QA Count
0	D	3	7.833	6.659	9.007	7.3	8,2	0.1575		6.03%	0
3		3	8	6.917	9.083	7.5	8,3	0.1453		5.45%	0
8.35		3	7.867	6.832	8.901	7.4	8,2	0.1388		5.29%	0
16.7		3	7.867	6.832	8.901	7.4	8,2	0.1388		5.29%	0
Overall		12	7.892	7.652	8.132	7.3	8.3	0.109	0.3777	4.79%	0 (0%)
Hardness (Ca	aCO3)-mg/L										
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Ei		CV%	QA Count
0	D	3	250	250	250	250	250	0	0	0.00%	0
16.7		3	330	330	330	330	330	0	0	0.00%	0
Overall		6	290	244	336	250	330	17.89	43.82	15.11%	0 (0%)
pH-Units											
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL		Max			CV%	QA Count
0	D	3	7.533	6.96	8.107	7.4	7.8	0.0769		3.07%	0
3		3	7.533	7.154	7.913	7.4	7.7	0.0509		2.03%	0
										0.77%	<u> </u>
		3	7.533	7.39	7.677	7.5	7.6	0.0192			0
16.7		3	7.567	7.423	7.71	7.5	7.6	0.0192	24 0.05773	0.76%	0
16.7 Overall									24 0.05773		
16.7 Overall		3 12	7.567 7.542	7.423 7.463	7.71 7.62	7.5 7.4	7.6 7.8	0.0192 0.0358	24 0.05773 3 0.124	0.76% 1.64%	0 0 (0%)
16.7 Overall Temperature- Conc-µL/L	Code	3 12 Count	7.567 7.542 Mean	7.423 7.463 95% LCL	7.71 7.62 95% UCL	7.5 7.4 Min	7.6 7.8 Max	0.0192 0.0358 Std Ei	24 0.05773 3 0.124 rr Std Dev	0.76% 1.64% CV%	0 0 (0%) QA Count
16.7 Overall Temperature- Conc-µL/L 0		3 12 Count 3	7.567 7.542 Mean 24.07	7.423 7.463 95% LCL 23.78	7.71 7.62 95% UCL 24.35	7.5 7.4 Min 24	7.6 7.8 Max 24.2	0.0192 0.0358 Std En 0.0384	24 0.05773 3 0.124 rr Std Dev 47 0.1154	0.76% 1.64% CV% 0.48%	0 0 (0%) QA Count 0
8.35 16.7 Overall Temperature- Conc-µL/L 0 3 0 05	Code	3 12 Count 3 3	7.567 7.542 Mean 24.07 24.07	7.423 7.463 95% LCL 23.78 23.92	7.71 7.62 95% UCL 24.35 24.21	7.5 7.4 Min 24 24	7.6 7.8 Max 24.2 24.1	0.0192 0.0358 Std Ef 0.0384 0.0191	24 0.05773 3 0.124 rr Std Dev 17 0.1154 18 0.05755	0.76% 1.64% CV% 0.48% 0.24%	0 0 (0%) QA Count 0 0
16.7 Overall Temperature- Conc-µL/L 0	Code	3 12 Count 3	7.567 7.542 Mean 24.07	7.423 7.463 95% LCL 23.78	7.71 7.62 95% UCL 24.35	7.5 7.4 Min 24	7.6 7.8 Max 24.2	0.0192 0.0358 Std Ef 0.0384 0.0191	24 0.05773 3 0.124 rr Std Dev 17 0.1154 18 0.05755 3 0.09989	0.76% 1.64% CV% 0.48%	0 0 (0%) QA Count 0

QA: P Analyst:___

 Report Date:
 21 Jul-21 15:02 (p 2 of 3)

 Test Code/ID:
 TRU0721.006afml / 03-7525-8897

Fathead Minnow 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

Alkalinity (CaC	03)-mg/L							
Conc-µL/L	Code	Read	Time	Measure QA	Diff-%	Inst ID	Analyst	Notes
0	D	1		120				
16.7				125				
0	D	2		120				
16.7				125				
0	D	3		120				
16.7				125				

Conductivity-µmhos

Conc-µL/L	Code	Read	Time	Measure QA	A Diff-%	Inst ID	Analyst Notes	
0	D	1		1043				
3				1017				
8.35				1012				
16.7				1029				
0	D	2		1042				
3				1010				
8.35				1012				
16.7				1019				
0	D	3		1048				
3				1012				
8.35				1015				
16.7				1021				

Dissolved Oxygen-mg/L

Conc-µL/L	Code	Read	Time	Measure QA Diff-% Inst ID Analyst Notes
0	D	1		8.2
3				8.3
8.35				8
16.7				8
0	D	2		8
3				8.2
8.35				8.2
16.7				8.2
0	D	3		7.3
3				7.5
8.35				7.4
16.7				7.4

Hardness (CaCO3)-mg/L

Conc-µL/L	Code	Read	Time	Measure QA	Diff-%	Inst ID	Analyst	Notes
0	D	1		250				
16.7				330				
0	D	2		250				
16.7				330				
0	D	3		250				
16.7				330				

an:_1 Analyst:

Fathead Minnow 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

pH-Units										
Conc-µL/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes	-
0	D	1		7.4						
3				7.4						
8.35				7.5						
16.7				7.6						
0	D	2		7.4						
3				7.5						
8.35				7.5						
16.7				7.6						
0	D	3		7.8						
3				7.7						
8.35				7.6						
16.7				7.5						

Temperature-°C

Conc-µL/L	Code	Read	Time	Measure QA Diff-% Inst ID Analyst Notes
0	D	1		24
3				24.1
8.35				24.1
16.7				24.1
0	D	2		24.2
3				24.1
8.35				24.2
16.7				24.3
0	D	3		24
3				24
8.35				24
16.7				24

Analyst:______A:____



July 21, 2021

Mr. David Hokanson Trussell Technologies 232 N. Lake Avenue Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms EPA-821-R-02-012. "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Trussell Technologies
SAMPLE ID.:	Weymouth WTP Infl. with EarthTec QZ
DATE RECEIVED:	1 July – 21
ABC LAB NO.:	TRU0721.006

ACUTE CERIODAPHNIA SURVIVAL BIOASSAY

% Survival

= 0 % Survival in 3.0 ul/l Sample

EC50 = 1.5 ul/l

Yours y truly, Scott Johnson

Laboratory Director

CETIS Summary Report

 Report Date:
 21 Jul-21 15:03 (p 1 of 1)

 Test Code/ID:
 TRU0721.006acer / 01-9970-4374

Ceriodaphnia	96-h Acute Su	rvival Test							Aqua	atic B	ioassay & C	Consulting	Labs, Inc.
Batch ID: Start Date: Ending Date: Test Length:	: 07 Jul-21 14:50 Pro tte: 11 Jul-21 14:10 Spe th: 95h Tax		est Type: rotocol: pecies: axon:	Survival (96h) EPA/821/R-02- Ceriodaphnia d Branchiopoda	· ·			Dil Bri	alyst: uent: ne: urce:	Receiving Water Not Applicable Aquatic Biosystems, CO			Age: <24
Sample ID:	09-4593-1718	C	ode:	TRU0721.006a	RU0721.006acer			Pro	oject:				
Sample Date:	01 Jul-21 11:30) M	aterial:	Sample Water				So	urce:	Bioa	ssay Report	t	
Receipt Date:	01 Jul-21 11:30) C	AS (PC):					Sta	tion:	Wey	mouth WTF	Infl. with E	arth Tec G
Sample Age:	6d 3h (12 °C)	C	ient:	Trussell Techno	ologies								
Point Estimat	e Summary												
Analysis ID	Endpoint		Point	Estimate Meth	od		√ L	_evel	μL/L		95% LCL	95% UCL	
01-5908-9405	96h Survival R	ate	Linea	r Interpolation (I	CPIN)		E	EC10	0.3		0.3	0.3	
							E	EC15	0.45		0.45	0.45	
							E	EC20	0.6		0.6	0.6	
								EC25	0.75		0.75	0.75	
							E	EC40	1.2		1.2	1.2	
							E	EC50	1.5		1.5	1.5	
Test Acceptal	bility					TAC	Lim	its					
Analysis ID	Endpoint	Attrib	oute	Test Stat	Lower	ι	Jpper	Over	rlap	Decision			
01-5908 - 9405	96h Survival R	ate	Contr	ol Resp	1	0.9	>	>>	Yes		Passes Cr	iteria	
12-5132-4588	96h Survival R	ate	Contr	Control Resp 1			>	>>	Yes		Passes Cr	iteria	
96h Survival I	Rate Summary												
Conc-µL/L	Code	Count	Mean		-		_	Max	Std I		Std Dev	CV%	%Effect
0	D	4	1.000		1.0000	1.0000		1.0000	0.00		0.0000		0.00%
3		4	0.000		0.0000	0.0000		0.0000	0.00		0.0000		100.00%
8.35		4	0.000		0.0000	0.0000		0.0000	0.00		0.0000	-	100.00%
16.7		4	0.000	0 0.0000	0.0000	0.0000		0.0000	0.00		0.0000		100.00%
96h Survival I	Rate Detail							M	D5: 03C	CEF1	D141244C8	33E77C1C0	0B25A1DE
Conc-µL/L	Code	Rep 1	Rep 2		Rep 4		_	_		_	_		
0	D	1.0000	1.000		1.0000								
3		0.0000	0.000	0 0.0000	0:0000								
8.35		0.0000	0.000	0.0000 0	0.0000								
16.7		0.0000	0.000	0 0.0000	0.0000					_			
96h Survival I	Rate Binomials												
Conc-µL/L	Code	Rep 1	Rep 2	2 Rep 3	Rep 4				_				
0	D	5/5	5/5	5/5	5/5								
3		0/5	0/5	0/5	0/5								
		0/5	0/5	0/5	0/5								
8.35													

Analyst: _____ QA: ____ MA35

 Report Date:
 21 Jul-21 15:03 (p 1 of 2)

 Test Code/ID:
 TRU0721.006acer / 01-9970-4374

Ceriodaphnia 96-h Acute Survival Test Aquatic Bioassay & Consulting Labs, Inc. 12-5132-4588 Endpoint: 96h Survival Rate **CETIS Version:** CETISv1.9.7 Analysis ID: Analyzed: 20 Jul-21 15:10 Analysis: Parametric-Two Sample Status Level: Edit Date: 20 Jul-21 14:52 MD5 Hash: 03CCEF1D141244C83E77C1C00B25A1DE Editor ID: 000-189-126-0 Batch ID: 11-4125-0527 Test Type: Survival (96h) Analyst: Start Date: 07 Jul-21 14:50 Protocol: EPA/821/R-02-012 (2002) **Diluent: Receiving Water** Ending Date: 11 Jul-21 14:10 Species: Ceriodaphnia dubia Brine: Not Applicable Test Length: 95h Taxon: Branchiopoda Source: Aquatic Biosystems, CO Age: <24 TRU0721.006acer Sample ID: 09-4593-1718 Code: Project: Sample Date: 01 Jul-21 11:30 Material: Sample Water Source: **Bioassay Report** Receipt Date: 01 Jul-21 11:30 CAS (PC): Station: Weymouth WTP Infl. with Earth Tec Q Sample Age: 6d 3h (12 °C) Client: **Trussell Technologies Test Acceptability Criteria TAC Limits** Decision Attribute Test Stat Lower Upper Overlap 0.9 Passes Criteria Control Resp >> Yes 1 **ANOVA Assumptions Tests** Attribute Test Stat Critical **P-Value** Decision(a:1%) Test Shapiro-Wilk W Normality Test Indeterminate Distribution 96h Survival Rate Summary 95% LCL 95% UCL Median Min Std Err CV% %Effect Conc-µL/L Code Count Mean Max 0.00% 1.0000 0.0000 0.00% 0 D 4 1.0000 1.0000 1.0000 1.0000 1.0000 4 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 100.00% 3 ---4 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 100.00% 8.35 ----0.0000 0.0000 0.0000 100.00% 4 0.0000 0.0000 0.0000 0.0000 16.7 ----Angular (Corrected) Transformed Summary Code Count 95% LCL 95% UCL Median Min Max Std Err CV% %Effect Conc-µL/L Mean 0.0000 0.00% 0.00% 0 D 4 1:3460 1.3450 1.3450 1.3450 1.3450 1.3450 3 4 0.2255 0.2255 0.2256 0.2255 0.2255 0.2255 0.0000 0.00% 83.24% 0.2255 0.2255 0.0000 0.00% 83.24% 8.35 4 0.2255 0.2255 0.2256 0.2255 0.2255 0.2255 0.2255 0.0000 0.00% 83.24% 4 0.2255 0.2255 0.2256 16.7 96h Survival Rate Detail Conc-µL/L Code Rep 1 Rep 2 Rep 3 Rep 4 0 D 1.0000 1.0000 1.0000 1.0000 3 0.0000 0.0000 0.0000 0.0000 8.35 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 16.7 Angular (Corrected) Transformed Detail Conc-µL/L Rep 3 Rep 4 Code Rep 1 Rep 2 1.3450 1.3450 0 D 1.3450 1.3450 0.2255 0.2255 0.2255 3 0.2255 0.2255 0.2255 0.2255 0.2255 8.35 16.7 0.2255 0.2255 0.2255 0.2255 96h Survival Rate Binomials Conc-µL/L Code Rep 1 Rep 2 Rep 3 Rep 4 0 D 5/5 5/5 5/5 5/5 3 0/5 0/5 0/5 0/5 0/5 0/5 0/5 0/5 8.35 0/5 0/5 0/5 16.7 0/5

Analyst:_____QA;

Analysis ID: Analyzed: Edit Date:	12-5132-4588 20 Jul-21 15:10 20 Jul-21 14:52	Analysis: Pa	h Survival Rate rametric-Two Sample CCEF1D141244C83E77	7C1C00B25A1DE	CETIS Version: Status Level: Editor ID:	CETISv1.9.7 1 000-189-126-0
Graphics						
1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.0	•	8,35	• Reject Nuil -	1.0 0.8 0.8 0.5 0.5 0.3 0.3 - -0.0 -2.0 -1.5	-10 -0.5 0.0	0.5 1.0 1.5 2.0
	Cor	nc-µL/L			Rankits	

Ceriodaphnia 96-h Acute Survival Test

 Report Date:
 21 Jul-21 15:03 (p 2 of 2)

 Test Code/ID:
 TRU0721.006acer / 01-9970-4374

Aquatic Bioassay & Consulting Labs, Inc.

Var 1

Analyst:_

Report Date: 21 Jul-21 15:03 (p 1 of 2)

Test Code/ID: TRU0721.006acer / 01-9970-4374

Cerioda	aphnia	96-h Acute Surv	ival Test						Aqu	atic Bi	oassay &	Consulting	Labs, Inc
Analysi	s ID:	01-5908-9405	End	point:	96h Survival Ra	ate			CETIS Ve	rsion:	CETISv	1.9.7	
Analyze		20 Jul-21 15:10		•	Linear Interpola	•	,		Status Le		1		
Edit Da	te:	20 Jul-21 14:52	MD5	Hash:	03CCEF1D141	244C83E77	C1C00	B25A1DE	Editor ID:		000-189	-126-0	
Batch I	D:	11-4125-0527	Test	Type:	Survival (96h)				Analyst:				
Start D	ate:	07 Jul-21 14:50	Prot	ocol:	EPA/821/R-02-	012 (2002)			Diluent:	Rece	eiving Wat	er	
Ending	Date:	11 Jul-21 14:10	Spe	cies:	Ceriodaphnia d	ubia			Brine:	Not /	Applicable		
Test Le	ngth:	95h	Тахо	on:	Branchiopoda				Source:	Aqua	atic Biosys	stems, CO	Age: <2
Sample	D:	09-4593-1718	Cod	e:	TRU0721.006a	cer			Project:				
Sample	Date:	01 Jul-21 11:30	Mate	erial:	Sample Water				Source:	Bioa	ssay Repo	ort	
Receip	t Date:	01 Jul-21 11:30	CAS	(PC):					Station:	Wey	mouth W1	FP Infl. with	Earth Tec
Sample	e Age:	6d 3h (12 °C)	Clie	nt:	Trussell Technol	ologies							
Linear	Interpo	lation Options											
X Trans	sform	Y Transform	See	d	Resamples	Exp 95%	CL	Method					
Linear	_	Linear	0		280	Yes		Two-Point	Interpolatic	n			
Test Ac	ceptal	oility Criteria	TAC L	imits									
Attribut	te	Test Stat	Lower	Upper	r Overlap	Decision						_	
Control	Resp	1	0.9	>>	Yes	Passes C	riteria						
Point E	stimat	es											
Level	μL/L	95% LCL	95% UCL										
EC10	0.3	0.3	0.3										
EC15	0.45	0.45	0.45										
EC20	0.6	0.6	0.6										
EC25	0.75	0.75	0.75										
EC40	1.2	1.2	1.2										
EC50	1.5	1.5	1.5									_	
96h Su	rvival I	Rate Summary		_		Calc	ulated V	/ariate(A/E	3)			Isotor	nic Variate
Conc-µ	IL/L	Code	Count	Mean	Median	Min	Max	CV	% % E	ffect	A/B	Mean	%Effec
0		D	4	1.000	0 1.0000	1.0000	1.000	0.00	0.0	0%	20/20	1.0000	0.00%
3			4	0.000	0.0000	0.0000	0.000			0.00%	0/20	0.0000	100.00
8.35			4	0.000		0.0000	0.000			0.00%	0/20	0.0000	100.00
16.7			4	0.000	0.0000	0.0000	0.000		10	0.00%	0/20	0.0000	100.00
96h Su	rvival	Rate Detail											
Conc-µ	ıL/L	Code	Rep 1	Rep 2		Rep 4			_	_		_	_
0		D	1.0000	1.000		1.0000							
3			0.0000	0.000		0.0000							
8.35			0.0000	0.000		0.0000							
16.7			0.0000	0.000	0 0.0000	0.0000							
96h Su	rvival	Rate Binomials											
Conc-µ	IL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4						_	
0		D	5/5	5/5	5/5	5/5							
0													
3			0/5	0/5	0/5	0/5							
			0/5 0/5	0/5 0/5	0/5 0/5	0/5 0/5							

~____P Analyst:___

16.7

0/5

0/5

0/5

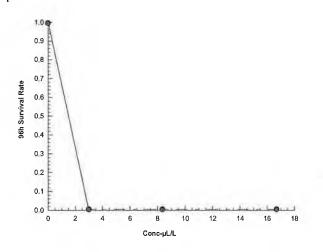
0/5

CETIS Ana	alytical Report			Report Date: Test Code/ID:	21 Jul-21 15:03 (p 2 of 2) TRU0721.006acer / 01-9970-4374
Ceriodaphnia	a 96-h Acute Surviva	al Test		Aquatic B	ioassay & Consulting Labs, Inc.
Analysis ID: Analyzed:	01-5908-9405 20 Jul-21 15:10	•	96h Survival Rate Linear Interpolation (ICPIN)	CETIS Version; Status Level:	CETISv1.9.7

MD5 Hash: 03CCEF1D141244C83E77C1C00B25A1DE Editor ID:

Graphics

Edit Date: 20 Jul-21 14:52



Analyst:

000-189-126-0

Report Date: 21 Jul-21 15:03 (p 1 of 3)

Aquatic Bioassay & Consulting Labs, Inc.

Test Code/ID: TRU0721.006acer / 01-9970-4374

Ceriodaphnia	96-h Acut	te Survival Test	

11-4125-0527		Test Type:	Survival (96h)				Analyst:			
07 Jul-21 14:50		Protocol:	EPA/821/R-02	-012 (2002)			Diluent: F	Receiving Wat	er	
11 Jul-21 14:10		Species:	Ceriodaphnia o	lubia			Brine: N	lot Applicable		
95h		Taxon:	Branchiopoda				Source: A	Aquatic Biosys	tems, CO	Age: <24
09-4593-1718		Code:	TRU0721.006a	acer			Project:			
01 Jul-21 11:30		Material:	Sample Water				Source: E	Bioassay Repo	ort	
01 Jul-21 11:30		CAS (PC):					Station: V	Veymouth WT	P Infl. with	Earth Tec Q
6d 3h (12 °C)		Client:	Trussell Techn	ologies						
CO3)-mg/L										
Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
D	3	120	120	120	120	120	0	0	0.00%	0
	3	125	125	125	125	125	0	0	0.00%	0
	6	122.5	119.6	125.4	120	125	1.118	2.739	2.24%	0 (0%)
µmhos										
Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
D	3	1044	1036	1052	1042	1048	1.072	3.215	0.31%	0
	3	1013	1004	1022	1010	1017	1.202	3.606	0.36%	0
	3	1013	1009	1017	1012	1015	0.5774	1.732	0.17%	0
	3	1023	1010	1036	1019	1029	1.764	5.292	0.52%	0
	12	1023	1015	1032	1010	1048	3.963	13.73	1.34%	0 (0%)
ygen-mg/L										
Code	Count	Mean	95% LCL	95% UCL	Min	Мах	Std Err	Std Dev	CV%	QA Count
D	3	7.833	6.659	9.007	7.3	8.2	0.1575	0.4726	6.03%	0
	3	8	6.917	9.083	7.5	8.3	0.1453	0.4359	5.45%	0
	3	7.867	6.832	8.901	7.4	8.2	0.1388	0.4163	5.29%	0
	3	7.867	6.832	8.901	7.4	8.2	0.1388	0.4163	5.29%	0
	12	7.892	7.652	8.132	7.3	8.3	0.109	0.3777	4.79%	0 (0%)
CO3)-mg/L										
Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
D	3	250	250	250	250	250	0	0	0.00%	0
	3	330	330	330	330	330	0	0	0.00%	0
	6	290	244	336	250	330	17.89	43.82	15.11%	0 (0%)
Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
D	3	7.533	6.96	8.107	7.4	7.8	0.07698	3 0.2309	3.07%	0
	3	7.533	7.154	7.913	7.4	7.7	0.05092	2 0.1528	2.03%	0
	3	7.533	7.39	7.677	7.5	7.6	0.01924	4 0.05773	0.77%	0
	3	7.567	7.423	7.71	7.5	7.6	0.01924	1 0.05773	0.76%	0
	12	7.542	7.463	7.62	7.4	7.8	0.0358	0.124	1.64%	0 (0%)
°C										
Code	Count		95% LCL		Min	Max			CV%	
	Count 3	24.07	95% LCL 23.78	24.35	24	24.2	0.0384	7 0.1154	0.48%	QA Coun 0
Code		24.07 24.07	23.78 23.92	24.35 24.21	24 24	24.2 24.1	0.0384 0.01918	7 0.1154 3 0.05755	0.48% 0.24%	0 0
Code	3	24.07	23.78	24.35	24	24.2	0.0384	7 0.1154 3 0.05755 0.09989	0.48%	
	07 Jul-21 14:50 11 Jul-21 14:10 95h 09-4593-1718 01 Jul-21 11:30 6d 3h (12 °C) CO3)-mg/L Code D ygen-mg/L Code D CO3)-mg/L Code D Code D	07 Jul-21 14:50 11 Jul-21 14:10 95h 09-4593-1718 01 Jul-21 11:30 6d 3h (12 °C) CO3)-mg/L Code Count D 3 3 6 µmhos Code Count D 3 3 3 12 ygen-mg/L Code Count D 3 3 3 12 ygen-mg/L Code Count D 3 3 3 12 ygen-mg/L Code Count D 3 3 3 3 3 3 3 3 3 3 3 3 3 3	O7 Jul-21 14:50 Protocol: 11 Jul-21 14:10 Species: 95h Taxon: 09-4593-1718 Code: 01 Jul-21 11:30 Material: 01 Jul-21 11:30 CAS (PC): 6d 3h (12 °C) Client: CO3)-mg/L Code Count Mean D 3 120 3 125 6 122.5 µmhos Code Mean D 3 1044 3 1013 3 3 1023 1023 ygen-mg/L Code Count Mean D 3 7.833 3 7.833 3 3 7.867 3 J2 7.892 CO3)-mg/L Code Count Mean D 3 7.867 J2 7.892 CO3)-mg/L Code Count Mean D 3 7.533 <t< td=""><td>O7 Jul-21 14:50 Protocol: EPA/821/R-02 11 Jul-21 14:10 Species: Ceriodaphnia of 95h Taxon: Branchiopoda 09-4593-1718 Code: TRU0721.0062 01 Jul-21 11:30 Material: Sample Water 01 Jul-21 11:30 CAS (PC): 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Err Std Dev CV% 0 3 104 1036 1052 1042 1048 1.072 3.215 0.31% 10 3 1010 1036 1019 1029 1.764 5.292 0.52% 10 3 1010 1036 1019 1029

~QA:_ Analyst:__

Report Date: 21 Jul-21 15:03 (p 2 of 3)

Test Code/ID:

Ceriodaphnia 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

TRU0721.006acer / 01-9970-4374

Alkalinity (CaC	:O3)-mg/L								
Conc-µL/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	D	1		120					
16.7				125					
0	D	2		120					
16.7				125					
0	D	3		120			2.2		
16.7				125					

Conductivity-µmhos

Conc-µL/L	Code	Read	Time	Measure QA Diff-% Inst ID Analyst Notes
0	D	1		1043
3				1017
8.35				1012
16.7				1029
0	D	2		1042
3				1010
8.35				1012
16.7				1019
0	D	3		1048
3				1012
8.35				1015
16.7				1021

Dissolved Oxygen-mg/L

Conc-µL/L	Code	Read	Time	Measure QA	Diff-%	Inst ID	Analyst	Notes
0	D	1		8.2				
3				8.3				
8.35				8				
16.7				8				
0	D	2		8				
3				8.2				
8.35				8.2				
16.7				8.2				
0	D	3		7.3				
3				7.5				
8.35				7.4				
16.7				7.4				

Hardness (CaCO3)-mg/L

Conc-µL/L	Code	Read	Time	Measure QA	A Diff-%	Inst ID	Analyst	Notes
0	D	1		250				
16.7				330				
0	D	2		250				
16.7				330				
0	D	3		250				
16.7				330				

QA: P Analyst:

Report Date: 21 Jul-21 15:03 (p 3 of 3)

Test Code/ID: TRU0721.006acer / 01-9970-4374

Ceriodaphnia 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

pH-Units								
Conc-µL/L	Code	Read	Time	Measure QA	Diff-%	Inst ID	Analyst	Notes
0	D	1		7.4				
3				7.4				
8.35				7.5				
16.7				7.6				
0	D	2		7.4				
3				7.5				
8.35				7.5				
16.7				7.6				
0	D	3		7.8				
3				7.7				
8.35				7.6				
16.7				7.5				

Temperature-°C

Conc-µL/L	Code	Read	Time	Measure QA Diff-% Inst ID Analyst Notes
0	D	1		24
3				24.1
8.35				24.1
16.7				24.1
0	D	2		24.2
3				24.1
8.35				24.2
16.7				24.3
0	D	3		24
3				24
8.35				24
16.7				24

Analyst:_____QA:___



Appendix G – Lake Mathews 2021 Toxicity Test Report



September 8, 2021

Mr. David Hokanson Trussell Technologies 232 N. Lake Avenue Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms EPA-821-R-02-012.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Trussell Technologies
SAMPLE ID .:	Lake Mathews with EarthTec QZ
DATE RECEIVED	1 July – 21
ABC LAB NO.:	TRU0721.007

RAINBOW TROUT SURVIVAL BIOASSAY

% Survival = CON = 100.00% 3.0uL/L = 100.00% 8.35uL/L = 0.00% 16.7uL/L = 0.00%

EC50 = 5.675 ul/l

Yours very truly, No Scott Johnson

Laboratory Director

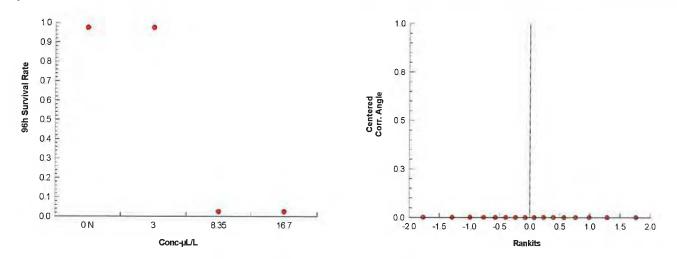
	mmary Repo	ort						ort Date: t Code/ID		3 Sep-21 13: 0721.007 / 1	
Fish 96-h Acu	ute Survival Test							Aquat	tic Bioassay &	Consulting	j Labs, Ir
Batch ID:	15-2797-9235	Т	est Type:	Survival (96h)			Ana	lyst: J	loe Freas		
Start Date:	07 Jul-21 16:01	Р	rotocol:	EPA/821/R-02	-012 (2002)		Dilu	ent: L	aboratory Wate	er	
Ending Date:	11 Jul-21 14:01	S	pecies:	Oncorhynchus	mykiss		Brin	ie: N	Not Applicable		
Test Length:	94h	Т	axon:	Actinopterygii			Sou	rce: A	Aquatic Biosyste	ems, CO	Age:
Sample ID:	01-7395-3681	С	ode:	TRU0721_007			Proj	ect:			
Sample Date:	01 Jul-21 11:30	N	laterial:	Sample Water			Sou	rce: E	Bioassay Report	t	
Receipt Date:	01 Jul-21 11:30	С	AS (PC):				Stat	ion: L	ake Mathews		
Sample Age:	6d 5h	С	lient:	Trussell Techn	ologies						
Single Compa	arison Summary										
Analysis ID	Endpoint			arison Method			P-Value		rison Result		
14-8891-5003	96h Survival Rate	;	Steel I	Many-One Rank	Sum Test		0.5000	ՅµL/L բ	bassed 96h sur	vival rate	
Point Estimat	e Summary										
Analysis ID	Endpoint		Point	Estimate Methe	od	\checkmark	Level	μL/L	95% LCL	95% UCL	
04-3346-7794	96h Survival Rate	9	Linear	Interpolation (IC	PIN)		EC10	3.535	3_535	3.535	
							EC15	3.803	3.803	3.803	
							EC20	4.07	4.07	4.07	
							EC25	4.338	4.338	4.338	
							EC40	5.14	5.14	5,14	
		_	_				EC50	5.675	5.675	5.675	
Test Acceptat	aility										
	Jiiity					TAC L	imits				
Analysis ID	Endpoint		Attrib		Test Stat	Lower	imits Upper	Overla			
Analysis ID 04-3346-7794	Endpoint 96h Survival Rate		Contro	l Resp	1	Lower 0.9		Yes	Passes Cr		
Analysis ID 04-3346-7794	Endpoint			l Resp		Lower	Upper				
Analysis ID 04-3346-7794 14-8891-5003	Endpoint 96h Survival Rate		Contro	l Resp	1	Lower 0.9	Upper >>	Yes	Passes Cr		
Analysis ID 04-3346-7794 14-8891-5003 96h Survival F Conc-µL/L	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code	Count	Contro Contro Mean	I Resp I Resp 95% LCL	1 1 95% UCL	Lower 0.9 0_9 Min	Upper >> >> Max	Yes Yes Std Err	Passes Cr Passes Cr Std Dev		%Effec
Analysis ID 04-3346-7794 14-8891-5003 96h Survival F Conc-µL/L	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary	Count 4	Contro Contro Mean 1.0000	I Resp I Resp 95% LCL 0 1.0000	1 1 95% UCL 1_0000	Lower 0.9 0.9 Min 1.0000	Upper >> >> Max 1.0000	Yes Yes Std Err 0.0000	Passes Cr Passes Cr Std Dev 0.0000	riteria	0.00%
Analysis ID 04-3346-7794 14-8891-5003 96h Survival F Conc-µL/L 0 3	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code	Count 4 4	Contro Contro Mean 1.0000 1.0000	I Resp I Resp 95% LCL 1.0000 1.0000	1 1 95% UCL 1.0000 1.0000	Lower 0.9 0.9 Min 1.0000 1.0000	Upper >> >> Max 1.0000 1.0000	Yes Yes Std Err 0.0000 0.0000	Passes Cr Passes Cr Std Dev 0.0000 0.0000	riteria CV%	0.00% 0.00%
Analysis ID 04-3346-7794 14-8891-5003 96h Survival F Conc-µL/L 0 3 3.35	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code	Count 4 4 4	Contro Contro Mean 1.0000 0.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000	1 1 95% UCL 1.0000 1.0000 0.0000	Lower 0.9 0.9 Min 1.0000 1.0000 0.0000	Upper >> >> Max 1.0000 1.0000 0.0000	Yes Yes Std Err 0.0000 0.0000 0.0000	Passes Cr Passes Cr Std Dev 0.0000 0.0000 0.0000	riteria CV%	0.00% 0.00% 100.009
Analysis ID 04-3346-7794 14-8891-5003 96h Survival F Conc-µL/L 0 3 3.35 16.7	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N	Count 4 4	Contro Contro Mean 1.0000 1.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000	1 1 95% UCL 1.0000 1.0000	Lower 0.9 0.9 Min 1.0000 1.0000	Upper >> >> Max 1.0000 1.0000	Yes Yes Std Err 0.0000 0.0000	Passes Cr Passes Cr Std Dev 0.0000 0.0000	CV%	0.00% 0.00%
Analysis ID 04-3346-7794 14-8891-5003 96h Survival F Conc-µL/L 0 3 3.35 16.7 96h Survival F	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail	Count 4 4 4 4	Contro Contro Mean 1.0000 1.0000 0.0000 0.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000	1 95% UCL 1.0000 1.0000 0.0000 0.0000	Lower 0.9 0.9 Min 1.0000 1.0000 0.0000	Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	Passes Cr Passes Cr Std Dev 0.0000 0.0000 0.0000	CV% 	0.00% 0.00% 100.009 100.009
Analysis ID 04-3346-7794 14-8891-5003 96h Survival F Conc-µL/L 0 3 3.35 16.7 96h Survival F Conc-µL/L	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code	Count 4 4 4 4 8 Rep 1	Contro Contro Mean 1.0000 0.0000 0.0000 Rep 2	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3	1 95% UCL 1.0000 1.0000 0.0000 0.0000 Rep 4	Lower 0.9 0.9 Min 1.0000 1.0000 0.0000	Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	Passes Cr Passes Cr Std Dev 0.0000 0.0000 0.0000 0.0000	CV% 	0.00% 0.00% 100.009 100.009
Analysis ID 04-3346-7794 14-8891-5003 96h Survival F Conc-µL/L 0 3 3.35 16.7 96h Survival F Conc-µL/L 0	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail	Count 4 4 4 4 4 1.0000	Contro Contro Mean 1.0000 0.0000 0.0000 Rep 2 1.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000	1 1 95% UCL 1.0000 0.0000 0.0000 Rep 4 1.0000	Lower 0.9 0.9 Min 1.0000 1.0000 0.0000	Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	Passes Cr Passes Cr Std Dev 0.0000 0.0000 0.0000 0.0000	CV% 	0.00% 0.00% 100.009 100.009
Analysis ID 04-3346-7794 14-8891-5003 96h Survival F Conc-µL/L 0 3 3.35 16.7 96h Survival F Conc-µL/L 0 3	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code	Count 4 4 4 4 4	Contro Contro Mean 1.0000 0.0000 0.0000 0.0000 Rep 2 1.0000 1.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 1.0000	1 95% UCL 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000	Lower 0.9 0.9 Min 1.0000 1.0000 0.0000	Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	Passes Cr Passes Cr Std Dev 0.0000 0.0000 0.0000 0.0000	CV% 	0.00% 0.00% 100.009 100.009
Analysis ID 04-3346-7794 14-8891-5003 96h Survival F Conc-µL/L 0 3 3.35 16.7 96h Survival F Conc-µL/L 0 3 3,35	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code	Count 4 4 4 4 4 1 0000 1.0000 1.0000 0.0000	Contro Contro Mean 1.0000 0.0000 0.0000 Rep 2 1.0000 1.0000 0.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 1.0000 0.0000	1 1 95% UCL 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000 0.0000	Lower 0.9 0.9 Min 1.0000 1.0000 0.0000	Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	Passes Cr Passes Cr Std Dev 0.0000 0.0000 0.0000 0.0000	CV% 	0.00% 0.00% 100.009 100.009
Analysis ID 04-3346-7794 14-8891-5003 96h Survival F Conc-µL/L 0 3 3.35 16.7 96h Survival F Conc-µL/L 0 3 3,35	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code	Count 4 4 4 4 4	Contro Contro Mean 1.0000 0.0000 0.0000 0.0000 Rep 2 1.0000 1.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 1.0000 0.0000	1 95% UCL 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000	Lower 0.9 0.9 Min 1.0000 1.0000 0.0000	Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	Passes Cr Passes Cr Std Dev 0.0000 0.0000 0.0000 0.0000	CV% 	0.00% 0.00% 100.009 100.009
Analysis ID 04-3346-7794 14-8891-5003 96h Survival F Conc-µL/L 0 3 3.35 16.7 96h Survival F Conc-µL/L 0 3 3.35 16.7 96h Survival F 16.7	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code N	Count 4 4 4 4 4 4 1 0000 1.0000 0.0000 0.0000	Contro Contro Mean 1.0000 0.0000 0.0000 Rep 2 1.0000 1.0000 0.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 1.0000 0.0000	1 1 95% UCL 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000 0.0000 0.0000 0.0000	Lower 0.9 0.9 Min 1.0000 1.0000 0.0000	Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	Passes Cr Passes Cr Std Dev 0.0000 0.0000 0.0000 0.0000	CV% 	0.00% 0.00% 100.009 100.009
Analysis ID 24-3346-7794 14-8891-5003 36h Survival F Conc-µL/L 3 3.35 16.7 36h Survival F 3.35 6.7 6 .7 36h Survival F 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 375 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 377 	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code N Rate Binomials Code	Count 4 4 4 4 1.0000 1.0000 0.0000 0.0000 0.0000	Contro Contro Mean 1.0000 0.0000 0.0000 Rep 2 1.0000 0.0000 0.0000 0.0000	I Resp I Resp 95% LCL 1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 0.0000 0.0000 0.0000	1 1 95% UCL 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000	Lower 0.9 0.9 Min 1.0000 1.0000 0.0000	Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	Passes Cr Passes Cr Std Dev 0.0000 0.0000 0.0000 0.0000	CV% 	0.00% 0.00% 100.009 100.009
Analysis ID 04-3346-7794 14-8891-5003 96h Survival F Conc-µL/L 0 3.35 16.7 96h Survival F Conc-µL/L 0 3.35 16.7 96h Survival F Conc-µL/L	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code N	Count 4 4 4 4 1 0000 1.0000 0.0000 0.0000 0.0000 Rep 1 10/10	Contro Contro Contro 1.0000 0.0000 0.0000 Rep 2 1.0000 0.0000 0.0000 0.0000 Rep 2 10/10	I Resp I Resp I Resp 95% LCL 1.0000 0.0000 0.0000 Rep 3 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	1 1 95% UCL 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	Lower 0.9 0.9 Min 1.0000 1.0000 0.0000	Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	Passes Cr Passes Cr Std Dev 0.0000 0.0000 0.0000 0.0000	CV% 	0.00% 0.00% 100.009 100.009
Analysis ID 04-3346-7794 14-8891-5003 96h Survival F Conc-µL/L 0 33.35 16.7 96h Survival F Conc-µL/L 0 33.35 16.7 96h Survival F Conc-µL/L	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code N Rate Binomials Code	Count 4 4 4 4 4 1 0000 1.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.000	Contro Contro Contro 1.0000 0.0000 0.0000 0.0000 1.0000 0.000000	I Resp I Resp I Resp 95% LCL 1.0000 0.0000 0.0000 0.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	1 1 95% UCL 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.000000 0.00000 0.00000000	Lower 0.9 0.9 Min 1.0000 1.0000 0.0000	Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	Passes Cr Passes Cr Std Dev 0.0000 0.0000 0.0000 0.0000	CV% 	0.00% 0.00% 100.009 100.009
Analysis ID 04-3346-7794 14-8891-5003 96h Survival F Conc-µL/L 0 3 8.35 16.7 96h Survival F Conc-µL/L 0 3 8.35 16.7	Endpoint 96h Survival Rate 96h Survival Rate Rate Summary Code N Rate Detail Code N Rate Binomials Code N	Count 4 4 4 4 1 0000 1.0000 0.0000 0.0000 0.0000 Rep 1 10/10	Contro Contro Contro 1.0000 0.0000 0.0000 Rep 2 1.0000 0.0000 0.0000 0.0000 Rep 2 10/10	I Resp I Resp I Resp 95% LCL 1.0000 0.0000 0.0000 Rep 3 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	1 1 95% UCL 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	Lower 0.9 0.9 Min 1.0000 1.0000 0.0000	Upper >> >> Max 1.0000 1.0000 0.0000 0.0000	Yes Yes Std Err 0.0000 0.0000 0.0000 0.0000	Passes Cr Passes Cr Std Dev 0.0000 0.0000 0.0000 0.0000	CV% 	0.00% 0.00% 100.009 100.009

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Fish 96-h Acu	ite Survival Tes	it							Aqua	atic Bioassay	& Consulti	ng Labs, li
Analysis ID:	14-8891-5003		Endpoint:	96h Survival R	Rate			CE	TIS Versi	ion: CETIS	(1.9_7	
Analyzed:	08 Sep-21 13:3			Nonparametric				Sta	tus Leve	d: 1		
Edit Date:	08 Sep-21 13:2	6	MD5 Hash:	3A0D5E0FE4	0D419F8B	DE03F51	2603FC	Edi	tor ID:	007-979	9-628-1	
Batch ID:	15-2797-9235		Test Type:	Survival (96h)				Ana	lyst:	Joe Freas		
Start Date:	07 Jul-21 16:01		Protocol:	EPA/821/R-02	2-012 (2002	!)		Dilu	ent:	Laboratory Wa	ter	
-	11 Jul-21 14:01		Species:	Oncorhynchus	s mykiss			Brir	ne:	Not Applicable		
Test Length:	94h		Taxon:	Actinopterygii				Sou	Irce:	Aquatic Biosys	tems, CO	Age:
Sample ID:	01-7395-3681		Code:	TRU0721.007				Pro	ject:			
Sample Date:	01 Jul-21 11:30	I.	Material:	Sample Water						Bioassay Repo	rt	
Receipt Date:	01 Jul-21 11:30		CAS (PC):					Stat		Lake Mathews		
Sample Age:	6d 5h		Client:	Trussell Techr	nologies							
Data Transfor	m	Alt H	ур			Com	oarison F	Result				
Angular (Corre	cted)	C > T						_	vival rate	endpoint		
Steel Many-O	ne Rank Sum Te	est										
Control	vs Conc-µL	./L	Test St	at Critical	Ties	DF P-Ty	e P-\	/alue	Decisi	ion(α: 5 %)		
Negative Contro	ol 3		18	12		5 CDF		5000		ignificant Effec	t	
Test Acceptab	oility Criteria	т	AC Limits									
Attribute	Test Stat			Overlap	Decisio	n						
Control Resp	1	0.9	>>	Yes	Passes	Criteria						
ANOVA Table												
Source	Sum Squ	ares	Mean S	quare	DF	F Sta	P.	/alue	Decisi	ion(α:5%)		
Between	0	-	0		1			ande		rminate		
Error	0		0		6							
Tota/												
	0				7	-						
					7	_		_		_		
NOVA Assum						t Critic	al P-V	alue	Decisi	on(α:1%)		
ANOVA Assun Attribute	nptions Tests	Ratio F T	est			t Critic	al P-V	alue	Decisi			
ANOVA Assum Attribute /ariance	nptions Tests Test Variance F		est ormality Test			t Critic	al P-V	/alue		minate		
ANOVA Assum Attribute /ariance Distribution	nptions Tests Test Variance F					t Critic	al P-V	alue	Indeter	minate		
ANOVA Assum Attribute /ariance Distribution 6h Survival R	nptions Tests Test Variance F Shapiro-W		ormality Test	95% LCL					Indeter	minate	CV%	%Effect
ANOVA Assum Attribute /ariance Distribution 6h Survival R Conc-µL/L	nptions Tests Test Variance F Shapiro-W	/ilk VV No	ormality Test	95% LCL 1.0000	Test Sta		n Mir	1	Indeter Indeter	rminate rminate Std Err	CV% 0.00%	%Effect 0.00%
ANOVA Assum Attribute /ariance Distribution 6h Survival R Conc-µL/L	nptions Tests Test Variance F Shapiro-W ate Summary Code	/ilk W No	ormality Test Mean		Test Sta 95% UCI	- Media	n Mir	n DOO	Indeter Indeter Max	Std Err 0.0000		
ANOVA Assum Attribute /ariance Distribution 6h Survival R Conc-µL/L	nptions Tests Test Variance F Shapiro-W ate Summary Code	/ilk W No Count 4	Mean	1.0000	Test Sta 95% UCI 1.0000	- Media 1.0000	n Mir) 1.00	n DOO DOO	Indeter Indeter Max 1.0000	Std Err 0.0000 0.0000	0.00%	0.00% 0.00%
ANOVA Assum Attribute /ariance Distribution //6h Survival R Conc-µL/L	nptions Tests Test Variance F Shapiro-W ate Summary Code	/ilk W No Count 4 4	Mean 1_0000 1_0000	1.0000 1.0000	Test Sta 95% UCI 1.0000 1.0000	Media	n Mir 9 1.00 9 1.00	n DOO DOO DOO	Indeter Indeter Max 1.0000 1.0000	Std Err 0.0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00%	
ANOVA Assum Attribute /ariance Distribution /6h Survival R Conc-µL/L / / / / / / / / / / / / / / / / / /	nptions Tests Test Variance F Shapiro-W ate Summary Code	/ilk W No Count 4 4 4 4	Mean 1_0000 0.0000 0.0000	1.0000 1.0000 0.0000	Test Sta 95% UCI 1.0000 1.0000 0.0000	- Media 1.0000 1.0000 0.0000	n Mir 9 1.00 9 1.00	n DOO DOO DOO	Indeter Indeter Max 1.0000 1.0000 0.0000	Std Err 0.0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% 	0.00% 0.00% 100.00%
ANOVA Assum Attribute /ariance Distribution 6h Survival R Conc-µL/L .35 6.7 .ngular (Corre conc-µL/L	rptions Tests Test Variance F Shapiro-W tate Summary Code N	/ilk W No Count 4 4 4 4	Mean 1.0000 1.0000 0.0000 0.0000 0.0000	1.0000 1.0000 0.0000	Test Sta 95% UCI 1.0000 1.0000 0.0000	- Media 1.0000 1.0000 0.0000 0.0000	n Mir) 1.00) 1.00) 0.00) 0.00	000 000 000 000 000	Indeter Indeter Max 1.0000 1.0000 0.0000	Std Err 0.0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% 	0.00% 0.00% 100.00% 100.00%
ANOVA Assum Attribute /ariance Distribution 6h Survival R Conc-µL/L 35 6.7 angular (Corre conc-µL/L	nptions Tests Test Variance F Shapiro-W tate Summary Code N	/ilk W No Count 4 4 4 4 4 need Sun Count 4	Mean 1.0000 1.0000 0.0000 0.0000 0.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.0000 1.0000 1.4120	1.0000 1.0000 0.0000 0.0000 95% LCL 1.4120	Test Sta 95% UCI 1.0000 1.0000 0.0000 0.0000 95% UCI 1.4120	Media 1.000 1.000 0.000 0.000	n Mir) 1.0()) 1.0()) 0.0()) 0.0()) 0.0() n Miri 1.4'	1 000 000 000 000 000	Indeter Indeter Max 1.0000 0.0000 0.0000 Max 1.4120	Std Err 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% 	0.00% 0.00% 100.00% 100.00%
ANOVA Assum Attribute /ariance Distribution 6h Survival R Conc-µL/L .35 6.7 	rptions Tests Test Variance F Shapiro-W tate Summary Code N	ilk W No Count 4 4 4 4 4 4 ned Sun Count 4 4	Mean 1.0000 1.0000 0.0000 0.0000 0.0000 1.4120 1.4120	1.0000 1.0000 0.0000 0.0000 95% LCL 1.4120 1.4120	Test Sta 95% UCI 1.0000 0.0000 0.0000 95% UCI 1.4120 1.4120	 Media 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 1.4120 1.4120 	n Mir) 1.00) 0.00) 0.00) 0.00) 0.00) 1.41 1.41 1.41	1 000 000 000 000 000 120	Indeter Indeter Max 1.0000 0.0000 0.0000 0.0000 Max 1.4120 1.4120	Std Err 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% CV% 0.00% 0.00%	0.00% 0.00% 100.00% 100.00% %Effect 0.00%
ANOVA Assum Attribute /ariance Distribution 6h Survival R Conc-µL/L .35 6.7 	rptions Tests Test Variance F Shapiro-W tate Summary Code N	Count 4 4 4 4 4 4 4 Count 4 4 4	Mean 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.1000 0.0000 0.0000 0.1000 0.1588	1.0000 1.0000 0.0000 95% LCL 1.4120 1.4120 0.1588	Test Sta 95% UCI 1.0000 1.0000 0.0000 0.0000 95% UCI 1.4120 1.4120 1.4120 0.1588	Media 1.000 1.000 0.000 0.000 1.412 1.412 0.158	n Mir) 1.00) 1.00) 0.00) 0.00 n Min 1.4' 1.4' 0.15	1 000 000 000 000 000 120 120 588	Indeter Indeter Max 1.0000 0.0000 0.0000 0.0000 Max 1.4120 1.4120 0.1588	Std Err 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% CV% 0.00% 0.00%	0.00% 0.00% 100.00% 100.00% %Effect 0.00% 88.76%
ANOVA Assum Attribute /ariance Distribution 6h Survival R Conc-µL/L 35 6.7 angular (Corre conc-µL/L	rptions Tests Test Variance F Shapiro-W tate Summary Code N ected) Transform Code N	ilk W No Count 4 4 4 4 4 4 ned Sun Count 4 4	Mean 1.0000 1.0000 0.0000 0.0000 0.0000 1.4120 1.4120	1.0000 1.0000 0.0000 0.0000 95% LCL 1.4120 1.4120	Test Sta 95% UCI 1.0000 0.0000 0.0000 95% UCI 1.4120 1.4120	 Media 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 1.4120 1.4120 	n Mir) 1.00) 1.00) 0.00) 0.00 n Min 1.4' 1.4' 0.15	1 000 000 000 000 000 120 120 588	Indeter Indeter Max 1.0000 0.0000 0.0000 0.0000 Max 1.4120 1.4120	Std Err 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% CV% 0.00% 0.00%	0.00% 0.00% 100.00% 100.00% %Effect 0.00%
ANOVA Assum Attribute /ariance Distribution 6h Survival R Conc-µL/L .35 6.7 .ngular (Corre conc-µL/L .35 6.7 .6.7	ate Detail	Count 4	Mean 1.0000 1.0000 0.0000 0.0000 nmary Mean 1.4120 1.4120 0.1588 0.1588	1.0000 1.0000 0.0000 95% LCL 1.4120 1.4120 0.1588 0.1588	Test Sta 95% UCI 1.0000 0.0000 0.0000 95% UCI 1.4120 1.4120 0.1588 0,1588	Media 1.000 1.000 0.000 0.000 1.412 1.412 0.158	n Mir) 1.00) 1.00) 0.00) 0.00 n Min 1.4' 1.4' 0.15	1 000 000 000 000 000 120 120 588	Indeter Indeter Max 1.0000 0.0000 0.0000 0.0000 Max 1.4120 1.4120 0.1588	Std Err 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% CV% 0.00% 0.00%	0.00% 0.00% 100.00% 100.00% %Effect 0.00% 88.76%
ANOVA Assum Attribute /ariance Distribution 6h Survival R Conc-µL/L 	ate Detail Code	Count 4 8 8 8 8 8 8 8 8 8 8 8 8 9 10 11 12 13 14 15 16 17 17 17 17 16	Mean 1.0000 1.0000 0.0000 0.0000 nmary Mean 1.4120 1.4120 0.1588 0.1588 Rep 2	1.0000 1.0000 0.0000 95% LCL 1.4120 1.4120 0.1588 0.1588 Rep 3	Test Sta 95% UCI 1.0000 1.0000 0.0000 0.0000 95% UCI 1.4120 1.4120 1.4120 0.1588 0.1588 Rep 4	Media 1.000 1.000 0.000 0.000 1.412 1.412 0.158	n Mir) 1.00) 1.00) 0.00) 0.00 n Min 1.4' 1.4' 0.15	1 000 000 000 000 000 120 120 588	Indeter Indeter Max 1.0000 0.0000 0.0000 0.0000 Max 1.4120 1.4120 0.1588	Std Err 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% CV% 0.00% 0.00%	0.00% 0.00% 100.00% 100.00% %Effect 0.00% 88.76%
ANOVA Assum Attribute /ariance Distribution 16h Survival R Conc-µL/L 35 6.7 Angular (Corre Conc-µL/L 35 6.7 6h Survival Ra conc-µL/L	ate Detail	Count 4 1,0000	Mean 1.0000 1.0000 0.0000 0.0000 nmary Mean 1.4120 1.4120 1.4120 0.1588 0.1588 0.1588	1.0000 1.0000 0.0000 95% LCL 1.4120 1.4120 0.1588 0.1588 Rep 3 1.0000	Test Sta 95% UCI 1.0000 1.0000 0.0000 0.0000 95% UCL 1.4120 1.4120 1.4120 0.1588 0.1588 Rep 4 1.0000	Media 1.000 1.000 0.000 0.000 1.412 1.412 0.158	n Mir) 1.00) 1.00) 0.00) 0.00 n Min 1.4' 1.4' 0.15	1 000 000 000 000 000 120 120 588	Indeter Indeter Max 1.0000 0.0000 0.0000 0.0000 Max 1.4120 1.4120 0.1588	Std Err 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% CV% 0.00% 0.00%	0.00% 0.00% 100.00% 100.00% %Effect 0.00% 88.76%
ANOVA Assum Attribute /ariance Distribution Conc-µL/L) 335 6.7 Angular (Corre Conc-µL/L .35 6.7 6h Survival Rational Conc-µL/L	ate Detail Code	Count 4 8 8 8 8 8 8 8 8 8 8 8 8 9 10 11 12 13 14 15 16 17 17 17 17 16	Mean 1.0000 1.0000 0.0000 0.0000 0.0000 nmary Mean 1.4120 1.4120 0.1588 0.1588 0.1588 1.0000 1.0000	1.0000 1.0000 0.0000 95% LCL 1.4120 1.4120 0.1588 0.1588 Rep 3	Test Sta 95% UCI 1.0000 1.0000 0.0000 0.0000 95% UCI 1.4120 1.4120 1.4120 0.1588 0.1588 Rep 4	Media 1.000 1.000 0.000 0.000 1.412 1.412 0.158	n Mir) 1.00) 1.00) 0.00) 0.00 n Min 1.4' 1.4' 0.15	1 000 000 000 000 000 120 120 588	Indeter Indeter Max 1.0000 0.0000 0.0000 0.0000 Max 1.4120 1.4120 0.1588	Std Err 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	0.00% 0.00% CV% 0.00% 0.00%	0.00% 0.00% 100.00% 100.00% %Effect 0.00% 88.76%

007-979-628-1

CETIS Ana	alytical Repo	ort				Report Date: Test Code/ID:	08 Sep-21 13:30 (p 2 of 2) TRU0721.007 / 11-3625-3181
Fish 96-h Acı	ute Survival Test					Aquatic E	Bioassay & Consulting Labs, Inc.
Analysis ID: Analyzed: Edit Date:	14-8891-5003 08 Sep-21 13:30 08 Sep-21 13:26	A	Analysis: N	•	ate -Control vs Treatments DD419F8BDE03F5112603FC	CETIS Version: Status Level: Editor ID:	CETISv1.9.7 1 007-979-628-1
Angular (Cor	rected) Transforn	ned Deta	ail				
Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4		
0	Ν	1.4120	1.4120	1.4120	1.4120		
3		1.4120	1.4120	1.4120	1.4120		
8,35		0.1588	0.1588	0.1588	0.1588		
16.7		0.1588	0.1588	0.1588	0.1588		
96h Survival	Rate Binomials						
Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4		
0	N	10/10	10/10	10/10	10/10		
3		10/10	10/10	10/10	10/10		
8.35		0/10	0/10	0/10	0/10		
16.7		0/10	0/10	0/10	0/10		

Graphics



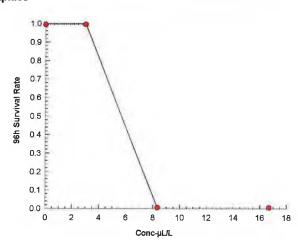
Analyst:



	_		ort				_		eport Date: est Code/ID			ep-21 13: 21.007 / 1	1-3625-31
Fish 9	6-h Acu	te Survival Test							Aqua	tic Bioas	say & Co	onsultin	g Labs, Inc
Analys		04-3346-7794		dpoint:	96h Survival R				ETIS Versio	41	TISv1.9.	7	
Analyz Edit Da		08 Sep-21 13:30 08 Sep-21 13:26		alysis:)5 Hash:	Linear Interpola 3A0D5E0FE40		3F5112603		atus Level: litor ID:		7-979-628	8-1	
Batch	ID:	15-2797-9235	Te	st Type:	Survival (96h)			Ai	nalyst: .	loe Freas	;		
Start D		07 Jul-21 16:01	Pro	tocol:	EPA/821/R-02-			Di	luent: [aboratory	y Water		
	-	11 Jul-21 14:01	•	ecies:	Oncorhynchus	mykiss				Vot Applic			
Test L	ength:	94h	Тах	(on:	Actinopterygii	_		So	ource: A	Aquatic B	iosystem	s, CO	Age:
Sample		01-7395-3681	Co		TRU0721.007			Pr	oject:				
		01 Jul-21 11:30		terial:	Sample Water					Bioassay			
		01 Jul-21 11:30		S (PC):		-1		St	ation: L	ake Math	news		
	e Age:			ent:	Trussell Techn	ologies							
Linear X Tran	•	lation Options Y Transform	See	h	Resamples	Exp 95% C	L Meth	od					
Linear	5.510111	Linear	0		280	Yes		Point Inte	rpolation	_			
Test A	cceptab	ility Criteria	TACI	Limits									
Attribu		Test Stat	Lower	Upper	Overlap	Decision							
Control		1	0.9	>>	Yes	Passes Crite	eria	_		_	_		
Point E	Estimate	S											
Level	μL/L	95% LCL	95% UCL										
	µL/L 3.535		95% UCL 3.535				_				_		
EC10 EC15	3.535 3.803	3.535 3.803	3.535 3.803					_					
EC10 EC15 EC20	3.535 3.803 4.07	3.535 3 803 4.07	3.535 3.803 4.07				-	-					
EC10 EC15 EC20 EC25	3.535 3.803 4.07 4.338	3.535 3.803 4.07 4.338	3.535 3.803 4.07 4.338										
EC10 EC15 EC20 EC25 EC40	3.535 3.803 4.07 4.338 5.14	3.535 3.803 4.07 4.338 5.14	3.535 3.803 4.07 4.338 5.14										
EC10 EC15 EC20 EC25 EC40 EC50	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338										
EC10 EC15 EC20 EC25 EC40 EC50	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338 5.14 5.675				ited Variat						ic Variate
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-µ	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338 5.14 5.675 Rate Summary Code	3.535 3.803 4.07 4.338 5.14 5.675 Count	Mean	Median	Min	Max	CV%	%Effec			/lean	%Effect
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-µ	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338 5.14 5.675 Count 4	Mean 1.0000	1.0000	Min 1.0000	Max 1.0000	CV%	0.00%	40/4	10 1	/lean .0000	%Effect 0.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-µ	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338 5.14 5.675 Rate Summary Code	3.535 3.803 4.07 4.338 5.14 5.675 Count	Mean 1.0000 1.0000	1.0000 1.0000	Min 1.0000 1.0000	Max 1.0000 1.0000	CV%	0.00% 0.00%	40/4 40/4	10 1 10 1	/lean .0000 .0000	%Effect 0.00% 0.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-µ D 3 3.35	3.535 3.803 4.07 4.338 5.14 5.675	3.535 3.803 4.07 4.338 5.14 5.675 Rate Summary Code	3.535 3.803 4.07 4.338 5.14 5.675 Count 4	Mean 1.0000	1.0000 1.0000 0.0000	Min 1.0000 1.0000 0.0000	Max 1.0000	CV%	0.00%	40/4 40/4 % 0/40	10 1 10 1) C	/lean .0000	%Effect 0.00% 0.00% 100.00%
Conc-µ 0 3 8.35 16.7	3.535 3.803 4.07 4.338 5.14 5.675 rvival R	3.535 3.803 4.07 4.338 5.14 5.675 Rate Summary Code	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4	Mean 1.0000 1.0000 0.0000	1.0000 1.0000 0.0000	Min 1.0000 1.0000 0.0000	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.00	40/4 40/4 % 0/40	10 1 10 1) C	/lean .0000 .0000 .0000	%Effect 0.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-µ D 3 3.35 16.7 96h Su	3.535 3.803 4.07 4.338 5.14 5.675 rvival R iL/L	3.535 3.803 4.07 4.338 5.14 5.675 Ate Summary Code N	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4	Mean 1.0000 1.0000 0.0000	1.0000 1.0000 0.0000	Min 1.0000 1.0000 0.0000	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.00	40/4 40/4 % 0/40	10 1 10 1) C	/lean .0000 .0000 .0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-µ D 3 3.35 16.7	3.535 3.803 4.07 4.338 5.14 5.675 rvival R iL/L	3.535 3.803 4.07 4.338 5.14 5.675 3ate Summary Code N	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4	Mean 1.0000 1.0000 0.0000 0.0000	 1.0000 1.0000 0.0000 0.0000 0.0000 Rep 3	Min 1.0000 1.0000 0.0000 0.0000	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.00	40/4 40/4 % 0/40	10 1 10 1) C	/lean .0000 .0000 .0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-µ 0 3 3.35 16.7 96h Su Conc-µ	3.535 3.803 4.07 4.338 5.14 5.675 rvival R iL/L	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 8 Rep 1	Mean 1.0000 1.0000 0.0000 0.0000 Rep 2	 1.0000 1.0000 0.0000 0.0000 0.0000 Rep 3 1.0000 	Min 1.0000 1.0000 0.0000 0.0000 Rep 4	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.00	40/4 40/4 % 0/40	10 1 10 1) C	/lean .0000 .0000 .0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-µ 3 3.35 16.7 96h Su Conc-µ 3 3.35	3.535 3.803 4.07 4.338 5.14 5.675 rvival R iL/L	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 Rep 1 1.0000	Mean 1.0000 0.0000 0.0000 Rep 2 1.0000	 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 Rep 3 1.0000 1.0000 	Min 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.00	40/4 40/4 % 0/40	10 1 10 1) C	/lean .0000 .0000 .0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-µ 3 3.35 16.7 96h Su Conc-µ 3 3.35	3.535 3.803 4.07 4.338 5.14 5.675 rvival R iL/L	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 4 Rep 1 1.0000 1.0000	Mean 1.0000 1.0000 0.0000 Rep 2 1.0000 1.0000	 1.0000 1.0000 0.0000 0.0000 0.0000 Rep 3 1.0000 1.0000 0.0000 	Min 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.00	40/4 40/4 % 0/40	10 1 10 1) C	/lean .0000 .0000 .0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-µ 0 3 3.35 16.7 96h Su Conc-µ 0 3 3.35 16.7	3.535 3.803 4.07 4.338 5.14 5.675 rvival R iL/L	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 4 4 1.0000 1.0000 0.0000	Mean 1.0000 1.0000 0.0000 0.0000 Rep 2 1.0000 1.0000 0.0000	 1.0000 1.0000 0.0000 0.0000 0.0000 Rep 3 1.0000 1.0000 0.0000 	Min 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000 0.0000	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.00	40/4 40/4 % 0/40	10 1 10 1) C	/lean .0000 .0000 .0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-µ 0 3 3.35 16.7 96h Su Conc-µ 0 3 3.35 16.7 96h Su	3.535 3.803 4.07 4.338 5.14 5.675 rvival R iL/L	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N ate Detail Code N ate Detail Code	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 4 4 4 1.0000 1.0000 0.0000 0.0000 0.0000 Rep 1	Mean 1.0000 0.0000 0.0000 Rep 2 1.0000 1.0000 0.0000 0.0000 Rep 2	 1.0000 1.0000 0.0000 0.0000 0.0000 Rep 3 1.0000 1.0000 0.0000 0.0000 0.0000 Rep 3 	Min 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000 0.0000 0.0000 0.0000 Rep 4	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.00	40/4 40/4 % 0/40	10 1 10 1) C	/lean .0000 .0000 .0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-µ 0 3 3.35 16.7 96h Su 0 3 3.35 16.7 96h Su Conc-µ 0	3.535 3.803 4.07 4.338 5.14 5.675 rvival R iL/L	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N ate Detail Code N	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 4 4 4 4 4 4 7 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	Mean 1.0000 0.0000 0.0000 0.0000 Rep 2 1.0000 0.0000 0.0000 Rep 2 1.0000 0.0000 Rep 2 1.0000 0.0000 1.0000 0.0000	1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	Min 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 Rep 4 10/10	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.00	40/4 40/4 % 0/40	10 1 10 1) C	/lean .0000 .0000 .0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su Conc-µ 0 3 3.35 16.7 96h Su 0 3 3.35 16.7 96h Su 0 3 3 3.35 16.7 96h Su	3.535 3.803 4.07 4.338 5.14 5.675 rvival R iL/L	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N ate Detail Code N ate Detail Code	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 4 4 4 4 4 7 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	Mean 1.0000 0.0000 0.0000 0.0000 0.0000 Rep 2 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 1.0000 1.0000 0.0000 0.0000 0.0000 Rep 3 10/10 10/10 	Min 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 Rep 4 10/10 10/10	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.00	40/4 40/4 % 0/40	10 1 10 1) C	/lean .0000 .0000 .0000	%Effect 0.00% 0.00% 100.00%
EC10 EC15 EC20 EC25 EC40 EC50 96h Su 20nc-µ 3 3.35 I6.7 96h Su 3 3.35 I6.7 96h Su 3 3.35	3.535 3.803 4.07 4.338 5.14 5.675 rvival R iL/L	3.535 3.803 4.07 4.338 5.14 5.675 ate Summary Code N ate Detail Code N ate Detail Code	3.535 3.803 4.07 4.338 5.14 5.675 Count 4 4 4 4 4 4 4 4 4 4 4 4 7 1.0000 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	Mean 1.0000 0.0000 0.0000 0.0000 Rep 2 1.0000 0.0000 0.0000 Rep 2 1.0000 0.0000 Rep 2 1.0000 0.0000 1.0000 0.0000	1.0000 1.0000 0.0000 0.0000 Rep 3 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	Min 1.0000 1.0000 0.0000 0.0000 Rep 4 1.0000 0.0000 0.0000 0.0000 0.0000 0.0000 Rep 4 10/10	Max 1.0000 1.0000 0.0000	CV% 0.00% 0.00%	0.00% 0.00% 100.00	40/4 40/4 % 0/40	10 1 10 1) C	/lean .0000 .0000 .0000	%Effect 0.00% 0.00% 100.009

h QA:-E Analyst:_

CETIS An	alytical Report			Report Date: Test Code/ID:	08 Sep-21 13:31 (p 2 of 2) TRU0721.007 / 11-3625-3181			
Fish 96-h Acute Survival Test Aquatic Bioassay & Consulting Labs,								
Analysis ID:	04-3346-7794	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.9.7			
Analyzed:	08 Sep-21 13:30	Analysis:	Linear Interpolation (ICPIN)	Status Level:	1			
Edit Date:	08 Sep-21 13:26	MD5 Hash:	3A0D5E0FE40D419F8BDE03F5112603FC	Editor ID:	007-979-628-1			
Graphics								







UE IIS Mea	asurement	керо	n					Report Date Test Code/I			3:31 (p 1 of 11 <mark>-3625-31</mark> 8
Fish 96-h Acu	te Survival Test	t						Aqu	atic Bioassay a	& Consultin	ng Labs, Inc
Batch ID:	15-2797-9235			Survival (96h)				Analyst:	Joe Freas		
Start Date:	07 Jul-21 16:01		Protocol:	EPA/821/R-02	• • •			Diluent:	Laboratory Wat	ter	
Ending Date:	11 Jul-21 14:01		Species:	Oncorhynchus	s mykiss			Brine:	Not Applicable		
Test Length:	94h		Taxon:	Actinopterygii				Source:	Aquatic Biosys	tems, CO	Age:
Sample ID:	01-7395-3681		Code:	TRU0721.007				Project:			
•	01 Jul-21 11:30		Material:	Sample Water				Source:	Bioassay Repo	rt	
•	01 Jul-21 11:30		CAS (PC):					Station:	Lake Mathews		
Sample Age:	6d 5h		Client:	Trussell Techr	nologies						
Alkalinity (Ca	CO3)-mg/L										
Conc-µL/L	Code	Count		95% LCL	95% UCL	Min	Max	Std Er	r Std Dev	CV%	QA Coun
0	N	2	125.5	119 1	131,9	125	126	0.3536	0.7071	0.56%	0
3		2	133.5	127.1	139.9	133	134	0.3536		0.53%	0
8.35		2	136.5	130,1	142.9	136	137	0.3536	0.7071	0.52%	0
16.7		2	129.5	123.1	135.9	129	130	0.3536		0.55%	0
Overall		8	131.2	127.5	135	125	137	1.578	4.464	3.40%	0 (0%)
Dissolved Oxy	• •										
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Er	r Std Dev	CV%	QA Coun
0	N	5	10.18	9.996	10.36	10	10.4	0.0296	6 0.1483	1.46%	0
3		5	10.04	9.57	10.51	9.4	10.4	0.0756	3 0.3782	3.77%	0
8.35		2	9.75	6.573	12.93	9.5	10	0.1768	0.3536	3.63%	0
16.7		2	9.7	5.888	13,51	9.4	10	0.2121	0.4243	4.37%	0
Overall	_	14	10	9.808	10.19	9.4	10.4	0.0889	5 0.3328	3.33%	0 (0%)
Hardness (Ca											
Conc-µL/L	Code	Count		95% LCL	95% UCL	Min	Max	Std Er	r Std Dev	CV%	QA Coun
0	N	2	125.5	119.1	131.9	125	126	0,3536	0 7071	0.56%	0
3		2	292.5	260.7	324.3	290	295	1.768	3.536	1.21%	0
3.35		2	327.5	295.7	359.3	325	330	1.768	3.536	1.08%	0
Overall		6	248.5	147.1	349.9	125	330	39.43	96.58	38.86%	0 (0%)
oH-Units	Orde	0									
Conc-µL/L	Code N	Count 5	Mean 7.9	95% LCL 7.549	95% UCL	Min	Max	Std En		CV%	QA Count
3	IN IN	5	7.86	7.536	8.251 8.184	7.4	8.1	0.0565		3.58%	0
3.35		2	7.7	5.159	10.24	7.4 7.5	8 7.9	0.0521		3.32% 3.67%	0
16.7		2	7.65	4.473	10.83	7.4	7.9	0.1414 0.1768		4.62%	0
Overall		14	7.821	7.668	7.975	7.4	8_1	0.07124		3.41%	0 (0%)
Temperature-°	c										
Conc-µL/L		Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	· Std Dev	CV%	QA Count
)		5	13.1	12.47	13.73	12.8	14	0.102	0.5099	3.89%	0
3		5	13.06	12.36	13.76	12.5	14	0.1128	0.5639	4.32%	0
3.35		2	13.3	5 676	20.92	12.7	13.9	0.4243	0.8485	6.38%	0
6.7		2	13.3	6.947	19.65	12.8	13.8	0.3536	0.7071	5.32%	0
Overall		14	13.14	12.84	13.45	12.5	14	0.1421	0.5316	4.05%	0 (0%)

Analyst:_____ QA:



July 21, 2021

Mr. David Hokanson Trussell Technologies 232 N. Lake Avenue Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms EPA-821-R-02-012.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Trussell Technologies
SAMPLE ID.:	Lake Matthew Raw with EarthTec QZ
DATE RECEIVED:	1 July – 21
ABC LAB NO.:	TRU0721.007

ACUTE FATHEAD MINNOW SURVIVAL BIOASSAY

% Survival = 97.50% Survival in 16.7 ul/l Sample

EC50 = >16.7 ul/l

Yours very truly,

M. Scott Johnson Laboratory Director

CETIS Summary Report

Report Date: 21 Jul-21 15:04 (p 1 of 1)

Test Code/ID: TRU0721.007afm! / 09-6969-6427

ancea miiii	ow 96-h Acute		_					лчиа	tic Bioassay &	consulting	_uss, iiic.
Batch ID:	10-3180-3556			Survival (96h)				nalyst:			
Start Date:	07 Jul-21 15:01			EPA/821/R-02-	. ,			iluent:	Receiving Wate	er	
-	11 Jul-21 14:15	-		Pimephales pro	omelas			rine:	Not Applicable	00	
Test Length:	95h	Та	ixon:	Actinopterygii			s	ource:	Aquatic Biosyst	iems, CO	Age: <24
Sample ID:	13-0172-2416		ode:	TRU0721.007a	fml			roject:			
-	01 Jul-21 11:30		aterial:	Sample Water				ource:	Bioassay Repo		
•	01 Jul-21 11:30		AS (PC):				S	tation:	Lake Matthew F	Raw with Ear	rth Tec QZ
Sample Age:	6d 4h (11 °C)	C	ient:	Trussell Techn	ologies		_				
Multiple Com	parison Summ	ary									
Analysis ID	Endpoint		Comp	arison Method		`	/ NOEL	LOEL	TOEL	PMSD	
07-1275-9365	96h Survival R	ate	Steel I	Vany-One Rank	Sum Test		16.7	>16.7		4.96%	
Point Estimat	e Summary										
Analysis ID	Endpoint		Point	Estimate Meth	od		√ Level	μL/L	95% LCL	95% UCL	-
07-7480-8197	96h Survival R	ate	Linear	Interpolation (I	CPIN)		EC10	>16.7			
							EC15	>16.7			
							EC20	>16.7			
							EC25	>16.7			
							EC40	>16.7			
							EC50	>16.7			
Test Acceptal	bility						Limits				
Analysis ID	Endpoint		Attrib		Test Stat	Lower	Upper				
	96h Survival R			ol Resp	1	0.9	>>	Yes	Passes C		
07-7480-8197	96h Survival R	ate	Contro	ol Resp	1	0.9	>>	Yes	Passes C	Criteria	
96h Survival I	Rate Summary										
Conc-µL/L	Code	Count	Mean	95% LCL		Min	Max	Std E		CV%	%Effect
0	D	4	1.0000		1.0000	1.0000	1.000				0.00%
3		4	1.0000		1.0000	1.0000	1.000				0.00%
8.35		4	1.0000		1.0000	1.0000	1.000				0.00%
		4	0.9750	0.8954	1.0550	0.9000	1.000	0.025	0.0500	5.13%	2.50%
16.7		4	_			0.0000	_				75DEE9E
	Rate Detail	4				0.0000		MD5: 64C	D5B1D74951B1	BFA48CE85	
16.7	Code	Rep 1	Rep 2		Rep 4	0.0000		MD5: 64C	D5B1D74951B1	BFA48CE85	
16.7 96h Survival		Rep 1 1.0000	Rep 2	1.0000	1.0000			MD5: 64C	D5B1D74951B1	BFA48CE85	
16.7 96h Survival Сопс-µL/L 0 3	Code	Rep 1 1.0000 1.0000	Rep 2 1.0000 1.0000) 1.0000) 1.0000	1.0000 1.0000			MD5: 64C	D5B1D74951B1	BFA48CE85	
16.7 96h Survival Conc-µL/L 0 3 8.35	Code	Rep 1 1.0000	Rep 2	1.0000 1.0000 1.0000 1.0000 1.0000	1.0000 1.0000 1.0000			MD5: 64C	D5B1D74951B1	BFA48CE85	
16.7 96h Survival Сопс-µL/L 0 3	Code	Rep 1 1.0000 1.0000	Rep 2 1.0000 1.0000	1.0000 1.0000 1.0000 1.0000 1.0000	1.0000 1.0000			MD5: 64C	D5B1D74951B1	BFA48CE85	
16.7 96h Survival Conc-µL/L 0 3 8.35 16.7	Code	Rep 1 1.0000 1.0000 1.0000 0.9000	Rep 2 1.0000 1.0000 1.0000	1.0000 1.0000 1.0000 1.0000 1.0000	1.0000 1.0000 1.0000			MD5: 64C	D5B1D74951B1	BFA48CE85	
16.7 96h Survival Conc-µL/L 0 3 8.35 16.7	Code D	Rep 1 1.0000 1.0000 0.9000 5 Rep 1	Rep 2 1.0000 1.0000 1.0000 1.0000 Rep 2	 1.0000 1.0000 1.0000 1.0000 1.0000 	1.0000 1.0000 1.0000 1.0000 Rep 4			MD5: 64C	D5B1D74951B1	BFA48CE85	
16.7 96h Survival 0 3 8.35 16.7 96h Survival	Code D Rate Binomials	Rep 1 1.0000 1.0000 1.0000 0.9000	Rep 2 1.0000 1.0000 1.0000 1.0000 Rep 2 10/10	0 1.0000 0 1.0000 0 1.0000 0 1.0000 0 1.0000	1.0000 1.0000 1.0000 1.0000			MD5: 64C	D5B1D74951B1	BFA48CE85	
16.7 96h Survival 0 3 8.35 16.7 96h Survival Conc-µL/L	Code D Rate Binomials Code	Rep 1 1.0000 1.0000 0.9000 0.9000 6 Rep 1 10/10 10/10	Rep 2 1.0000 1.0000 1.0000 1.0000 Rep 2 10/10 10/10	 1.0000 1.0000 1.0000 1.0000 1.0000 	1.0000 1.0000 1.0000 1.0000 Rep 4			MD5: 64C	D5B1D74951B1	BFA48CE85	
16.7 96h Survival 0 3 8.35 16.7 96h Survival Conc-µL/L 0	Code D Rate Binomials Code	Rep 1 1.0000 1.0000 0.0000 0.9000 6 Rep 1 10/10	Rep 2 1.0000 1.0000 1.0000 1.0000 Rep 2 10/10	0 1.0000 0 1.0000 0 1.0000 0 1.0000 0 1.0000	1.0000 1.0000 1.0000 1.0000 Rep 4 10/10			MD5: 64C	D5B1D74951B1	BFA48CE85	

Analyst: _____QA:______AASS

 Report Date:
 21 Jul-21 15:03 (p 1 of 2)

 Test Code/ID:
 TRU0721.007afml / 09-6969-6427

Fathead Minnow 96-h Acute Survival Test Aquatic Bioassay & Consulting Labs, Inc. 07-1275-9365 Analysis ID: Endpoint: 96h Survival Rate **CETIS Version:** CETISv1.9.7 20 Jul-21 15:15 Analyzed: Analysis: Nonparametric-Control vs Treatments Status Level: Edit Date: 20 Jul-21 15:12 MD5 Hash: 64CD5B1D74951B1BFA48CE8575DEE9E9 Editor ID: 000-189-126-0 Batch ID: 10-3180-3556 Test Type: Survival (96h) Analyst: Start Date: 07 Jul-21 15:01 Protocol: EPA/821/R-02-012 (2002) Diluent: Receiving Water Ending Date: 11 Jul-21 14:15 Pimephales promelas Brine: Species: Not Applicable Test Length: 95h Taxon: Actinopterygii Source: Aquatic Biosystems, CO Age: <24 Sample ID: TRU0721.007afml 13-0172-2416 Code: Project: Sample Date: 01 Jul-21 11:30 Material: Sample Water Source: **Bioassay Report** Receipt Date: 01 Jul-21 11:30 CAS (PC): Station: Lake Matthew Raw with Earth Tec QZ Sample Age: 6d 4h (11 °C) **Client:** Trussell Technologies NOEL LOEL TOEL τu MSDu PMSD Data Transform Alt Hyp C > T >16.7 0.04964 4.96% Angular (Corrected) 16.7 --------Steel Many-One Rank Sum Test Control vs Conc-µL/L Test Stat Critical Ties DF P-Type P-Value Decision(a:5%) 10 6 Non-Significant Effect **Dilution Water** 3 18 1 CDF 0.7500 8.35 18 10 1 6 CDF 0.7500 Non-Significant Effect 16.7 16 10 1 6 CDF 0.5065 Non-Significant Effect **Test Acceptability Criteria** TAC Limits Attribute Test Stat Lower Upper Overlap Decision Control Resp 0.9 >> Yes Passes Criteria 1 ANOVA Table DF Source Sum Squares Mean Square F Stat P-Value Decision(a:5%) 3 0.4262 Non-Significant Effect Between 0.0049799 0.00166 1 0.0199195 0.00166 12 Error 15 Total 0.0248994 ANOVA Assumptions Tests Test Stat Critical **P-Value** Decision(a:1%) Attribute Test Bartlett Equality of Variance Test Indeterminate Variance Levene Equality of Variance Test 9 5.953 0.0021 Unequal Variances 5.953 0.4262 Equal Variances Mod Levene Equality of Variance Test 1 <1.0E-05 Non-Normal Distribution 3.878 Distribution Anderson-Darling A2 Test 3.496 3.733 2.576 0.0002 Non-Normal Distribution D'Agostino Skewness Test Kolmogorov-Smirnov D Test 0.4375 0.2471 <1.0E-05 Non-Normal Distribution 0.5647 0.8408 <1.0E-05 Non-Normal Distribution Shapiro-Wilk W Normality Test 96h Survival Rate Summary Max CV% Conc-µL/L Code Count Mean 95% LCL 95% UCL Median Min Std Err %Effect 0 1.0000 1.0000 1.0000 1.0000 0.0000 0.00% 0.00% D 4 1.0000 1.0000 0.00% 3 4 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 0.00% 0.0000 0.00% 4 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.00% 8.35 2.50% 1.0000 0.9000 1.0000 0.0250 5.13% 0.9750 0.8954 1.0000 16.7 4 Angular (Corrected) Transformed Summary CV% 95% UCL Median Min Max Std Err %Effect Conc-µL/L Code Count Mean 95% LCL 0.0000 0.00% 0.00% 1.4120 0 D 4 1.4120 1.4120 1.4120 1.4120 1.4120 0.00% 4 1.4120 1.4120 1.4120 1.4120 1.4120 1.4120 0.0000 0.00% 3 0.0000 0.00% 0.00% 4 1.4120 1.4120 1.4120 1.4120 1.4120 1.4120 8.35 0.0407 2.89% 1.4120 5.94% 16.7 4 1.3710 1.2420 1.5010 1.4120 1.2490

Report Date: Test Code/ID:

Aquatic Bioassay & Consulting Labs, Inc.

21 Jul-21 15:03 (p 2 of 2) TRU0721.007afml / 09-6969-6427

Fathead	Minnow	96-h Acute	Survival	Test

Analysis ID:	07-1275-9365	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.9.7
Analyzed:	20 Jul-21 15:15	Analysis:	Nonparametric-Control vs Treatments	Status Level:	1
Edit Date:	20 Jul-21 15:12	MD5 Hash:	64CD5B1D74951B1BFA48CE8575DEE9E9	Editor ID:	000-189-126-0

96h Survival Rate Detail

Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	1.0000
3		1.0000	1.0000	1.0000	1.0000
8.35		1.0000	1.0000	1.0000	1.0000
16.7		0.9000	1.0000	1.0000	1.0000

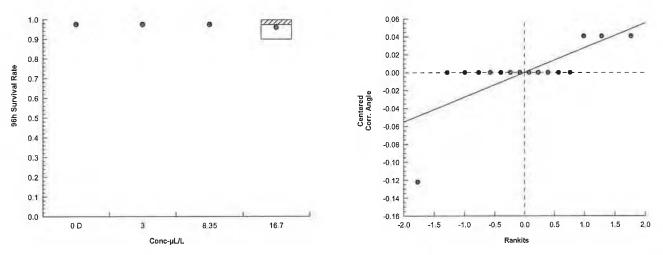
Angular (Corrected) Transformed Detail

Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.4120	1.4120	1.4120	1.4120
3		1.4120	1.4120	1.4120	1.4120
8.35		1.4120	1.4120	1.4120	1.4120
16.7		1.2490	1.4120	1.4120	1.4120

96h Survival Rate Binomials

Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	10/10	10/10	10/10
3		10/10	10/10	10/10	10/10
8.35		10/10	10/10	10/10	10/10
16.7		9/10	10/10	10/10	10/10

Graphics



Analyst: _____QA:___

 Report Date:
 21 Jul-21 15:03 (p 1 of 2)

 Test Code/ID:
 TRU0721.007afml / 09-6969-6427

Fathead Minnow 96-h Acute Survival Test Aquatic Bioassay & Consulting Labs, Inc. 07-7480-8197 Analysis ID: 96h Survival Rate **CETIS Version**; CETISv1.9.7 Endpoint: Analyzed: 20 Jul-21 15:15 Analysis: Linear Interpolation (ICPIN) Status Level: 1 Edit Date: 20 Jul-21 15:12 MD5 Hash: 64CD5B1D74951B1BFA48CE8575DEE9E9 Editor ID: 000-189-126-0 Batch ID: 10-3180-3556 Test Type: Survival (96h) Analyst: Start Date: 07 Jul-21 15:01 EPA/821/R-02-012 (2002) Diluent: **Receiving Water** Protocol: Ending Date: 11 Jul-21 14:15 Species: Pimephales promelas Brine: Not Applicable Aquatic Biosystems, CO Test Length: 95h Taxon: Actinopterygii Source: Age: <24 Sample ID: 13-0172-2416 Code: TRU0721.007afml Project: Sample Date: 01 Jul-21 11:30 Material: Sample Water Source: **Bioassay Report** Receipt Date: 01 Jul-21 11:30 CAS (PC): Station: Lake Matthew Raw with Earth Tec QZ Sample Age: 6d 4h (11 °C) **Client: Trussell Technologies Linear Interpolation Options** X Transform Y Transform Seed Resamples Exp 95% CL Method 280 Linear Linear 0 Yes Two-Point Interpolation Test Acceptability Criteria

TAC Limits						
Attribute	Test Stat	Lower	Upper	Overlap	Decision	
Control Resp	1	0.9	>>	Yes	Passes Criteria	

Point Estimates

1	Level	µL/L	95% LCL	95% UCL
	EC10	>16.7		
	EC15	>16.7		
	EC20	>16.7		
	EC25	>16.7		
	EC40	>16.7	-222	
	EC50	>16.7	-	

96h Survival R	ate Summary	Calculated Variate(A/B)								Isotonic Variate	
Conc-µL/L	Code	Count	Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	D	4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	40/40	1.0000	0.00%
3		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	40/40	1.0000	0.00%
8.35		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	40/40	1.0000	0.00%
16.7		4	0.9750	1.0000	0.9000	1.0000	5.13%	2.50%	39/40	0.9750	2.50%

96h Survival Rate Detail

Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	1.0000
3		1.0000	1.0000	1.0000	1.0000
8.35		1.0000	1.0000	1.0000	1.0000
16.7		0.9000	1.0000	1.0000	1.0000

96h Survival Rate Binomials

Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	10/10	10/10	10/10
3		10/10	10/10	10/10	10/10
8.35		10/10	10/10	10/10	10/10
16.7		9/10	10/10	10/10	10/10

Analyst:_____QA:___

				Test Code/ID:	TRU0721.007afml / 09-6969-6427
Fathead Mini	now 96-h Acute Sur	vival Test		Aquatic B	ioassay & Consulting Labs, Inc.
Analysis ID: Analyzed: Edit Date:	07-7480-8197 20 Jul-21 15:15 20 Jul-21 15:12	Endpoint: Analysis: MD5 Hash:	96h Survival Rate Linear Interpolation (ICPIN) 64CD5B1D74951B1BFA48CE8575DEE9E9	CETIS Version: Status Level: Editor ID:	CETISv1.9.7 1 000-189-126-0
Graphics 1.0 0.9 0.8 0.7 1.0 0.9 0.8 0.7 1.0 0.6 0.5 45 0.4	• • • • •	0			
索 0.4 - 0.3 - 0.2 -					

0 0 2 4 6 8 10 12 14 16 18 Conc-µL/L

0.1

Analyst: _____ QA:____

Report Date: 21 Jul-21 15:03 (p 2 of 2)

 Report Date:
 21 Jul-21 15:04 (p 1 of 3)

 Test Code/ID:
 TRU0721.007afml / 09-6969-6427

Fathead Minn	now 96-h Acute S	Survival	Test					Aquatic	Bioassay &	Consulting	g Labs, Inc.
Batch ID:	10-3180-3556	1	fest Type:	Survival (96h)				Analyst:			
Start Date:	07 Jul-21 15:01	Ł	Protocol:	EPA/821/R-02-	. ,			Diluent: Re	eceiving Wate	er	
•	11 Jul-21 14:15	5	Species:	Pimephales pr	omelas				ot Applicable		
Test Length:	95h	-	Taxon:	Actinopterygii				Source: Ac	uatic Biosys	tems, CO	Age: <24
Sample ID:	13-0172-2416	(Code:	TRU0721.007a	afml			Project:			
Sample Date:	01 Jul-21 11:30	F	Material:	Sample Water				Source: Bi	oassay Repo	ort	
Receipt Date:	01 Jul-21 11:30	(CAS (PC):					Station: La	ke Matthew	Raw with Ea	arth Tec QZ
Sample Age:	6d 4h (11 °C)	C	Client:	Trussell Techn	ologies						
Alkalinity (Ca	CO3)-mg/L										
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Мах	Std Err	Std Dev	CV%	QA Count
0	D	3	123	123	123	123	123	0	0	0.00%	0
16.7		3	129	129	129	129	129	0	0	0.00%	0
Overall		6	126	122.6	129.4	123	129	1.342	3.286	2.61%	0 (0%)
Conductivity-	µmhos										
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	D	3	1009	1002	1016	1007	1012	0.8819	2.646	0.26%	0
3		3	1011	1008	1014	1010	1012	0.3849	1.155	0.11%	0
8.35		3	1005	996	1014	1001	1008	1.202	3.606	0.36%	0
16.7		3	1012	1011	1014	1012	1013	0.1925	0.5774	0.06%	0
Overall		12	1009	1007	1011	1001	1013	1.001	3.467	0.34%	0 (0%)
Dissolved Ox	ygen-mg/L										
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	D	3	7.9	6.586	9.214	7.3	8.3	0.1764	0.5291	6.70%	0
3		3	7.933	6.929	8.937	7.5	8.3	0.1347	0.4041	5.09%	0
8.35		3	7.9	6.817	8.983	7.4	8.2	0.1453	0.4359	5.52%	0
16.7		3	7.867	6.832	8.901	7.4	8.2	0.1388	0.4163	5.29%	0
Overall		12	7.9	7.656	8.144	7.3	8.3	0.1108	0.3838	4.86%	0 (0%)
Hardness (Ca	CO3)-mg/L										
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	D	3	295	295	295	295	295	0	0	0.00%	0
16.7		3	330	330	330	330	330	0	0	0.00%	0
Overall		6	312.5	292.4	332.6	295	330	7.826	19.17	6.13%	0 (0%)
pH-Units											
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	D	3	7.667	7.38	7.954	7.6	7.8	0.03849	0.1155	1.51%	0
3		3	7.7	7.452	7.948	7.6	7.8	0.03333	0.1	1.30%	0
8.35		3	7.633	7.49	7.777	7.6	7.7	0.01924	0.05773	0.76%	0
16.7		3	7.633	7.49	7.777	7.6	7.7	0.01924	0.05773	0.76%	0
Overall		12	7.658	7.608	7.709	7.6	7.8	0.02289	0.0793	1.04%	0 (0%)
Temperature-	°C										
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	D	3	24.1	23.85	24.35	24	24.2	0.0333	0.09989	0.41%	0
3		3	24.1	23.85	24.35	24	24.2	0.0333	0.09989	0.41%	0
8.35		3	24.1	23.85	24.35	24	24.2	0.0333	0.09989	0.41%	0
16.7				23.85			24.2	0.0333	0.09989	0.41%	

QA:_ Analyst:_

 Report Date:
 21 Jul-21 15:04 (p 2 of 3)

 Test Code/ID:
 TRU0721.007afml / 09-6969-6427

Fathead Minnow 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

Alkalinity (CaC	O3)-mg/L								
Conc-µL/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	D	1		123					
16.7				129					
0	D	2		123					
16.7				129					
0	D	3		123					
16.7				129					
Conductivity-µ	mhos								
Conc-µL/L	Code	Read	Time	Measure	QA -	Diff-%	Inst ID	Analyst	Notes
0	D	1		1012					
3				1010					
8.35				1008					
16.7				1012					
0	D	2	_	1007	-				
3	U	2		1010					
8.35				1006					
16.7				1012					
					_	_		_	
0	D	3		1008					
3				1012					
8.35				1001					
16.7				1013					
Dissolved Oxy	gen-mg/L								
Conc-µL/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	D	1		8.3					
3				8.3					
8.35				8.2					
16.7				8.2					
0	D	2		8.1					
3				8					
8.35				8.1					
16.7				8					
	D	3		7.3					
0		0		7.5					
	D			1.0					
3	U								
3 8.35	D			7.4					
3 8.35 16.7									
3 8.35 16.7 Hardness (CaC	:O3)-mg/L			7.4 7.4					
3 8.35 16.7 Hardness (CaC Conc-µL/L	:O3)-mg/L Code	Read	Time	7.4 7.4 Measure	QA	Diff-%	Inst ID	Analyst	Notes
3 8.35 16.7 Hardness (CaC Conc-µL/L 0	:O3)-mg/L	Read 1	Time	7.4 7.4 Measure 295	QA	Diff-%	Inst ID	Analyst	Notes
3 8.35 16.7 Hardness (CaC Conc-µL/L 0 16.7	:03)-mg/L Code D	1	Time	7.4 7.4 Measure 295 330	QA	Diff-%	Inst ID	Analyst	Notes
3 8.35 16.7 Hardness (CaC Conc-µL/L 0 16.7 0	:O3)-mg/L Code		Time	7.4 7.4 Measure 295 330 295	QA	Diff-%	Inst ID	Analyst	Notes
3 8.35 16.7 Hardness (CaC Conc-µL/L 0 16.7 0	:03)-mg/L Code D	1	Time	7.4 7.4 Measure 295 330	QA	Diff-%	Inst ID	Analyst	Notes
8.35	:03)-mg/L Code D	1	Time	7.4 7.4 Measure 295 330 295	QA	Diff-%	Inst ID	Analyst	Notes

Analyst: _____ QA; P

 Report Date:
 21 Jul-21 15:04 (p 3 of 3)

 Test Code/ID:
 TRU0721.007afml / 09-6969-6427

Fathead Minnow 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

pH-Units									
Conc-µL/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	D	1		7.6					
3				7.6					
8.35				7.6					
16.7				7.6					
0	D	2		7.6					
3				7.7					
8.35				7.6					
16.7				7.6					
0	D	3		7.8					
3				7.8					
8.35				7.7					
16.7				7.7					

Temperature-°C

Conc-µL/L	Code	Read	Time	Measure QA	Diff-%	Inst ID	Analyst	Notes
0	D	1		24.2				
3				24.2				
8.35				24.2				
16.7				24.2				
0	D	2		24.1				
3				24.1				
8.35				24.1				
16.7				24.1				
0	D	3		24				
3				24				
8.35				24				
16.7				24				



July 21, 2021

Mr. David Hokanson Trussell Technologies 232 N. Lake Avenue Pasadena, CA 91101

Dear Mr. Hokanson:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms EPA-821-R-02-012.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Trussell Technologies
SAMPLE ID.:	Lake Matthew Raw with EarthTec QZ
DATE RECEIVED:	1 July – 21
ABC LAB NO.:	TRU0721.007

ACUTE CERIODAPHNIA SURVIVAL BIOASSAY

% Survival = 15 % Survival in 3.0 ul/l Sample

EC50 = 1.765 ul/l

Yours very truly,

Laboratory Director

CETIS Summary Report

 Report Date:
 21 Jul-21 15:07 (p 1 of 1)

 Test Code/ID:
 TRU0721.007acer / 09-4100-3530

Ceriodaphnia	96-h Acute Surv	vival Test						Aquatic	: Bioassay & C	Consulting	Labs, Inc.
Batch ID:	00-9683-5858	Test	Type:	Survival (96h)			Anal	yst:			
Start Date:	07 Jul-21 15:01	Prote	ocol:	EPA/821/R-02-	012 (2002)		Dilue	ent: La	aboratory Wate	er	
•	11 Jul-21 14:15	Spec	cies:	Ceriodaphnia d	ubia		Brin	e: N	ot Applicable		
Test Length:	95h	Тахо	n:	Branchiopoda			Sour	rce: A	quatic Biosyste	ems, CO	Age:
Sample ID:	16-7326-1851	Code	Ð:	TRU0721.007a	cer		Proje	ect:			
Sample Date:	01 Jul-21 11:30	Mate	rial:	Sample Water			Sour	rce: B	ioassay Repor	t	
Receipt Date:	: 01 Jul-21 11:30	CAS	(PC):				Stati	on: La	ake Matthew R	aw with Ear	th Tec QZ
Sample Age:	6d 4h (11 °C)	Clier	nt:	Trussell Techno	ologies						
Single Compa	arison Summary										
Analysis ID	Endpoint	_	Comp	oarison Method		-	P-Value	Compa	rison Result		
12-0540-3137	96h Survival Rat	е	Steel	Many-One Rank	Sum Test		0.0105	3µL/L fa	ailed 96h survi	val rate	
Point Estimat	te Summary										
Analysis ID	Endpoint		Point	Estimate Meth	od	1	Level	_μL/L	95% LCL	95% UCL	-
00-7855-5265	96h Survival Rat	e	Linea	r Interpolation (I	CPIN)		EC10	0.3529	0.2682	0.4739	
							EC15	0.5294	0.4024	0.7109	
							EC20	0.7059	0.5365	0.9479	
							EC25	0.8824	0.6706	1.185	
							EC40	1.412	1.073	1.896	
							EC50	1.765	1.341	2.37	
Test Accepta	bility					TAC Li	imits				
Analysis ID				ute	Test Stat	Lower	Upper	Overla	p Decision		
00-7855-5265	96h Survival Rat	e	Contro	ol Resp	1	0.9	>>	Yes	Passes C	riteria	
12-05/0-3137	96h Survival Rat	•	Contro	al Boon	1	~ ~		×		34 - 3 -	
12-00-0107	oon ourmannut	e	oonu	or Resp		0.9	>>	Yes	Passes Ci	riteria	
	Rate Summary		Conta			0.9	>>	Yes			
96h Survival		Count	Mean			Min	Max	Std Err		CV%	%Effect
96h Survival Conc-µL/L	Rate Summary			95% LCL							%Effect
96h Survival Сопс-µL/L 0	Rate Summary Code	Count	Mean	95% LCL 0 1.0000	95% UCL	Min	Max	Std Err	· Std Dev	CV%	
96h Survival Сопс-µL/L 0 3 8.35	Rate Summary Code	Count 4	Mean	95% LCL 0 1.0000 0 -0.1547 0 0.0000	95% UCL 1.0000 0.4547 0.0000	Min 1.0000 0.0000 0.0000	Max 1.0000 0.4000 0.0000	Std Err 0.0000 0.0957 0.0000	Std Dev 0.0000 0.1915 0.0000	CV%	0.00% 85.00% 100.00%
	Rate Summary Code	Count 4 4	Mean 1.000 0.150	95% LCL 0 1.0000 0 -0.1547 0 0.0000	95% UCL 1.0000 0.4547	Min 1.0000 0.0000	Max 1.0000 0.4000	Std Err 0.0000 0.0957	• Std Dev 0.0000 0.1915	CV% 127.66%	0.00% 85.00%
96h Survival Conc-µL/L 0 3 8.35	Rate Summary Code D	Count 4 4 4	Mean 1.000 0.150 0.000	95% LCL 0 1.0000 0 -0.1547 0 0.0000	95% UCL 1.0000 0.4547 0.0000	Min 1.0000 0.0000 0.0000	Max 1.0000 0.4000 0.0000 0.0000	Std Err 0.0000 0.0957 0.0000 0.0000	Std Dev 0.0000 0.1915 0.0000	CV% 127.66% 	0.00% 85.00% 100.00% 100.00%
96h Survival Conc-µL/L 0 3 8.35 16.7 96h Survival	Rate Summary Code D Rate Detail Code	Count 4 4 4 4 4 8 Rep 1	Mean 1.000 0.150 0.000 0.000 Rep 2	95% LCL 0 1.0000 0 -0.1547 0 0.0000 0 0.0000	95% UCL 1.0000 0.4547 0.0000 0.0000 Rep 4	Min 1.0000 0.0000 0.0000	Max 1.0000 0.4000 0.0000 0.0000	Std Err 0.0000 0.0957 0.0000 0.0000	Std Dev 0.0000 0.1915 0.0000 0.0000	CV% 127.66% 	0.00% 85.00% 100.00% 100.00%
96h Survival Conc-µL/L 0 3 8.35 16.7 96h Survival Conc-µL/L	Rate Summary Code D Rate Detail	Count 4 4 4 4 4 8 8 8 9 1 1.0000	Mean 1.000 0.150 0.000 0.000	95% LCL 0 1.0000 0 -0.1547 0 0.0000 0 0.0000 2 Rep 3 0 1.0000	95% UCL 1.0000 0.4547 0.0000 0.0000 Rep 4 1.0000	Min 1.0000 0.0000 0.0000	Max 1.0000 0.4000 0.0000 0.0000	Std Err 0.0000 0.0957 0.0000 0.0000	Std Dev 0.0000 0.1915 0.0000 0.0000	CV% 127.66% 	0.00% 85.00% 100.00% 100.00%
96h Survival Conc-µL/L 0 3 8.35 16.7 96h Survival Conc-µL/L 0	Rate Summary Code D Rate Detail Code	Count 4 4 4 4 4 4 Rep 1 1.0000 0.4000	Mean 1.000 0.150 0.000 0.000 Rep 2 1.000 0.000	95% LCL 0 1.0000 0 -0.1547 0 0.0000 0 0.0000 2 Rep 3 0 1.0000 0 0.0000	95% UCL 1.0000 0.4547 0.0000 0.0000 Rep 4	Min 1.0000 0.0000 0.0000	Max 1.0000 0.4000 0.0000 0.0000	Std Err 0.0000 0.0957 0.0000 0.0000	Std Dev 0.0000 0.1915 0.0000 0.0000	CV% 127.66% 	0.00% 85.00% 100.00% 100.00%
96h Survival Conc-µL/L 0 3 8.35 16.7	Rate Summary Code D Rate Detail Code	Count 4 4 4 4 4 8 8 8 9 1 1.0000	Mean 1.000 0.150 0.000 0.000 Rep 2 1.000	95% LCL 0 1.0000 0 -0.1547 0 0.0000 0 0.0000 2 Rep 3 0 1.0000 0 0.0000	95% UCL 1.0000 0.4547 0.0000 0.0000 Rep 4 1.0000	Min 1.0000 0.0000 0.0000	Max 1.0000 0.4000 0.0000 0.0000	Std Err 0.0000 0.0957 0.0000 0.0000	Std Dev 0.0000 0.1915 0.0000 0.0000	CV% 127.66% 	0.00% 85.00% 100.00% 100.00%
96h Survival Conc-µL/L 0 3 8.35 16.7 96h Survival Conc-µL/L 0 3	Rate Summary Code D Rate Detail Code	Count 4 4 4 4 4 4 Rep 1 1.0000 0.4000	Mean 1.000 0.150 0.000 0.000 Rep 2 1.000 0.000	95% LCL 0 1.0000 0 -0.1547 0 0.0000 0 0.0000 2 Rep 3 0 1.0000 0 0.0000 0 0.0000	95% UCL 1.0000 0.4547 0.0000 0.0000 Rep 4 1.0000 0.2000	Min 1.0000 0.0000 0.0000	Max 1.0000 0.4000 0.0000 0.0000	Std Err 0.0000 0.0957 0.0000 0.0000	Std Dev 0.0000 0.1915 0.0000 0.0000	CV% 127.66% 	0.00% 85.00% 100.00% 100.00%
96h Survival Conc-µL/L 0 3 8.35 16.7 96h Survival Conc-µL/L 0 3 8.35 16.7	Rate Summary Code D Rate Detail Code	Count 4 4 4 4 4 4 4 1.0000 0.4000 0.4000 0.0000	Mean 1.000 0.150 0.000 0.000 Rep 2 1.000 0.000	95% LCL 0 1.0000 0 -0.1547 0 0.0000 0 0.0000 2 Rep 3 0 1.0000 0 0.0000 0 0.0000	95% UCL 1.0000 0.4547 0.0000 0.0000 Rep 4 1.0000 0.2000 0.0000	Min 1.0000 0.0000 0.0000	Max 1.0000 0.4000 0.0000 0.0000	Std Err 0.0000 0.0957 0.0000 0.0000	Std Dev 0.0000 0.1915 0.0000 0.0000	CV% 127.66% 	0.00% 85.00% 100.00% 100.00%
96h Survival Conc-µL/L 0 3 8.35 16.7 96h Survival 0 3 8.35 16.7 96h Survival	Rate Summary Code D Rate Detail Code D	Count 4 4 4 4 4 4 4 1.0000 0.4000 0.4000 0.0000	Mean 1.000 0.150 0.000 0.000 0.000 0.000 0.000 0.000 Rep 2	95% LCL 0 1.0000 0 -0.1547 0 0.0000 0 0.0000 2 Rep 3 0 1.0000 0 0.0000 0 0.0000 0 0.0000	95% UCL 1.0000 0.4547 0.0000 0.0000 Rep 4 1.0000 0.2000 0.0000	Min 1.0000 0.0000 0.0000	Max 1.0000 0.4000 0.0000 0.0000	Std Err 0.0000 0.0957 0.0000 0.0000	Std Dev 0.0000 0.1915 0.0000 0.0000	CV% 127.66% 	0.00% 85.00% 100.00% 100.00%
96h Survival Conc-µL/L 0 3 8.35 16.7 96h Survival 0 3 8.35 16.7 96h Survival Conc-µL/L	Rate Summary Code D Rate Detail Code D Rate Binomials	Count 4 4 4 4 4 4 7 8 8 9 1.0000 0.4000 0.0000 0.0000	Mean 1.000 0.150 0.000 0.000 Rep 2 1.000 0.000 0.000 0.000	95% LCL 0 1.0000 0 -0.1547 0 0.0000 0 0.0000 2 Rep 3 0 1.0000 0 0.0000 0 0.0000 0 0.0000	95% UCL 1.0000 0.4547 0.0000 0.0000 Rep 4 1.0000 0.2000 0.0000 0.0000	Min 1.0000 0.0000 0.0000	Max 1.0000 0.4000 0.0000 0.0000	Std Err 0.0000 0.0957 0.0000 0.0000	Std Dev 0.0000 0.1915 0.0000 0.0000	CV% 127.66% 	0.00% 85.00% 100.00% 100.00%
96h Survival Conc-µL/L 0 3 8.35 16.7 96h Survival Conc-µL/L 0 3 8.35 16.7 96h Survival Conc-µL/L 0	Rate Summary Code D Rate Detail Code D Rate Binomials Code	Count 4 4 4 4 4 1 1.0000 0.4000 0.0000 0.0000 Rep 1	Mean 1.000 0.150 0.000 0.000 0.000 0.000 0.000 0.000 Rep 2	95% LCL 0 1.0000 0 -0.1547 0 0.0000 0 0.0000 2 Rep 3 0 1.0000 0 0.0000 0 0.0000 0 0.0000 2 Rep 3	95% UCL 1.0000 0.4547 0.0000 0.0000 Rep 4 1.0000 0.2000 0.0000 0.0000 Rep 4	Min 1.0000 0.0000 0.0000	Max 1.0000 0.4000 0.0000 0.0000	Std Err 0.0000 0.0957 0.0000 0.0000	Std Dev 0.0000 0.1915 0.0000 0.0000	CV% 127.66% 	0.00% 85.00% 100.00% 100.00%
96h Survival Conc-µL/L 0 3 8.35 16.7 96h Survival Conc-µL/L 0 3 8.35 16.7	Rate Summary Code D Rate Detail Code D Rate Binomials Code	Count 4 4 4 4 4 4 1.0000 0.4000 0.0000 0.0000 0.0000 0.0000 0.0000 0.5/5	Mean 1.000 0.150 0.0000 0.00000 0.00000 0.0000 0.0000 0.0000 0.00000 0.00000 0	95% LCL 0 1.0000 0 -0.1547 0 0.0000 0 0.0000 2 Rep 3 0 1.0000 0 0.0000 0 0.0000 0 0.0000 2 Rep 3 5/5	95% UCL 1.0000 0.4547 0.0000 0.0000 Rep 4 1.0000 0.2000 0.0000 0.0000 0.0000 0.0000 0.0000 5/5	Min 1.0000 0.0000 0.0000	Max 1.0000 0.4000 0.0000 0.0000	Std Err 0.0000 0.0957 0.0000 0.0000	Std Dev 0.0000 0.1915 0.0000 0.0000	CV% 127.66% 	0.00% 85.00% 100.00% 100.00%

Analyst:_____QA:___M35

 Report Date:
 21 Jul-21 15:07 (p 1 of 2)

 Test Code/ID:
 TRU0721.007acer / 09-4100-3530

Ceriodaphnia	96-h Acute Sur	vival Test						Aquatic	Bioassay &	Consulting	Labs, Inc
Analysis ID:	12-0540-3137	Ene	dpoint:	96h Survival Ra	ate		CE	TIS Version	CETISv1	1.9.7	
Analyzed:	20 Jul-21 15:16	Ana	alysis:	Nonparametric-	Control vs T	reatments	Sta	tus Level:	1		
Edit Date:	20 Jul-21 15:16	MD	5 Hash:	1FDA7366E4C	0792CC729	0D2E29076	677A Edi	tor ID:	000-189-	-126-0	
Batch ID:	00-9683-5858	Tes	t Type:	Survival (96h)			An	alyst:			1.00
Start Date:	07 Jul-21 15:01		tocol:	EPA/821/R-02-	012 (2002)		Dil	uent: La	boratory Wat	ter	
Ending Date:	11 Jul-21 14:15	Spe	ecies:	Ceriodaphnia d			Bri	ne: No	t Applicable		
Test Length:		Tax	on:	Branchiopoda			So	u rce: Aq	uatic Biosyst	tems, CO	Age:
Sample ID:	16-7326-1851	Co	de:	TRU0721.007a	cer		Pro	ject:			
	01 Jul-21 11:30	Ма	terial:	Sample Water				-	bassay Repo	rt	
	01 Jul-21 11:30		S (PC):						ke Matthew I		rth Tec Q2
	6d 4h (11 °C)		ent:	Trussell Techno	ologies						
Data Transfo	m	Alt Hyp				Compari	son Resul	t			PMSD
Angular (Corre		C > T						vival rate en	dpoint		18.13%
Steel Many-O	ne Rank Sum Te	ast									
Control	vs Conc-µL		Toet	Stat Critical	Ties DF	P-Type	P-Value	Decisio	η(α:5%)		
Dilution Water			10	12	0 6	CDF	0.0105		nt Effect		_
Test Accepta	hility Criteria										
			imits	Quarter	Desister						
Attribute	Test Stat		Uppe		Decision	14 - 14 -			_		-
Control Resp	1	0.9	>>	Yes	Passes Cr	lteria	_				_
ANOVA Table											
Source	Sum Squ	ares	Mean	Square	DF	F Stat	P-Value	Decision	n(α:5%)		
Between	1.78769		1.787	69	1	73.46	0.0001	Significa	nt Effect		
Error	0.146007		0.024	3345	6	-					
Total	1.9337				7						
ANOVA Assu	mptions Tests										
Attribute	Test				Test Stat	Critical	P-Value	Decisio	n(α:1%)		
Variance	Levene Ed	quality of V	ariance 1	est	14.93	13.75	0.0083	Unequal	Variances		
	Mod Leve	ne Equality	of Varia	nce Test	9.95	13.75	0.0197	Equal Va	ariances		
	Variance I	Ratio F Tes	t					Indeterm	iinate		
Distribution		-Darling A2			0.7003	3.878	0.0674		Distribution		
	•	ov-Smirnov			0.25	0.3313	0.1599		Distribution		
	Shapiro-W	Vilk W Norr	nality Te	st	0.8543	0.6451	0.1052	Normal I	Distribution		_
96h Survival	Rate Summary										
Conc-µL/L	Code	Count	Mean				Min	Max	Std Err	CV%	%Effect
0	D	4	1.000		1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
3		4	0.150		0.4547	0.1000	0.0000	0.4000	0.0957	127.66%	85.00%
		4	0.000		0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
		4	0.000	0 0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
		med Sumr	nary								
16.7	rected) Transfor					Median	Min	Max	Std Err	CV%	%Effect
16.7 Angular (Corr	rected) Transfor Code	Count	Mean	95% LCL	95% UCL	Meulan					
16.7 Angular (Corr Conc-µL/L			Mean 1.345		95% UCL 1.3460	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
8.35 16.7 Angular (Corr Conc-µL/L 0 3	Code	Count		0 1.3450				1.3450 0.6847	0.0000 0.1103	0.00% 55.17%	0.00% 70.28%
16.7 Angular (Corr Conc-µL/L 0	Code	Count 4	1.345	0 1.3450 8 0.0488	1.3460	1.3450	1.3450				

Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	
0	D	1.0000	1.0000	1.0000	1.0000	
3		0.4000	0.0000	0.0000	0.2000	
8.35		0.0000	0.0000	0.0000	0.0000	
16.7		0.0000	0.0000	0.0000	0.0000	

Analyst:_

QA:

Report Date: 21 Jul-21 15:07 (p 2 of 2) Test Code/ID: TRU0721.007acer / 09-4100-3530

Ceriodaphnia	a 96-h Acute Surviva	al Test	Aquatic Bioassay & Consulting Labs, Inc.			
Analysis ID:	12-0540-3137	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.9.7	
Analyzed:	20 Jul-21 15:16	Analysis:	Nonparametric-Control vs Treatments	Status Level:	1	
Edit Date:	20 Jul-21 15:16	MD5 Hash:	1FDA7366E4C0792CC7290D2E2907677A	Editor ID:	000-189-126-0	

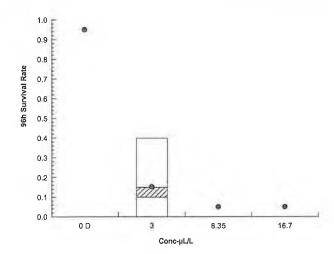
Angular (Corrected) Transformed Detail

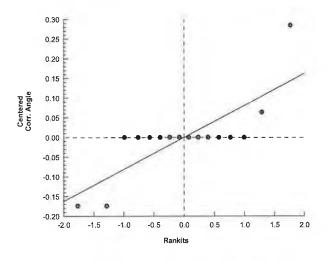
Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	_
0	D	1.3450	1.3450	1.3450	1.3450	
3		0.6847	0.2255	0.2255	0.4636	
8.35		0.2255	0.2255	0.2255	0.2255	
16.7		0.2255	0.2255	0.2255	0.2255	

96h Survival Rate Binomials

oon our man					
Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	5/5	5/5	5/5	5/5
3		2/5	0/5	0/5	1/5
8.35		0/5	0/5	0/5	0/5
16.7		0/5	0/5	0/5	0/5

Graphics





 Report Date:
 21 Jul-21 15:07 (p 1 of 2)

 Test Code/ID:
 TRU0721.007acer / 09-4100-3530

0/20

100.00%

0.0000

100.00%

Ceriodaphnia 96-h Acute Survival Test Aquatic Bioassay & Consulting Labs, Inc. Analysis ID: 00-7855-5265 Endpoint: 96h Survival Rate **CETIS Version:** CETISv1.9.7 Analyzed: 20 Jul-21 15:16 Analysis: Linear Interpolation (ICPIN) Status Level: 1 Edit Date: 20 Jul-21 15:16 MD5 Hash: 1FDA7366E4C0792CC7290D2E2907677A Editor ID: 000-189-126-0 Batch ID: 00-9683-5858 Test Type: Survival (96h) Analyst: Start Date: 07 Jul-21 15:01 Protocol: EPA/821/R-02-012 (2002) **Diluent:** Laboratory Water Ending Date: 11 Jul-21 14:15 Species: Ceriodaphnia dubia Brine: Not Applicable Branchiopoda Aquatic Biosystems, CO Test Length: 95h Taxon: Source: Age: Sample ID: 16-7326-1851 Code: TRU0721.007acer Project: Sample Date: 01 Jul-21 11:30 Material: Sample Water Source: **Bioassay Report** Receipt Date: 01 Jul-21 11:30 CAS (PC): Station: Lake Matthew Raw with Earth Tec QZ Sample Age: 6d 4h (11 °C) Client: Trussell Technologies **Linear Interpolation Options** X Transform Y Transform Resamples Exp 95% CL Method Seed 280 0 Two-Point Interpolation Linear Linear Yes **Test Acceptability Criteria** TAC Limits Attribute Test Stat Lower Overlap Decision Upper Control Resp 0.9 >> Yes Passes Criteria 1 **Point Estimates** µL/L 95% UCL Level 95% LCL 0.2682 EC10 0.3529 0.4739 EC15 0.5294 0.4024 0.7109 **EC20** 0.7059 0.5365 0.9479 EC25 0.8824 0.6706 1.185 EC40 1.412 1.073 1.896 1.765 2.37 EC50 1.341 Calculated Variate(A/B) **Isotonic Variate** 96h Survival Rate Summary Median Min Max CV% %Effect A/B Mean %Effect Conc-µL/L Code Count Mean 0.00% 0.00% 20/20 1.0000 0.00% 0 D 4 1.0000 1.0000 1.0000 1.0000 3/20 0.1500 85.00% 3 4 0.1500 0.1000 0.0000 0.4000 127.66% 85.00% 0/20 0.0000 100.00% 4 0.0000 0.0000 0.0000 0.0000 100.00% 8.35

96h Survival Rate Detail

4

0.0000

0.0000

16.7

Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	1.0000
3		0.4000	0.0000	0.0000	0.2000
8.35		0.0000	0.0000	0.0000	0.0000
16.7		0.0000	0.0000	0.0000	0.0000

0.0000

0.0000

96h Survival Rate Binomials

Conc-µL/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	5/5	5/5	5/5	5/5
3		2/5	0/5	0/5	1/5
8.35		0/5	0/5	0/5	0/5
16.7		0/5	0/5	0/5	0/5

VQA: Analyst:

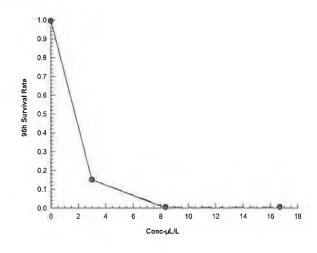
CETIS	Analytical	Report
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 Report Date:
 21 Jul-21 15:07 (p 2 of 2)

 Test Code/ID:
 TRU0721.007acer / 09-4100-3530

Ceriodaphnia	a 96-h Acute Surviva	al Test		Aquatic Bioassay & Consulting Labs, Inc.			
Analysis ID:	00-7855-5265	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.9.7		
Analyzed:	20 Jul-21 15:16	Analysis:	Linear Interpolation (ICPIN)	Status Level:	1		
Edit Date:	20 Jul-21 15:16	MD5 Hash:	1FDA7366E4C0792CC7290D2E2907677A	Editor ID:	000-189-126-0		

Graphics



Analyst: _____QA: ____

 Report Date:
 21 Jul-21 15:07 (p 1 of 3)

 Test Code/ID:
 TRU0721.007acer / 09-4100-3530

Ceriodaphnia 96-h Acute Survival Test							Aquatic Bioassay & Consulting Labs, Inc.					
Batch ID: Start Date: Ending Date: Test Length:	00-9683-5858 07 Jul-21 15:01 11 Jul-21 14:15 95h	Pr Sp	st Type: otocol: becies: xon:	Survival (96h) EPA/821/R-02 Ceriodaphnia o Branchiopoda			D B	Brine: N	aboratory Wa ot Applicable quatic Biosys		Age:	
Sample ID:	16-7326-1851	Co	de:	TRU0721.007a	TRU0721.007acer			roject:				
-	: 01 Jul-21 11:30		aterial:	Sample Water					ioassay Repo			
	: 01 Jul-21 11:30		AS (PC):				S	station: La	ake Matthew	Raw with Ea	arth Tec QZ	
Sample Age:	6d 4h (11 °C)	CI	ient:	Trussell Techn	ologies							
Alkalinity (Ca	CO3)-mg/L											
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count	
0	D	3	123	123	123	123	123	0	0	0.00%	0	
16.7		3	129	129	129	129	129	0	0	0.00%	0	
Overall		6	126	122.6	129.4	123	129	1.342	3.286	2.61%	0 (0%)	
Conductivity-	-µmhos											
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count	
0	D	3	1009	1002	1016	1007	1012	0.8819	2.646	0.26%	0	
3		3	1011	1008	1014	1010	1012	0.3849	1.155	0.11%	0	
8.35		3	1005	996	1014	1001	1008	1.202	3.606	0.36%	0	
16.7		3	1012	1011	1014	1012	1013	0.1925	0.5774	0.06%	0	
Overall		12	1009	1007	1011	1001	1013	1.001	3.467	0.34%	0 (0%)	
Dissolved Ox	ygen-mg/L											
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count	
0	D	3	7.9	6.586	9.214	7.3	8.3	0.1764	0.5291	6.70%	0	
3		3	7.933	6.929	8.937	7.5	8.3	0.1347	0.4041	5.09%	0	
8.35		3	7.9	6.817	8.983	7.4	8.2	0.1453	0.4359	5.52%	0	
16.7		3	7.867	6.832	8.901	7.4	8.2	0.1388	0.4163	5.29%	0	
Overall		12	7.9	7.656	8.144	7.3	8.3	0.1108	0.3838	4.86%	0 (0%)	
Hardness (Ca	aCO3)-mg/L											
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count	
0	D	3	295	295	295	295	295	0	0	0.00%	0	
16.7		3	330	330	330	330	330	0	0	0.00%	0	
Overall		6	312.5	292.4	332.6	295	330	7.826	19.17	6.13%	0 (0%)	
pH-Units												
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count	
0	D	3	7.667	7.38	7.954	7.6	7.8	0.03849	0.1155	1.51%	0	
3		3	7.7	7.452	7.948	7.6	7.8	0.03333	0.1	1.30%	0	
8.35		3	7.633	7.49	7.777	7.6	7.7	0.01924	0.05773	0.76%	0	
16.7		3	7.633	7.49	7.777	7.6	7.7	0.01924	0.05773	0.76%	0	
Overall		12	7.658	7.608	7.709	7.6	7.8	0.02289	0.0793	1.04%	0 (0%)	
Temperature-	°C											
Conc-µL/L	Code	Count	Mean	95% LCL	95% UCL	Min	Мах	Std Err	Std Dev	CV%	QA Coun	
0	D	3	24.1	23.85	24.35	24	24.2	0.0333	0.09989	0.41%	0	
		3	24.1	23.85	24.35	24	24.2	0.0333	0.09989	0.41%	0	
3		0	6-11 I									
3 8.35		3	24.1	23.85	24.35	24	24.2 24.2	0.0333 0.0333	0.09989 0.09989	0.41% 0.41%	0 0	

QA:___ Analyst:___

Ceriodaphnia 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

Alkalinity (CaC Conc-µL/L		Deed	Time	Magazire	0.4	D:# 0/	In at ID	Analysi	Notos
0	Code D	Read 1	Time	Measure 123	QA	Diff-%	Inst ID	Analyst	NOTES
0 16.7	U	a		123					
	-	-	_		-			_	
0	D	2		123					
16.7		_		129					
0	D	3		123					
16.7				129					
Conductivity-µ	mhos								
Conc-µL/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	D	1		1012					
3				1010					
8.35				1008					
16.7				1012					
0	D	2		1007					
3				1010					
8.35				1006					
16.7				1012					
0	D	3		1008					
3				1012					
8.35				1001					
16.7				1013					
Dissolved Oxy	gen-mg/L								
Conc-µL/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	D	1		8.3					
3				8.3					
8.35				8.2					
16.7				8.2					
0	D	2		8.1					
3				8					
8.35				8.1					
16.7				8					
0	D	3		7.3					
•				7.5					
3				7.4					
3				7.4					
3 8.35	:03)-mg/L			7.4	-				
3 8.35 16.7 Hardness (CaC		Read	Time		QA	Diff-%	Inst ID	Analyst	Notes
3 8.35 16.7	:O3)-mg/L Code D	Read	Time	7.4 Measure 295	QA	Diff-%	Inst ID	Analyst	Notes
3 8.35 16.7 Hardness (CaC Conc-µL/L	Code		Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
3 8.35 16.7 Hardness (СаС Сопс-µL/L 0 16.7	Code D	1	Time	Measure 295 330	QA	Diff-%	Inst ID	Analyst	Notes
3 8.35 16.7 Hardness (CaC Conc-µL/L 0	Code		Time	Measure 295	QA	Diff-%	Inst ID	Analyst	Notes
3 8.35 16.7 Hardness (CaC Conc-µL/L 0 16.7 0	Code D	1	Time	Measure 295 330 295	QA	Diff-%	Inst ID	Analyst	Notes

<u>A</u> Analyst:_

Report Date:

21 Jul-21 15:07 (p 3 of 3) Test Code/ID: TRU0721.007acer / 09-4100-3530

Ceriodaphnia 96-h Acute Survival Test

Aquatic Bioassay & Consulting Labs, Inc.

pH-Units									
Conc-µL/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	D	1		7.6					
3				7.6					
8.35				7.6					
16.7				7.6					
0	D	2		7.6					
3				7.7					
8.35				7.6					
16.7				7.6					
0	D	3		7.8					
3				7.8					
8.35				7.7					
16.7				7.7					

Temperature-°C

Conc-µL/L	Code	Read	Time	Measure QA Diff-% Inst ID Analyst Notes
0	D	1		24.2
3				24.2
8.35				24.2
16.7				24.2
0	D	2		24.1
3				24.1
8.35				24.1
16.7				24.1
0	D	3		24
3				24
8.35				24
16.7				24

Analyst:_____QA:____

EN, 100' No. Date: Time: Date: Time: Comments 2 þ. 0 wer man J WT 50 è Analysis ç 11 Temp. upon sample receipt: Relinquised By:(signature) ege. Received By: (signature) Normer Number Nu 1 .u. M P1 m 3 1250 ml 11:30 15 Sul Ines CI 711/21 1130 Date: Time: Date: Time: David Hokan Son Andrew ILudaharleo 626) 370-3638 1202/1/2 Lake Matthews Row Weymouth WTP EnCI Project Name/Number: 2 Sampled By (signature) Sample ID FachTec Project Mgr. P.O. # Technologue S Matrix Sound L'nu q lictor Ma 91101 232 N. Lake hur 3638 Grab 2 Relinquised By:(signature) 40 duioo Received By:(signature) 390 -11:30 Time 11:30 Phone Number: Pasadeza. Trussell (626) Address Date Client: 7/1/21 7/1/21

Aquatic Bioassay and Consulting Laboratories 29 N. Olive Street Ventura, CA 93001 Phone: (805) 643-5621 Fax: (805) 643-2930

CHAIN OF CUSTODY RECORD

SAFETY DATA SHEET According to OSHA Hazard Communication Standard 29 CFR 1910.1200 (GHS)

EARTH SCIENCE LABORATORIES, INC.

113 SE 22nd Street, Suite 105 Rogers, AR 72756 earthsciencelabs.com

Emergency Phone Number: 1-800-535-5053 (Infotrac) Information Phone Number: 1-800-962-1492

Material Name: EarthTec QZ™

Page: 1 of 4 Issue Date: 01/14 Revision Date: 01/2020

Section 1 – IDENTIFICATION

Product Name: EarthTec QZ™

EPA Reg. No. 64962-1

Manufactured by: Earth Science Laboratories, Inc. 903 N 47th St., Suite 105 Rogers, AR 72756

Certified to: NSF/ANSI Standard 60. Do not exceed 19 mg/L.

Section 2 -HAZARDS IDENTIFICATION

NFPA HMIS III: Health = 2, Fire = 0, Reactivity = 1 H2///F0/PH1

GHS Signal Word: Warning GHS Hazard Pictograms:



GHS Classifications:

Physical, Corrosive to Metals, 1 Health, Acute Toxicity, 4 Oral Health, Harmful if absorbed through skin. Avoid contact with skin, 2 Health, Causes substantial but temporary eye injury. Do not get in eyes, 2 Environmental, Hazards to the aquatic environment - Chronic, 1

GHS Phrases:

- H290 May be corrosive to metal
- H302 Harmful if swallowed
- H315 Causes skin irritation
- H319 Causes serious eye irritation
- H410 Very toxic to aquatic life with long lasting effects

GHS Precautionary Statements:

- P102 Keep out of reach of children.
- P233 Keep container tightly closed.
- P262 Do not get in eyes, on skin or clothing.
- P264 Wash skin thoroughly after handling.
- P270 Do not eat, drink or smoke when handling this product.
- P280 Wear protective gloves/protective clothing/eye protection/face protection.
- P281 Use personal protective equipment as required.
- P301+310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- P301+330+331 -- IF SWALLOWED: Rinse mouth. DO NOT induce vomiting.

P303+361+353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing.

Rinse skin with water/shower.

P304+340 – IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P305+351+338 – IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.

P403+233 - Store in a well ventilated place. Keep container tightly closed

P501 - Dispose of contents /container according to State and Federal laws.

Section 3 - COMPOSITION/INFORMATION ON INGREDIENT

Components	CAS#	OSHA PEL	ACGIH TLV	⁶ /0
Copper sulfate pentahydrate	7758-99-8	1mg/m ³	1mg/m ³	18.25-21.75%

Section 4 - FIRST AID MEASURES

If in Eyes: Hold eye open and rinse slowly and gently with water for 20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for advice.

If on Skin or Clothing: Take off contaminated clothing. Rinse skin immediately with plenty of soap and water for 15 to 20 minutes. Call a poison control center or doctor for treatment.

If Swallowed: Call a poison control center or doctor immediately for treatment advice. Have a person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything to an unconscious person.

Note to Physician: Probable mucosal damage may contraindicate the use of gastric lavage.

Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact INFOTRAC 1-800-535-5053 for emergency treatment.

Section 5 - FIRE FIGHTING MEASURES

 Flash Point: N/E
 UFL: N/E
 LFL: N/E

 Hazardous Combustion Products: May react with high carbon metals to produce hydrogen gas, which can form an explosive mixture.
 Fire Fighting Equipment/Instructions: Firefighters must wear MSHA/NIOSH approved positive pressure breathing apparatus (SCBA) with full face mask and full protective equipment.

NFPA Ratings:	Fire: 0	Health: 2	Reactivity: 1	Other: X
HMIS III Ratings:	Fire: 0	Health: 2	Reactivity: 1	Personal Protection: X

Section 6 - ACCIDENTAL RELEASE MEASURES

Containment Procedures: Flush with water into retaining area or container. Caution should be exercised regarding personal safety and exposure to released product.

Clean-Up Procedures: Neutralize solution with bicarbonate of soda.

Evacuation Procedures: Keep unnecessary people away; isolate hazard area and deny entry.

Special Instructions: Notify local authorities and the National Response Center, if required.

Section 7-HANDLING AND STORAGE

Application and Handling Equipment: Application, handling or storage equipment MUST consist of fiberglass, PVC, polypropylene, viton, corrosion resistant plastics or stainless steel. Never use mild steel, nylon, brass or copper around product. Always rinse and clean equipment thoroughly each night with plenty of fresh, clean water.

Storage: Store in a safe place away from pets and keep out of the reach of children. Store away from excessive heat. Product will freeze. Always store product above 32 degrees F (Do Not Freeze). Freezing may cause product separation. Always keep container closed. Keep away from galvanized pipe, and any nylon storage or handling equipment.

Section 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal Protective Equipment (PPE)

Mixers, loaders, applicators and other handlers must wear the following: long-sleeved shirt, long pants, shoes plus socks, chemical-resistant gloves made of any water proof material (Chemical Resistance Category A), and protective eyewear.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing and other absorbent material that have been drenched or heavily contaminated with the product's concentrate. Do not reuse them.

Section 9 -- PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear blue liquid Physical State: Liquid pH: 0.2/0.3 Vapor Pressure: 0.1mm 68° F Boiling Point: 220° F Melting Point: N/A Odor: Minimal odor Vapor Density (Air=1): 1.0 Evaporation Rate: N/A Solubility in Water: Complete Specific Gravity (H20=1): 1.188 +/- 0.05

Section 10 - STABILITY AND REACTIVITY

Chemical Stability: Stable. Conditions to Avoid: Avoid mixing with strong bases and strong reducing agents. Incompatibility: Incompatible with strong bases and strong reducing agents. Hazardous Decomposition Products: Sulfur dioxide and sulfur trioxide may be produced with decomposition. Hazardous Polymerization: Will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

Acute Toxicity / Chronic Toxicity: Continued overexposure to this solution may cause systemic toxicity. Carcinogenicity: N/A Signs and Symptoms of Exposure: Overexposure may cause the following specific symptoms, depending on the concentration and duration of exposure: vomiting, shallow respiration and lung function changes.

Section 12 - ECOLOGICAL INFORMATION

Waters treated with this product may be hazardous to aquatic organisms.

Section 13 - DISPOSAL CONSIDERATIONS

Pesticide wastes are acutely hazardous. Improper disposal of excess product mixture or rinsate is a violation of federal law. If these wastes cannot be disposed of by use according to label instructions, contact your state pesticide or environmental control agency, or the hazardous waste representative at the nearest EPA regional office for guidance. In the event of spill, neutralize with limestone or baking soda before disposal. May deteriorate concrete.

Section 14 - TRANSPORT INFORMATION

DOT Information Proper Shipping Name: Corrosive liquid, acidic, inorganic, n.o.s., (contains cupric sulfate) Hazard Class: 8 UN/NA #: UN3264 Packing Group: III

• Packages that contain more than 5.1 US gallons are RQ (reportable quantity)

- Packages that contain less than 4.0 liters could be ORM-D
- The proper shipping information is the responsibility of the shipper and this information is only guidelines.
- •

Section 15 - REGULATORY INFORMATION

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for Safety Data Sheets, and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label:

WARNING Causes substantial but temporary eye injury. Harmful if swallowed. Harmful if absorbed through skin.

Section 16 - OTHER INFORMATION

Date of Last Revision: January 2020

The information set forth berein is furnished free of charge and is based on technical data that Earth Science Laboratories, Inc. believes to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of the information. Nothing herein is to be taken as a license to operate under or a recommendation to infringe any patents.