Rico-Argentine Mine Site
Rico, Colorado

Whole Effluent Toxicity (WET) Testing Data Summary and Analysis Report

Atlantic Richfield Company
317 Anaconda Road
Butte, Montana 59701

March 2021

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

1 INTRODUCTION

Atlantic Richfield Company (Atlantic Richfield) has prepared this Data Summary and Analysis Report (report) to provide a summary of the sampling and whole effluent toxicity (WET) testing results for samples collected during 2020. This work was conducted to support "Task F – Water Treatment System Analysis and Design," described in the Removal Action Work Plan (2011 RAWP) (EPA, 2011a) attached to the Unilateral Administrative Order for Removal Action for the Rico -Argentine Site, Docket No. CERCLA-08-2011-0005 (UAO) (EPA, 2011b).

WET testing has not been performed previously on the Enhanced Wetland Demonstration (EWD) treatment system effluent. Ongoing WET testing is anticipated to support future full-scale treatment system design at the St. Louis Tunnel (SLT), development of performance criteria, and full-scale treatment system performance evaluation. WET testing was performed twice during the 2020 field season in accordance with EPA guidelines (EPA, 2002 a,b). The first round of samples was collected August 2020, representing moderate river flow and lower hardness conditions. The second round of samples was collected November through December 2020 to represent lower river flow and higher hardness conditions. Acute and chronic WET testing was performed on samples from the following locations (see Figure 1):

- DR-3A (SLT discharge at the Maelstrom Oxidizer influent) (second round only);
- AC3EFF (EWD discharge to Pond 12);
- DR-2 (Dolores River directly upstream of the St. Louis Ponds System discharge);
- DR-6 (St. Louis Ponds System discharge to Dolores River); and
- DR-7 (Dolores River downstream of the St. Louis Ponds System discharge.

The second round of sampling was modified based on results of the first set of testing. The sampling location DR-3A and an additional WET test (acute *Oncorhynchus mykiss*, trout) were added to the sampling and testing programs.

This report includes the following items:

- Methods – an update on sampling and testing completed to-date;
- Results and Discussion– a summary and evaluation of the current results; and
- Conclusions and Recommendations – an interpretation of the testing and a proposal for the best course of action moving forward.

2 TASK OVERVIEW

The first round of sampling and testing at locations DR-2, DR-6, DR-7, and AC3EFF was completed by August 25th, 2020.

For the second round of testing, the sampling program was expanded to include an additional sampling location for acute testing, DR-3A, and an additional acute WET test using the rainbow trout (*O. mykiss*; EPA Method 2019.0), performed by TRE Environmental Strategies, LLC (TRE). Acute testing only was performed at DR-3A because chronic toxicity was expected based on historical water chemistry. Acute trout testing was completed by December 26th, 2020. The *Ceriodaphnia dubia* and *Pimephales promelas* WET tests conducted during the second round were completed by January 10th, 2021.

A laboratory control with high hardness water (high hardness control) was run to ensure the hardness of the SLT discharge and hence the EWD treatment system did not adversely affect test organisms and to isolate any potential hardness-related effects from other constituents. In both rounds of WET testing, the high hardness control water was created to match the ionic composition of DR-6.

Test details are provided in Table 1 and Table 2.

Table 1. *Acute WET Test Details.*

Parameter	Details
Testing Protocol	*Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms, Fifth Edition, October 2002 (EPA-821-R-02-012);* EPA Method 2019.0
Duration	48-hour static renewal for Invertebrates, 96-hour static renewal for Fish
Dilutions	100%, 80%, 60%, 40%, 20%, and 10% (100%, 50%, and 25% for *O. mykiss)*
Controls	One lab-dilution water control (0% effluent) and one high hardness lab control (0% effluent) at DR-6 hardness (approx. 750 mg/L). The ionic composition of the high hardness control was similar to historical analytical data from DR-6.
Dilution Water	Synthetic water prepared by the lab according to EPA (2002a). Synthetic water had similar hardness to upstream Dolores River (DR-2) hardness during high-flow/freshet conditions (approx. 95 mg/L) for August 2020 tests. Synthetic water had similar hardness to upstream Dolores River (DR-2) hardness during low-flow conditions (approx. 175 mg/L) for November/December 2020 tests.
Temperature	20°C ± 3°C (12°C ± 3°C for *O. mykiss)*
Invertebrate Species	Water Flea (*C. dubia*)
Fish Species	Fathead Minnow (*P. promelas)* Rainbow Trout *(O. mykiss)*

Table 2. *Chronic WET Test Details.*

Parameter	Details
Testing Protocol	*Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, Fourth Edition, October 2002 (EPA-821-R-02-013)*
Duration	7-day static renewal
Dilutions	100%, 80%, 60%, 40%, 20%, and 10%
Controls	One lab-dilution water control (0% effluent) and one high hardness lab control (0% effluent) at DR-6 hardness (approx. 750 mg/L). The ionic composition of the high hardness control was similar to historical analytical data from DR-6.
Dilution Water	Synthetic water prepared by the lab according to EPA (2002b). Synthetic water had similar hardness to upstream Dolores River (DR-2) hardness during high-flow/freshet conditions (approx. 95 mg/L) for August 2020 tests. Synthetic water had similar hardness to upstream Dolores River (DR-2) hardness during low-flow conditions (approx. 175 mg/L) for November/December 2020 tests.
Temperature	20°C ± 3°C
Invertebrate Species	Water Flea (*C. dubia*)

In accordance with EPA guidance on WET testing (EPA, 2002 a,b), effluent toxicity is evaluated using several endpoints, as follows:

- **No-Observed-Effect-Concentration (NOEC)** – the highest concentration of effluent to which organisms are exposed that causes no observable adverse effects (i.e., the highest concentration in which observed responses are not statistically significantly different from the control as determined by hypothesis testing).
- **Median Lethal Concentration (LC_{50})** – a point estimate of the effluent concentration that causes mortality in 50 percent of the test organisms.
- **Inhibition Concentration (IC)** – a point estimate of the effluent concentration that would cause a given percent reduction in a non-lethal response (e.g., reproduction or growth). The IC_{25} is a point estimate of the effluent concentration that causes a 25-percent reduction in a non-lethal response.

3 RESULTS AND DISCUSSION

The WET testing results for first round of sampling (summer) and second round of sampling (winter) are presented in Tables 3 and 4, respectively. Table 5 presents water chemistry results for each round of WET testing. The WET testing laboratory reports are provided in Appendix A.

Table 3. *Summer High Flow WET Testing Results.*

Test Species	Sample Location	End of Test Date	Test	Acute - Survival		Chronic - Survival			Chronic Reproduction[1]		
				LC_{50}	C.I.[2]	IC_{25}	C.I.[2]	NOEC	IC_{25}	C.I.[2]	NOEC
P. promelas	DR-2	8/8/2020	96-hour acute	>100%	N/A	-	-	-	-	-	-
	DR-6	8/15/2020	96-hour acute	>100%	N/A	-	-	-	-	-	-
	DR-7	8/15/2020	96-hour acute	>100%	N/A	-	-	-	-	-	-
	AC3EFF	8/22/2020	96-hour acute	>100%	N/A	-	-	-	-	-	-
C. dubia	DR-2	8/6/2020	48-hour acute	>100%	N/A	-	-	-	-	-	-
	DR-6	8/13/2020	48-hour acute	>100%	N/A	-	-	-	-	-	-
	DR-7	8/17/2020	48-hour acute	>100%	N/A	-	-	-	-	-	-
	AC3EFF	8/20/2020	48-hour acute	>100%	N/A	-	-	-	-	-	-
C. dubia	DR-2	8/10/2020	7-day chronic	-	-	>100%	N/A	100%	>100%	N/A	100%
	DR-6	8/17/2020	7-day chronic	-	-	>100%	N/A	100%	>100%	N/A	100%
	DR-7	8/18/2020	7-day chronic	-	-	>100%	N/A	100%	>100%	N/A	100%
	AC3EFF	8/25/2020	7-day chronic	-	-	>100%	N/A	100%	97.10%	N/A	100%

Notes:
1. Normalized to young produced per surviving female.
2. C.I. = confidence interval.

Table 4. *Winter Low Flow WET Testing Results.*

Test Species	Sample Location	End of Test Date	Test	Acute - Survival		Chronic - Survival			Chronic Reproduction[2]		
				LC_{50}	C.I.[3]	IC_{25}	C.I.[3]	NOEC	IC_{25}	C.I.[3]	NOEC
C. dubia	DR-2	1/10/2021	48-hour acute	>100%	N/A	-	-	-	-	-	-
	DR-3A	11/8/2020	48-hour acute	23.80%	16.9%-30.3%	-	-	-	-	-	-
	DR-6	12/3/2020	48-hour acute	>100%	N/A	-	-	-	-	-	-
	DR-7	12/3/2020	48-hour acute	>100%	N/A	-	-	-	-	-	-
	AC3EFF	11/19/2020	48-hour acute	>100%	N/A	-	-	-	-	-	-
C. dubia	DR-2	12/8/2020	7-day chronic	-	-	>100%	N/A	100%	>100%	N/A	100%
	DR-6	12/8/2020	7-day chronic	-	-	>100%	N/A	100%	76.5%[1]	N/A[1]	60%
	DR-7	12/8/2020	7-day chronic	-	-	>100%	N/A	100%	>100%	N/A	100%
	AC3EFF	12/14/2020	7-day chronic	-	-	>100%	N/A	100%	>100%	N/A	100%
P. promelas	DR-2	12/5/2020	96-hour acute	>100%	N/A	-	-	-	-	-	-
	DR-3A	11/10/2020	96-hour acute	>100%	N/A	-	-	-	-	-	-
	DR-6	12/5/2020	96-hour acute	>100%	N/A	-	-	-	-	-	-
	DR-7	12/5/2020	96-hour acute	>100%	N/A	-	-	-	-	-	-
	AC3EFF	11/21/2020	96-hour acute	>100%	N/A	-	-	-	-	-	-
O. mykiss	DR-2	12/26/2020	96-hour acute	>100%	N/A	-	-	-	-	-	-
	DR-3A	12/22/2020	96-hour acute	>100%	N/A	-	-	-	-	-	-
	DR-6	12/26/2020	96-hour acute	>100%	N/A	-	-	-	-	-	-
	DR-7	12/26/2020	96-hour acute	>100%	N/A	-	-	-	-	-	-
	AC3EFF	12/22/2020	96-hour acute	>100%	N/A	-	-	-	-	-	-

Notes:

1. IC_{25} (ICp Method) = 75.2% (C.I. 65.6 to 82.7). This was not used due to smoothing error, so reported value was calculated manually.
2. Normalized to young produced per surviving female.
3. C.I. = confidence interval.

Table 5. *Water Chemistry of WET Testing.*

Location			AC3EFF				DR-2		DR-3A		DR-6		DR-7	
Date			**08/17/20**	**11/16/20**	**12/11/20**	**12/17/20**	**08/03/20**	**11/30/20**	**11/05/20**	**12/17/20**	**08/10/20**	**11/30/20**	**08/10/20**	**11/30/20**
Metals														
Constituent	**Fraction**	**Unit**												
Aluminum	D	µg/L	8.2	8.2	8.2	8.2	16.6	8.2	181	90.7	8.2	8.2	10.1	8.2
	T	µg/L	8.2	8.2	8.2	12.4	125	36.1	1200	1040	25.1	19.2	42	13.3
Arsenic	D	µg/L	0.18	0.086	0.18	0.16	0.32	0.19	0.57	0.39	0.37	0.21	0.79	1.1
	T	µg/L	0.17	0.16	0.17	0.18	0.46	0.24	2.9	2.8	0.45	0.28	0.77	1.2
Boron	D	µg/L	11.7	11.7	11.7	11.7	16.3	11.7	-	11.7	17.5	11.7	12.3	11.7
	T	µg/L	11.7	11.7	11.7	11.7	11.7	259	-	11.7	12.1	11.7	14.3	11.7
Cadmium	D	µg/L	0.056	0.056	0.056	0.056	0.056	0.056	16.6	15.1	0.66	0.32	0.074	0.086
	T	µg/L	0.28	0.056	0.11	0.11	0.083	0.056	19.6	16.5	0.76	0.66	0.074	0.13
Chromium	D	µg/L	0.22	0.22	0.27	0.24	0.71	0.29	0.29	0.27	0.4	0.22	0.22	0.3
	T	µg/L	0.22	0.22	0.35	0.23	0.26	0.28	0.92	0.85	0.22	0.43	0.24	0.36
Copper	D	µg/L	0.1	0.18	0.18	0.1	0.41	0.32	38.9	19.5	1.4	0.51	0.56	1.2
	T	µg/L	0.18	0.2	0.3	0.24	0.57	0.39	243	197	3.2	2	0.55	0.9
Cyanide	T	mg/L	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Iron	D	µg/L	124	67.8	32.3	26.8	26.8	26.8	2140	1700	26.8	59.8	61.9	187
	T	µg/L	149	75.2	55.1	47.9	111	35	11200	11800	241	237	144	301
Lead	D	µg/L	0.1	0.12	0.1	0.1	0.1	0.1	2.3	0.83	0.1	0.1	0.1	0.1
	T	µg/L	0.12	0.12	0.12	0.23	0.22	0.12	20.7	21.5	0.63	0.48	0.12	0.12
Manganese	D	µg/L	507	106	172	129	47.8	140	1900	1870	175	304	105	332
	T	µg/L	500	117	182	120	53.2	151	2030	1710	172	308	100	334
Mercury	D	µg/L	0.052	0.052	0.052	0.052	0.052	0.052	0.056	0.052	0.052	0.052	0.052	0.052
	T	µg/L	0.052	0.052	0.052	0.052	0.052	0.052	0.054	0.052	0.052	0.052	0.052	0.052
Molybdenum	D	µg/L	4.1	15.9	11.7	12.4	0.97	1.1	12.6	13.1	5.3	12.6	1.5	2.7
	T	µg/L	4.4	15.6	11.5	12.4	1.1	1.1	15.1	14.8	5.4	12.7	1.4	2.8
Nickel	D	µg/L	0.41	1.6	1.8	2	0.27	0.24	4.2	4.1	0.5	1.5	0.31	0.55

Location			AC3EFF				DR-2		DR-3A		DR-6		DR-7	
Date			08/17/20	11/16/20	12/11/20	12/17/20	08/03/20	11/30/20	11/05/20	12/17/20	08/10/20	11/30/20	08/10/20	11/30/20
	T	µg/L	0.44	1.5	1.8	2.2	0.45	0.28	4.5	4.1	0.5	1.6	0.32	0.56
Selenium	D	µg/L	0.18	0.18	0.18	0.18	0.4	0.51	0.18	0.18	0.18	0.18	0.38	0.4
	T	µg/L	0.18	0.18	0.18	0.18	0.57	0.45	0.33	0.41	0.18	0.18	0.34	0.4
Silicon	D	µg/L	7350	6840	6770	6710	2770	3420	7840	7860	8940	8530	4750	6330
	T	µg/L	7450	6560	6700	6840	2970	4850	8820	9010	9140	8550	4850	6520
Silver	D	µg/L	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097
	T	µg/L	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097
Zinc	D	µg/L	6	11.7	18.6	12.3	4.3	6.2	3010	2740	117	164	14	29.5
	T	µg/L	65.7	77.1	124	141	5.6	6.8	3610	3070	129	174	14.7	31.2
Major Ions														
Calcium	D	mg/L	247	256	242	249	38	70.4	240	249	270	288	72.7	123
	T	mg/L	255	243	240	253	39.7	81.8	242	256	277	297	73.6	131
Chloride	T	mg/L	3.1	3.1	3.4	3.4	0.88	1.7	0.67	0.76	3	3.3	1.1	2
Magnesium	D	mg/L	18.6	19.9	19.4	19.1	5.33	9.31	18.9	18.9	23.2	25.2	8.86	15.3
	T	mg/L	20.1	19.6	18.8	19.4	5.63	9.61	19.2	19.5	23.4	25.6	9.05	16
Potassium	D	mg/L	1.62	1.73	1.8	1.74	0.478	0.853	1.66	1.78	3.17	2.8	1.55	2.3
	T	mg/L	1.9	1.83	1.77	1.68	0.671	17.2	1.71	1.76	3.14	2.85	1.57	2.52
Sodium	D	mg/L	11.7	12.8	12.1	12.2	2.16	3.95	11.2	12.3	15.4	15.5	5.2	8.32
	T	mg/L	12.1	11.9	11.8	12.5	2.32	101	11.4	12.7	15.8	15.3	5.27	8.47
Sulfate	T	mg/L	635	626	626	656	47.9	84.9	599	602	633	644	115	208
Sulfide, Total	T	mg/L	0.57	0.08	0.12	0.11	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Other Parameters														
Alkalinity	T, as $CaCO_3$	mg/L	98.6	96.5	91.2	85.1	75.5	120	116	105	133	121	108	168
B.O.D.	T	mg/L	2	2	2	2	-	-	2	2	2	-	2	-
D.O.C.	D	mg/L	1	1	1	1	1.6	1	1	1	1	1	1.4	1
Nitrogen	T, as Ammonia (NH_4)	mg/L	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.079	0.074	0.074	0.074	0.074

Location			AC3EFF				DR-2		DR-3A		DR-6		DR-7	
Date			08/17/20	11/16/20	12/11/20	12/17/20	08/03/20	11/30/20	11/05/20	12/17/20	08/10/20	11/30/20	08/10/20	11/30/20
Nitrogen, Nitrate, & Nitrite	T, as N	mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Phosphorus	T	mg/L	0.059	0.059	2	0.059	0.08	0.059	0.059	0.059	0.059	0.059	0.059	0.059
T.D.S.	D	mg/L	1110	1020	1010	1030	632	244	1020	1030	1170	1140	294	484
Total Hardness	T	mg/L	719	687	677	712	122	244	682	720	788	846	221	392
T.O.C.	T	mg/L	1	1	1	1	1.8	1	1	1	1	1	1.3	1
T.S.S.	T	mg/L	1.2	1.2	1.2	1.2	1.7	1.2	28.8	27.8	1.2	1.2	1.2	1.2

Notes:

1. In the absence of a detected value, the Method Detection Limit (MDL) is reported.

3.1 Summer 2020 Results

The first round of WET sampling was conducted in August 2020 when the Dolores River approached baseflow conditions (Figure 2). During this period, water hardness in the Dolores River ranged from 122 to 221 mg/L as $CaCO_3$ at locations DR-2 and DR-7, respectively. Hardness in discharge from the St. Louis Ponds System (location DR-6) was 788 mg/L as $CaCO_3$.

There were no significant effects in the acute *C. dubia* and *P. promelas* tests for any location as indicated by NOECs of 100% effluent and LC_{50}s of >100% in each sample (Table 3).

No significant chronic effects to *C. dubia* were observed in the tests conducted with DR-2, DR-6, and DR-7 samples (i.e., NOECs = 100%; IC_{25}s >100% effluent). In the AC3EEF chronic test for *C. dubia*, the reproduction NOEC and IC_{25} were 100% and 97.1% effluent, respectively, indicating reproduction in 100% effluent was not statistically different than control as determined by hypothesis testing. In addition, when the AC3EFF *C. dubia* chronic test was re-analyzed using the high-hardness control instead of the moderately hard laboratory control, no significant effects were detected.

3.2 Winter 2020/2021 Results

The second round of WET sampling was conducted in December 2020 during winter baseflow conditions in the Dolores River. Hardness concentrations in the Dolores River ranged from 244 to 392 mg/L as $CaCO_3$ at locations DR-2 and DR-7, respectively. Hardness in the discharge from the St. Louis Ponds System (location DR-6) was 846 mg/L as $CaCO_3$.

There were no significant acute effects in the *C. dubia*, *P. promelas*, or *O. mykiss* tests, except for location DR-3A where the estimated LC_{50} for *C. dubia* was 23.8% effluent. This location represents the SLT discharge (the influent to the EWD treatment system prior to treatment). Acute effects were not observed in the *P. promelas* and *O. mykiss* tests conducted with samples collected from this location.

No significant chronic effects to *C. dubia* were observed in tests conducted with DR-2, DR-7, and AC3EFF samples. In the DR-6 chronic test, the *C. dubia* reproduction NOEC and IC_{25} were 60 and 76.5% effluent, respectively. No effects on *C. dubia* survival were observed in this test.

3.3 Discussion

The WET results indicate acute toxicity to *P. promelas* and *O. mykiss* is not expected for the locations and conditions represented in the current study. The following provides an evaluation of potential causes of effluent toxicity observed in the two *C. dubia* tests described above.

Metals were evaluated as a potential contributor to effluent toxicity through a toxic-unit (TU) approach[1]. For this evaluation, TUs for dissolved metals were calculated using *C. dubia* (or other Cladocera) acute and chronic effect levels available in the scientific and regulatory literature. The TU evaluation focused on the dissolved metal fraction to evaluate potential toxicity because dissolved metals more closely approximate the bioavailable fraction than does total recoverable metal (EPA, 1993). When Cladocera effect levels were not available for a metal (e.g., silver and selenium for acute TUs; and arsenic, chromium, iron, lead, nickel and selenium for chronic TUs),

[1] Toxic Unit = Measured metal concentration divided by species-specific toxicity benchmark; TUs > 1 indicate the potential for toxicity for a given metal and species.

EPA or Colorado aquatic life standards were used. This approach is likely conservative because (1) aquatic life standards are lower than Cladocera acute and chronic effect levels and (2) both hardness-based metal effect levels and standards are capped at a hardness of 400 mg/L, significantly less than hardness observed at the EWD treatment system effluent and through the St. Louis Ponds System. Therefore, any hardness-mitigating effects above 400 mg/L are not considered for effluent samples. Lastly, we assumed the combined effects of multiple metals caused toxicity in an additive manner when in reality, the majority of metal mixtures exhibit independent action (Nys et al., 2018).

Tables 6 and 7 present a summary of *C. dubia* acute and chronic TUs for each metal as well as the cumulative TUs for all metals. Cumulative acute TUs exceeded 1.0 at location DR-3A in November 2020 when an LC_{50} of 23.8% (95% CI = 16.9 - 30.3%) was observed. Based on the TU evaluation, zinc (TU = 2.8) and, to a lesser extent, copper (TU = 1.5) were identified as the likely sources of acute toxicity (Table 6). No other sampling location exhibited an exceedance of individual or cumulative acute TUs and significant acute effects were not observed at other locations, demonstrating the effectiveness of the demonstration-scale constructed wetlands in ameliorating acute effluent toxicity. Based on the available literature (Mount et al., 2016; Erickson et al., 2018) and results presented herein, major ions are not expected to be a source of acute toxicity.

For the chronic evaluation, cumulative TUs exceeded 1.0 at location DR-6 in August and November/December 2020 (Table 7). Chronic toxicity was not observed at DR-6 in August 2020 and TUs calculated for each individual metal were < 1.0. In contrast, the estimated IC_{25} for *C. dubia* was 76.5% at DR-6 in November/December 2020 and the TU calculated for zinc exceeded 1.0 (TU = 1.33), suggesting the observed chronic toxicity is likely attributable to zinc (TUs calculated for all other metals were < 1.0).

Major ions were also considered as a potential source of chronic toxicity given the sensitivity of *C. dubia* to elevated TDS and hardness. Although *C. dubia* is a standard WET test species, it mostly occurs in softer waters. Given this, EPA recommends it be cultured in moderately hard water (80-100 mg/L) to which it is naturally adapted (EPA, 2002a,b). Others have demonstrated its chronic sensitivity to elevated TDS and calcium, including in waters composed primarily of $CaSO_4$ (Mount et al., 2019) similar to those evaluated in the current study. Mount et al. (2019) developed a model to predict the toxicity of major ion mixtures to *C. dubia*. Their model predicts an IC_{20} (not IC_{25}) of ~220 mg/L Ca for waters with an ionic composition like those tested in the current study. This suggests ~1 TU of chronic toxicity associated with Ca for all of the waters tested except DR-2 and DR-7. However, chronic toxicity was not observed at AC3EFF during either round (Ca range = 242 to 249 mg/L), DR-6 in the first round (Ca = 270 mg/L), or in the high hardness controls during either round (nominal Ca = 260 mg/L), suggesting Ca may not be the primary source of toxicity observed at DR-6 but may have elicited some stress on *C. dubia* reproduction in combination with zinc.

Importantly, chronic toxicity was not observed in the Dolores River downstream of the St. Louis Ponds System outfall at location DR-7 during either sampling event. Typically, chronic WET limits are expressed relative to the Receiving Water Concentration (RWC), which represents the percentage of effluent in the receiving water after mixing. For example, chronic WET limits often require the effluent discharge not to result in both 1) a NOEC less than the RWC and 2) an IC_{25} less than the RWC. The WET results from location DR-7 demonstrated a lack of chronic toxicity after effluent discharge mixed with the Dolores River during both rounds of WET sampling. For

additional context and comparison to the *C. dubia* IC_{25} of 76.5% at the outfall location (DR-6) in November/December 2020, an instantaneous RWC of 6.08% was estimated from effluent discharge and flow rates in the Dolores River during this period based on the following equation.

$$Instanteous\ RWC = \left(\frac{Effluent\ Flow}{Effluent\ Flow + Receiving\ Water\ Flow}\right) \times 100$$

Where:

Effluent Flow (0.97 cfs) = Average of daily flow rates measured at DR-6 flume from November 30 through December 7, 2020.

Receiving Water Flow (14.98 cfs) = Flow estimated at DR-2 using measured flow (23.0 cfs) at USGS Gage 09156000 (daily rate on November 8, 2020, which was the last reading before gage icing) and the following formula[2]:

$$(USGS\ 09156000\ Flow - DR6\ Flume\ Flow) \times 0.68$$

The estimated RWC of 6.08% effluent is substantially less than the IC_{25} of 76.5% effluent, which further demonstrates that chronic effluent toxicity was not a concern in the current study.

[2] Formula based upon watershed ratio between DR-2 and USGS Gage 09156000 (DR-G).

Table 6. *Acute Toxic Units to C. dubia based on Dissolved Metals.*

Metal	AC3EFF		DR-2		DR-3A	DR-6		DR-7	
	08/17/2020	11/16/2020	08/03/2020	11/30/2020	11/05/2020	08/10/2020	11/30/2020	08/10/2020	11/30/2020
Dissolved Metal TUs									
Aluminum[1]	0.001	0.001	0.003	0.001	0.015	0.001	0.001	0.001	0.001
Arsenic[2]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001
Cadmium[3]	0.000	0.000	0.001	0.000	0.088	0.003	0.002	0.001	0.000
Chromium (III)[4]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Chromium (VI)[5]	0.010	0.010	0.031	0.013	0.013	0.017	0.010	0.010	0.013
Copper[6]	0.004	0.007	0.049	0.020	**1.525**	0.055	0.020	0.038	0.048
Iron	--	--	--	--	--	--	--	--	--
Lead[7]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Manganese[8]	0.010	0.002	0.012	0.010	0.037	0.003	0.006	0.012	0.009
Mercury[2]	0.018	0.018	0.018	0.018	0.019	0.018	0.018	0.018	0.018
Nickel[4]	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000
Selenium[9]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Silver[10]	0.004	0.004	0.034	0.010	0.004	0.004	0.004	0.012	0.005
Zinc[11]	0.005	0.011	0.011	0.009	**2.756**	0.107	0.150	0.021	0.027
∑ TUs	0.052	0.053	0.158	0.082	***4.460***	0.210	0.211	0.114	0.122

Notes:

1. *C. dubia* acute threshold calculated from EPA (2018) MLR model with measured hardness or hardness = 430 mg/L, pH = 7, DOC = 1 mg/L.
2. *C. reticulata* acute threshold from EPA (1996).
3. *C. dubia* acute threshold from USGS (2010) at measured hardness or hardness of 400 mg/L.
4. *D. magna* acute threshold from EPA (1996).
5. *D. magna* acute threshold from EPA (1996) at measured hardness or hardness of 400 mg/L.
6. *C. dubia* acute threshold from EPA (2007) criteria at measured hardness or hardness of 400 mg/L.

7. *C. dubia* acute threshold from EPA (1985) at measured hardness or hardness of 400 mg/L.
8. *C. dubia* acute threshold from Windward (2014) at measured hardness or hardness of 400 mg/L.
9. Acute standard from EPA (2004) at measured sulfate concentration.
10. Acute standard from State of Colorado Aquatic Life Standards at measured hardness or hardness of 400 mg/L.
11. *C. dubia* acute threshold from Deforest and Van Genderen (2012) at measured hardness or hardness of 400 mg/L.

Abbreviations:
Bold = Toxic unit greater than one
Italic = Sum of toxic units greater than one

Table 7. *Chronic Toxic Units to C. dubia based on Dissolved Metals.*

Metal	AC3EFF		DR-2		DR-6		DR-7	
	08/17/2020	11/16/2020	08/03/2020	11/30/2020	08/10/2020	11/30/2020	08/10/2020	11/30/2020
Dissolved Metal TUs								
Aluminum[1]	0.003	0.003	0.013	0.009	0.003	0.003	0.010	0.007
Arsenic[2]	0.001	0.001	0.002	0.001	0.002	0.001	0.005	0.007
Cadmium[3]	0.007	0.007	0.016	0.010	0.088	0.043	0.014	0.012
Chromium (III)[4]	0.001	0.001	0.008	0.005	0.002	0.001	0.005	0.003
Chromium (VI)[2]	0.020	0.020	0.065	0.026	0.036	0.020	0.020	0.027
Copper[5]	0.013	0.023	0.145	0.062	0.179	0.065	0.119	0.156
Iron[2]	0.124	0.068	0.027	0.027	0.027	0.060	0.062	0.187
Lead[4]	0.009	0.011	0.032	0.015	0.009	0.009	0.017	0.009
Manganese[6]	0.033	0.007	0.008	0.013	0.012	0.020	0.011	0.022
Mercury	--	--	--	--	--	--	--	--
Nickel[4]	0.002	0.010	0.004	0.002	0.003	0.009	0.003	0.002
Selenium[2]	0.039	0.039	0.087	0.111	0.039	0.039	0.083	0.087
Silver[4]	0.028	0.028	0.218	0.065	0.028	0.028	0.077	0.029
Zinc[7]	0.049	0.095	0.096	0.077	0.951	**1.333**	0.189	0.245
∑ TUs	0.330	0.313	0.720	0.425	***1.380***	***1.632***	0.614	0.794

Notes:

1. *C. dubia* chronic threshold calculated from EPA (2018) MLR model with measured hardness or hardness = 430 mg/L, pH = 7, DOC = 1 mg/L.
2. Chronic standard from State of Colorado Aquatic Life Standards.
3. *C. dubia* chronic threshold from USGS (2010) at measured hardness or hardness of 400 mg/L.
4. Chronic standard from State of Colorado Aquatic Life Standards at measured hardness or hardness of 400 mg/L.
5. *C. dubia* chronic threshold from EPA (2007) at measured hardness or hardness of 400 mg/L.
6. *C. dubia* chronic threshold from Windward (2014) at measured hardness or hardness of 400 mg/L.
7. *C. dubia* chronic threshold from Deforest and Van Genderen (2012) at measured hardness or hardness of 400 mg/L.

Abbreviations:
Bold = Toxic unit greater than one
Italic = Sum of toxic units greater than one

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

Based on the WET results and evaluations presented herein, several conclusions can be made.

1) *P. promelas* and *O. mykiss* were not acutely affected by the SLT discharge, the effluent from the EWD treatment system, or the Dolores River (upstream and downstream of the outfall) over the range of conditions evaluated.
2) *C. dubia* was not acutely affected over the range of conditions evaluated, except in the untreated SLT discharge sample (location DR-3A). Zinc and, to a lesser degree, copper were identified as the probable cause(s) of the observed acute toxicity. The treatment system was effective in eliminating acute toxicity.
3) *C. dubia* was not chronically affected over the range of conditions evaluated, except location DR-6 (second round). However, chronic WET limits for this system should be evaluated relative to in-stream mixing consistent with regulatory guidance. An evaluation of DR-7 (Dolores River after mixing with the effluent), and the RWC, calculated from effluent and receiving water discharge rates, showed in-stream chronic toxicity is not expected over the range of conditions evaluated.
4) The ionic strength of waters excluding the Dolores River (before and after mixing with the effluent) may be high enough to cause ~1 TU of chronic toxicity to *C. dubia* due to elevated concentrations of calcium.

4.2 Recommendations

An additional round of WET testing in 2021 to evaluate effluent toxicity during freshet conditions is recommended. This period generally occurs in approximately May to July, when discharge from the SLT is characterized by a temporary rapid increase in metals concentration, a decrease in pH, and an increase in flow rate. The additional round of WET testing should follow the procedures described herein and in Atlantic Richfield (2020, included as Appendix B), including the test species, locations, high-hardness controls, and analytical sampling. If conditions permit, flow rates in the Dolores River should also be measured during subsequent WET testing.

5 REFERENCES

Atlantic Richfield, 2020, Whole Effluent Toxicity (WET) Testing Rico-Argentine Mine Site Rico, CO, Prepared by Copper Environmental Consulting and Benchmark Environmental LLC for Atlantic Richfield, dated July 29, 2020.

Colorado Department of Public Health and Environment, 2020, Regulation No. 31 – the basic standards and methodologies for surface water. 5 CCR 1002-31.

Deforest, D., and Van Genderen, E., 2012, Application of U.S. EPA guidelines in a bioavailability-based assessment of ambient water quality criteria for zinc in freshwater. Environ Toxicol Chem. 31:1264-1272.

Erickson RJ, DR Mount, TL Highland, RJ Hocket, DJ Hoff, CT Jenson, TJ Norberg-King, KN Peterson. 2018. The acute toxicity of major ion salts to Ceriodaphnia dubia. III. Mathematical models for mixture toxicity. *Environ. Toxicol. Chem.* 37: 247-259.

Mebane, C., 2010, Cadmium risks to freshwater life: derivation and validation of low-effect criteria values using laboratory and field studies. SIR 2006-5245 version 1.2.

Mount, DR, RJ Erickson, TL Highland, JR Hocket, DJ Hoff, CT Jenson, TJ Norberg-King, KN Peterson, ZM Polaske, S Wisniewski. 2016. The acute toxicity of major ions salts to *Ceriodaphnia dubia*: I. influence of background water chemistry. *Environ. Toxicol. Chem.* 35:3039-3057.

Mount, DR, RJ Erickson, BB Forsman, TL Highland, JR Hockett, DJ Hoff, CY Jenson, TJ Norberg-King, 2019, Chronic toxicity of major ion salts and their mixtures to *Ceriodaphnia dubia. Environ. Toxicol. Chem.* 38:769-783.

Nys, C, T Van Regenmortal, CR Janssen, K Oorts, E Smolders, KC De Schamphelaere, 2018, A framework for ecological risk assessment of metal mixtures in aquatic systems. *Environ. Toxicol. Chem.* 37:623-642.

U.S. Environmental Protection Agency, 1985, Ambient water quality criteria for lead – 1984. EPA-440/5-84-027.

U.S. Environmental Protection Agency, 1993, Office of Water and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria. Memorandum, dated October 1, 1993.

U.S. Environmental Protection Agency, 1996, 1995 updates: water quality criteria documents for the protection of aquatic life in ambient water. EPA-820-B-96-001.

U.S. Environmental Protection Agency, 2002a, Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms. Fifth Edition. October 2002. EPA-821-R-02-012.

U.S. Environmental Protection Agency, 2002b, Short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms. Fourth Edition. October 2002. EPA-821-R-02-013.

U.S. Environmental Protection Agency, 2004, Draft aquatic life water quality criteria for selenium – 2004. EPA-822-D-04-001.

U.S. Environmental Protection Agency, 2007, Aquatic life ambient freshwater quality criteria – copper 2007 revision. EPA-822-R-07-001.

U.S. Environmental Protection Agency, 2011a, Removal Action Work Plan. Rico-Argentine Mine Site – Rico Tunnels Operable Unit OU01, Rico, Colorado, dated March 9, 2011.

U.S. Environmental Protection Agency, 2011b, Unilateral Administrative Order for Removal Action, U.S. EPA Region 8, Docket No. CERCLA-08-2011-0005; Rico-Argentine Site, Dolores County, Colorado, dated March 23, 2011.

U.S. Environmental Protection Agency, 2018, Final aquatic life ambient water quality criteria for aluminum 2018. EPA-822-R-18-001.

Windward Environmental, 2014, Derivation of final manganese PRG to replace the Suter and Tsao (1996) Tier II value in the Portland harbor feasibility study. Memorandum, dated November 25, 2014.

FIGURES

Explanation

- Sample Location
- Dolores River

Rico-Argentine Mine Site

Figure 1. Water Collection and Sampling Locations for WET Testing

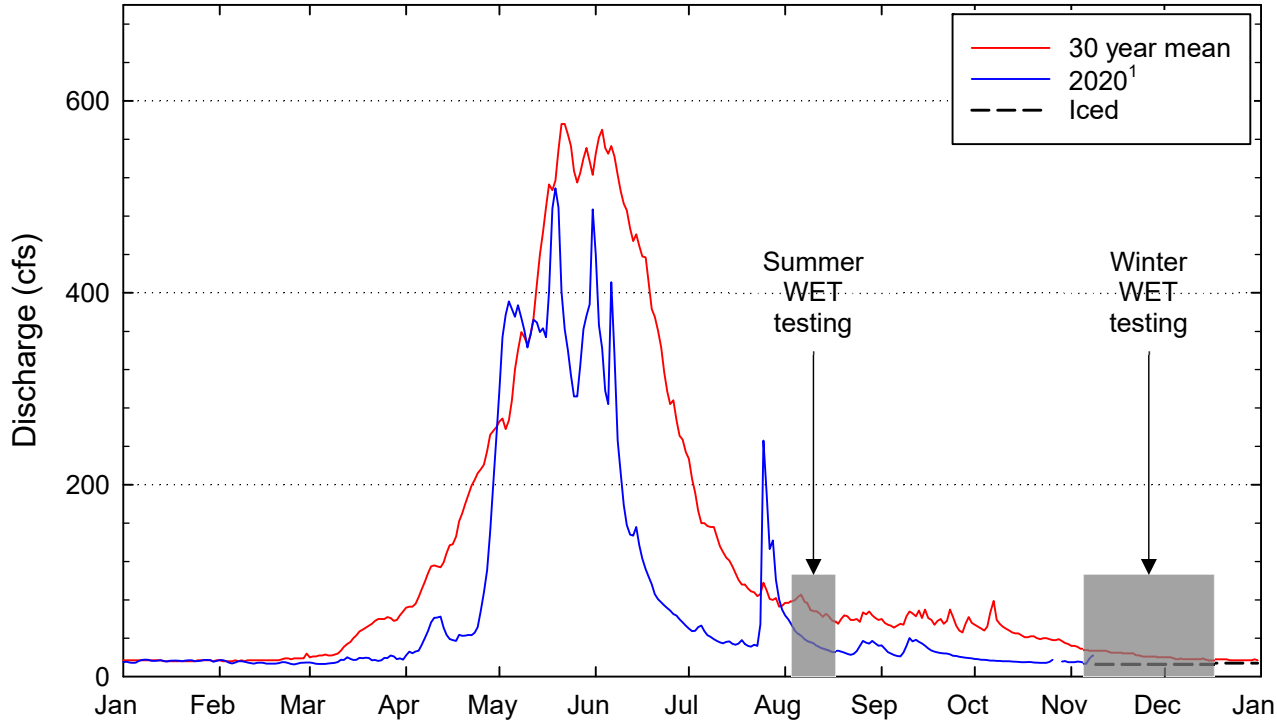
0 50 100 200 Yards

N

Copper Environmental Consulting
A PRISM SPECTRUM COMPANY

Prepared by: BR

Date: 2/12/2021



Notes: [1]Provisional data from October 1, 2020 to December 31, 2020.

Figure 2. *Dolores River Discharge below Rico, CO.*

APPENDIX A: LABORATORY REPORTS

GEI Consultants

Consulting
Engineers and
Scientists

Whole Effluent Toxicity Testing Report

Copper Environmental Consulting - Rico

Submitted to:
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Submitted by:
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September 17, 2020
Project 2003718
Report prepared by: AR

1.0 Test Summary

Enclosed are the results of the acute *Ceriodaphnia dubia* and *Pimephales promelas* tests and the chronic *C. dubia* tests performed August 4 to 10, 2020 for the DR-2 site, August 11 to 18, 2020 for the DR-6 and DR-7 sites, and August 18 to 24, 2020 for the AC3EFF site. Acute and chronic toxicity test procedures followed methods described in EPA documentation (EPA 2002a and 2002b).

Daily temperatures were taken in the test chambers for the duration of all tests. The temperature in DR-6 and AC3EFF acute *C. dubia* tests differed by 3.2°C and 3.3°C, respectively, and the temperature in the AC3EFF acute *P. promelas* test differed by 3.5°C. The temperature in the DR-6, DR-7, and AC3EFF chronic *C. dubia* tests differed by 5.2°C, 3.5°C, and 5.1°C, respectively.

Due to a technician error, dissolved oxygen (D.O.), conductivity, and pH were not measured for all dilutions on day two of the acute DR-2 *C. dubia* test.

A high hardness reconstituted (HH recon) water was tested to isolate whether potential effects on the organisms in the various site waters may be due in part to the ionic composition of the water. The high hardness water was created to match the ion composition of the DR-6 site based on a specific timeframe targeted by Rico. Some problems were encountered during the mixing of the high hardness water. The water used for test initiation of all DR-2 tests and the first day of renewals was not an ideal match; however, the correct water was mixed and the same batch was used for the remainder of the DR-2 tests and all other tests.

Poor organism quality was observed in the *C. dubia* species the week of August 11, 2020 which impacted the DR-6 and DR-7 acute and chronic *C. dubia* tests. The control organisms did not meet performance criteria for survival (<90% survival) in the DR-7 acute *C. dubia* test and the test was rescheduled for August 15, 2020. Control performance criteria were met for the DR-6 site, therefore, the site was not retested, but it is believed that the slightly lower survival noted throughout the test is due to poor organism performance and not the site water. Additionally, due to poor organism health of replicate “G” in in all test concentrations of the DR-6 and most concentrations of the DR-7 chronic *C. dubia* tests, replicate “G” was excluded from all statistical analyses.

There were no significant effects in the acute *C. dubia* and *P. promelas* tests for any site and control performance criteria were met.

The chronic DR-7 and chronic AC3EFF *C. dubia* tests were conducted for seven days, however, control performance criteria were met on day six. Therefore, data from day seven were excluded from all statistical analyses. No significant effects on survival or reproduction were detected in the chronic DR-2, DR-6, or DR-7 tests. There were no significant effects on survival in the chronic AC3EFF *C. dubia*, however, there were significant effects on reproduction based on one of the statistical tests with an IC_{25} of 97.1% effluent (95% C.I. unavailable) and a NOEC of 100% effluent. When statistical analyses were re-analyzed using

the high hardness control, no significant effects were detected, indicating the ionic composition may have played a part in the effects detected when analyzed with the EPA moderately hard reconstituted (EPA MH recon) water. Control performance criteria were met in all chronic *C. dubia* tests.

Report approved by:

Ashley Romero, Laboratory Manager	Natalie Love, Laboratory Director

2.0 Test Conditions

2.1 *Ceriodaphnia dubia* 48-hour acute toxicity test

Method: EPA-821-R-02-012 -- Methods for measuring the acute toxicity of effluents . . .

Test Duration: 48 hours

Sample Collection Procedure: grab

Sample Collection Dates: 8/3/20, 8/10/20, 8/14/20, 8/17/20

Dilution water: EPA moderately hard reconstituted water

Acclimation: cultured in moderately hard reconstituted water

Age of organisms at start: <24 hours old

Feeding: none

End Point: mortality

Start date and time:	DR -2	8/4/20	14:45
	DR-6	8/11/20	13:45
	DR-7	8/15/20	9:30
	AC3EFF	8/18/20	10:45
End date and time:	DR-2	8/6/20	14:10
	DR-6	8/13/20	12:50
	DR-7	8/17/20	9:30
	AC3EFF	8/20/20	9:50

Type of exposure chamber: 30 mL disposable plastic cup

Volume of exposure chamber: 25 mL

Number of animals exposed/chamber: 5

Number of replicates/treatment: 4

Test temperature:	DR-2	21.0°C ± 0.6°C
	DR-6	23.6°C ± 1.6°C
	DR-7	18.8°C ± 0.8°C
	AC3EFF	20.1°C ± 1.7°C

EPA recommended range: 20.0°C ± 1.0°C

Standard toxicant used: NaCl

2.2 *Pimephales promelas* 96-hour acute toxicity test

Method: EPA-821-R-02-012 -- Methods for measuring the acute toxicity of effluents . . .

Test Duration: 96 hours

Sample Collection Procedure: grab

Sample Collection Date: 8/3/20, 8/10/20, 8/17/20

Dilution water: EPA moderately hard reconstituted water

Age of organisms at start: 7 days old

Feeding: before 48-hour solution renewal

End Point: mortality

Start date and time:	DR -2	8/4/20	14:00
	DR-6	8/11/20	10:10
	DR-7	8/11/20	10:55
	AC3EFF	8/18/20	13:45
End date and time:	DR -2	8/8/20	13:40
	DR-6	8/15/20	11:10
	DR-7	8/15/20	11:35
	AC3EFF	8/22/20	13:30

Type of exposure chamber: 9 oz. disposable plastic cup

Volume of exposure chamber: 200 mL

Number of animals exposed/chamber: 10

Number of replicates/treatment: 4

Test temperature:	DR-2	19.5°C ± 0.5°C
	DR-6	19.8°C ± 0.6°C
	DR-7	19.6°C ± 0.9°C
	AC3EFF	21.0°C ± 1.8°C

EPA recommended range: 20.0°C ± 1.0°C

Standard toxicant used: NaCl

2.3 *Ceriodaphnia dubia* 7-day toxicity test to estimate chronic toxicity

Method: EPA-821-R-02-013 -- Short-Term Method for Estimating Chronic Toxicity. . .

Test Duration: until at least 60% of control organisms release 3 broods

Sample Collection Procedure: grab

Sample Collection Date:		
	DR-2	8/3/20, 8/5/20, 8/7/20
	DR-6/DR-7	8/10/20, 8/12/20, 8/14/20
	AC3EFF	8/17/20, 8/19/20, 8/21/20

Dilution water: EPA moderately hard reconstituted water

Age of organisms at start: <24 hours old

Feeding: 0.1 mL YCT/0.1 mL *Selenastrum* daily

End Point: mortality, normalized reproduction

Start Date and Time:			
	DR -2	8/4/20	13:25
	DR-6	8/11/20	11:25
	DR-7	8/11/20	11:50
	AC3EFF	8/18/20	12:20

End Date and Time:			
	DR -2	8/10/20	13:05
	DR-6	8/17/20	11:25
	DR-7	8/18/20	11:15
	AC3EFF	8/25/20	11:20

Type of exposure chamber: 30 mL disposable plastic cup

Volume of exposure chamber: 15 mL

Number of animals exposed/chamber: 1

Number of replicates/treatment: 10

Test temperature:		
	DR-2	25.2°C ± 1.5°C
	DR-6	24.0°C ± 2.6°C
	DR-7	23.8°C ± 1.8°C
	AC3EFF	26.2°C ± 2.6°C

EPA recommended range: 25.0°C ± 1.0°C

Standard toxicant used: NaCl

3.0 QA/QC Summary

3.1 Sample QA/QC

Client: Copper Environmental Consulting - Rico

Date tests start: 8/4/20, 8/11/20, 8/15/20, 8/18/20

Chain of custody received.....Yes

Chain of custody completed.....Yes

Samples received within holding times.....Yes

Samples at correct temperature (0-6°C or sampled same day received).....Yes

Samples used within 36 hours of collection.....Yes

3.2 Test Acceptability

Control performance criteria met (Tables 1 & 2) .....Yes

Table 1: Acute control performance criteria requirements and test results by species.

Test Species	Site	Survival	
		Test (%)	Acceptable (%)
C. dubia	DR-2	100	90
	DR-6	90	
	DR-7	100	
	AC3EFF	100	
P. promelas	DR-2	97.5	90
	DR-6	100	
	DR-7	100	
	AC3EFF	100	

Table 2: Chronic control performance criteria requirements and test results by species.

Test Species	Site	Survival		Reproduction	
		Test (%)	Acceptable (%)	Test (#)	Acceptable (#)
C. dubia	DR-2	100	≥80	33.6	≥15.0
	DR-6	100		31.7	
	DR-7	100		29.0	
	AC3EFF	100		36.7	

Tests renewed within acceptable timeframe .....Yes

At least 60% of control organisms in chronic *C. dubia* test released at least 3 broods.....Yes

3.3 Statistical QA/QC

Percent minimum significant difference (PMSD) below upper bound for chronic tests (Table 3).....Yes

Table 3: Chronic control calculated and allowable PMSD upper bounds by species.

Test Species	Site	Calculated PMSD	EPA PMSD Upper Bound
C. dubia	DR-2	24	47
	DR-6	24	
	DR-7	35	
	AC3EFF	27	

3.4 Reference Toxicant Summary

Most recent reference toxicant tests met performance requirements (Tables 4-6).....Yes

Most recent reference toxicant tests within control chart requirements.....Yes

Table 4: Acute *Ceriodaphnia dubia* reference toxicant test with NaCl, conducted August 11 to 13, 2020.

g NaCl/L	Control	1.5	2.0	2.5	3.0	3.5
#alive/#exposed	18/20	17/20	18/19*	15/20	10/20	0/20
% survival	90	85	100	75	50	0

*Technician error, missing organism; one organism excluded from all statistical analyses.

Survival:

48 hour LC_{50} (Trimmed Spearman-Kärber) = 2.91 g NaCl/L (95% C.I. 2.76 to 3.06)

Note: This is within our accepted performance range (2.08 to 3.23) determined by 20 previous reference tests performed.

Table 5: Acute *Pimephales promelas* reference toxicant test with NaCl, conducted August 4 to 8, 2020.

g NaCl/L	Control	5.0	6.0	7.0	8.0	9.0
#alive/#exposed	40/40	39/40	40/40	35/40	12/40	1/40
% survival	100	97.5	100	87.5	30	2.5

Survival:

96 hour LC_{50} (Trimmed Spearman-Kärber) = 7.65 g NaCl/L (95% C.I. 7.46 to 7.85)

Note: This is within our accepted performance range (6.94 to 8.69) determined by 20 previous reference tests performed.

Table 6: Chronic *Ceriodaphnia dubia* reference toxicant test with NaCl, conducted August 4 to 10, 2020.

mg NaCl/L	Control	150	300	600	1200	2400
#alive/#exposed	10/10	10/10	10/10	10/10	10/10	0/10
% survival	100	100	100	100	100	0
Normalized reproduction ±SD	41.4 ± 5.8	38.7 ± 8.8	36.7 ± 7.9	38.9 ± 3.9	13.6 ± 5.9	0.0 ± 0.0

Normalized Reproduction:

IC_{25} (ICp Method) = 767.4 mg NaCl/L (95% C.I. 681.6 to 823.1)

Note: This is within our accepted performance range (381.1 to 1350.7) determined by 20 previous reference tests performed.

4.0 Results

4.1 *Ceriodaphnia dubia* Acute Toxicity Test

TEST: 48-hour acute with *Ceriodaphnia dubia* OPERATORS: TE, JW

Start: 8/4/20 14:45
End: 8/6/20 14:10
Test Substance: DR-2 Site water
Diluent: EPA Moderately hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 7: Summary results of *C. dubia* acute toxicity test.

Treatment % Site water	HH Recon	EPA MH Recon	10	20	40	60	80	100
#alive/#exposed	19/20	20/20	20/20	20/20	20/20	20/20	20/20	20/20
% survival	95	100	100	100	100	100	100	100
Dissolved O_2 range (mg/L)	7.0	7.2	7.1	7.1	7.1	7.1	7.0	7.1
pH range (SU)	8.2	8.2	8.1	8.1	8.1	8.2	8.2	8.2
Conductivity range (µmho/cm)	1134	317	316	307	286	290	270	265
Temperature range (°C)	21.4 21.1	21.6 21.4	21.1 20.9	21.0 21.0	20.5 20.4	20.9 20.4	21.2 21.2	21.3 20.9

Statistical Analysis:

LC_{50} (Probit) = >100% DR-2 Site water (95% C.I. unavailable)

4.2 *Ceriodaphnia dubia* Acute Toxicity Test

TEST: 48-hour acute with *Ceriodaphnia dubia* OPERATORS: AW, JMS

Start: 8/11/20 13:45
End: 8/13/20 12:50
Test Substance: DR-6 Site water
Diluent: EPA Moderately hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 8: Summary results of *C. dubia* acute toxicity test.

Treatment % Site water	HH Recon	EPA MH Recon	10	20	40	60	80	100
#alive/#exposed	17/20	18/20	17/19*	17/20	17/20	14/20	17/20	17/20
% survival	85	90	89.5	85	85	70	85	85
Dissolved O_2 range (mg/L)	7.1 6.8	7.0 6.8	7.0 6.9	7.0 6.9	7.0 6.9	7.0 6.9	7.0 6.9	7.0 7.0
pH range (SU)	8.2 8.2	8.4 8.3	8.3 8.3	8.4 8.3	8.4 8.3	8.4 8.4	8.4 8.4	8.4 8.3
Conductivity range (µmho/cm)	1254 1195	327 296	437 396	548 492	755 684	946 858	1112 1026	1281 1199
Temperature range (°C)	23.0 22.3	24.6 22.7	25.2 22.3	24.9 22.2	24.1 22.1	24.9 22.5	23.9 22.1	23.9 22.0

*Technician error, missing organism; one organism excluded from all statistical analyses.

Statistical Analysis:

LC_{50} (Probit) = >100% DR-6 Site water (95% C.I. unavailable)

4.3 *Ceriodaphnia dubia* Acute Toxicity Test

TEST: 48-hour acute with *Ceriodaphnia dubia* OPERATORS: NL, JW, CL

Start: 8/15/20 9:30
End: 8/17/20 9:30
Test Substance: DR-7 Site water
Diluent: EPA Moderately hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 9: Summary results of *C. dubia* acute toxicity test.

Treatment % Site water	HH Recon	EPA MH Recon	10	20	40	60	80	100
#alive/#exposed	20/20	20/20	20/20	20/20	20/20	20/20	20/20	20/20
% survival	100	100	100	100	100	100	100	100
Dissolved O_2 range (mg/L)	7.5 7.2	7.5 7.1	7.5 7.2	7.5 7.3	7.5 7.3	7.5 7.3	7.5 7.3	7.5 7.3
pH range (SU)	8.1 8.1	8.3 8.2	8.2 8.2	8.3 8.2	8.3 8.3	8.4 8.3	8.4 8.3	8.4 8.3
Conductivity range (µmho/cm)	1240 1206	277 269	286 284	316 301	339 330	361 355	389 387	427 427
Temperature range (°C)	18.3 18.0	19.0 18.9	19.4 19.0	19.5 19.0	19.5 19.2	19.5 19.4	19.6 19.5	19.6 19.4

Statistical Analysis:

LC_{50} (Probit) = >100% DR-7 Site water (95% C.I. unavailable)

4.4 *Ceriodaphnia dubia* Acute Toxicity Test

TEST: 48-hour acute with *Ceriodaphnia dubia* OPERATORS: TE, AW, JMS

Start: 8/18/20 10:45
End: 8/20/20 9:50
Test Substance: AC3EFF Site water
Diluent: EPA Moderately hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 10: Summary results of *C. dubia* acute toxicity test.

Treatment % Site water	HH Recon	EPA MH Recon	10	20	40	60	80	100
#alive/#exposed	20/20	20/20	20/20	20/20	20/20	20/20	20/20	20/20
% survival	100	100	100	100	100	100	100	100
Dissolved O_2 range (mg/L)	7.3 7.2	7.3 7.1	7.2 7.1	7.3 7.1	7.3 7.1	7.3 7.1	7.3 7.1	7.3 7.0
pH range (SU)	8.0 7.9	8.2 8.2	8.2 8.2	8.2 8.2	8.2 8.2	8.2 8.2	8.2 8.2	8.2 8.2
Conductivity range (µmho/cm)	1665 1180	411 292	520 381	660 480	912 652	1147 820	1361 970	1600 1127
Temperature range (°C)	20.4 19.6	21.5 19.0	21.7 19.0	21.4 19.2	20.7 19.5	20.5 18.8	21.5 19.1	21.4 18.4

Statistical Analysis:

LC_{50} (Probit) = >100% AC3EFF Site water (95% C.I. unavailable)

4.5 *Pimephales promelas* Acute Toxicity Test

TEST: 96-hour acute with *Pimephales promelas* OPERATORS: TE, JW

Start: 8/4/20 14:00
End: 8/8/20 13:40
Test Substance: DR-2 Site water
Diluent: EPA Moderately hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 11: Summary results of *P. promelas* acute toxicity test.

Treatment % Site water	HH Recon	EPA MH Recon	10	20	40	60	80	100
#alive/#exposed	39/40	39/40	39/40	38/40	37/40	39/40	39/40	37/40
% survival	97.5	97.5	97.5	95	92.5	97.5	97.5	92.5
Dissolved O_2 range (mg/L)	7.0 6.6	7.0 6.7	7.0 6.6	7.0 6.5	6.9 6.6	6.9 6.6	6.9 6.5	6.9 6.6
pH range (SU)	8.1 8.1	8.1 7.8	8.1 7.8	8.0 7.8	8.0 7.9	8.0 7.9	8.0 7.9	8.1 8.0
Conductivity range (µmho/cm)	1237 1135	305 278	288 274	286 274	273 256	264 252	251 235	241 227
Temperature range (°C)	19.8 19.0	20.0 19.2	19.7 19.3	19.6 19.5	19.4 19.0	19.4 19.2	19.8 19.4	19.8 19.4

Statistical Analysis:

LC_{50} (Probit) = >100% DR-2 Site water (95% C.I. unavailable)

4.6 *Pimephales promelas* Acute Toxicity Test

TEST: 96-hour acute with *Pimephales promelas* OPERATORS: AW, JMS

Start: 8/11/20 10:10
End: 8/15/20 11:10
Test Substance: DR-6 Site water
Diluent: EPA Moderately hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 12: Summary results of *P. promelas* acute toxicity test.

Treatment % Site water	HH Recon	EPA MH Recon	10	20	40	60	80	100
#alive/#exposed	39/40	40/40	39/40	40/40	40/40	40/40	40/40	39/40
% survival	97.5	100	97.5	100	100	100	100	97.5
Dissolved O_2 range (mg/L)	7.0 6.5	6.9 6.4	6.9 6.4	6.9 6.3	6.9 6.3	6.9 6.3	6.9 6.3	6.9 6.2
pH range (SU)	8.0 7.8	8.2 8.0	8.1 7.9	8.0 7.9	8.1 8.0	8.1 8.1	8.2 8.1	8.2 8.1
Conductivity range (µmho/cm)	1263 1194	328 298	420 411	526 501	739 705	930 882	1119 1061	1298 1219
Temperature range (°C)	20.0 19.6	20.0 19.6	19.8 19.3	19.9 19.5	20.2 19.2	19.8 19.2	20.3 19.5	19.6 19.4

Statistical Analysis:

LC_{50} (Probit) = >100% DR-6 Site water (95% C.I. unavailable)

4.7 *Pimephales promelas* Acute Toxicity Test

TEST: 96-hour acute with *Pimephales promelas* OPERATORS: AW, JMS

Start: 8/11/20 10:55
End: 8/15/20 11:35
Test Substance: DR-7 Site water
Diluent: EPA Moderately hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 13: Summary results of *P. promelas* acute toxicity test.

Treatment % Site water	HH Recon	EPA MH Recon	10	20	40	60	80	100
#alive/#exposed	40/40	40/40	40/40	40/40	40/40	40/40	39/40	38/40
% survival	100	100	100	100	100	100	97.5	95
Dissolved O_2 range (mg/L)	6.9 6.8	7.0 6.6	6.9 6.3	6.9 6.3	6.9 6.3	7.0 6.3	6.9 6.4	6.9 6.4
pH range (SU)	8.0 7.9	8.2 8.0	8.1 8.0	8.1 8.0	8.1 8.0	8.1 8.0	8.2 8.1	8.2 8.1
Conductivity range (µmho/cm)	1261 1168	313 290	312 294	319 304	353 331	378 359	411 383	437 401
Temperature range (°C)	19.7 19.2	19.8 19.1	19.5 18.7	20.1 19.0	19.4 18.8	19.7 18.9	20.0 19.4	20.4 19.6

Statistical Analysis:

LC_{50} (Probit) = >100% DR-7 Site water (95% C.I. unavailable)

4.8 *Pimephales promelas* Acute Toxicity Test

TEST: 96-hour acute with *Pimephales promelas* OPERATORS: AW, JMS, TE

Start: 8/18/20 13:45
End: 8/22/20 13:30
Test Substance: AC3EFF Site water
Diluent: EPA Moderately hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 14: Summary results of *P. promelas* acute toxicity test.

Treatment % Site water	HH Recon	EPA MH Recon	10	20	40	60	80	100
#alive/#exposed	40/40	40/40	38/40	38/40	40/40	39/40	38/40	40/40
% survival	100	100	95	95	100	97.5	95	100
Dissolved O_2 range (mg/L)	6.6 6.5	6.7 6.5	6.7 6.4	6.7 6.3	6.7 6.2	6.7 6.2	6.7 6.2	6.7 6.3
pH range (SU)	7.8 7.8	8.1 8.0	8.1 7.9	8.1 7.9	8.1 7.9	8.1 8.0	8.1 8.0	8.1 8.0
Conductivity range (µmho/cm)	1668 1182	428 298	530 380	670 483	934 668	1171 979	1382 823	1594 1126
Temperature range (°C)	22.1 19.3	21.5 19.4	22.0 19.2	22.3 19.5	22.5 19.5	22.7 19.2	22.4 19.3	22.5 19.9

Statistical Analysis:

LC_{50} (Probit) = >100% AC3EFF Site water (95% C.I. unavailable)

4.9 *Ceriodaphnia dubia* Chronic Toxicity Test

TEST: 7-day chronic with *Ceriodaphnia dubia* OPERATORS: JW, TE

Start: 8/4/20 13:25
End: 8/10/20 13:05
Test Substance: DR-2 Site water
Diluent: EPA Moderately hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 15: Summary results of *C. dubia* chronic toxicity test.

Treatment % Site water	HH Recon	EPA MH Recon	10	20	40	60	80	100
#alive/#exposed	10/10	10/10	10/10	10/10	9/10	9/10	10/10	10/10
% survival	100	100	100	100	90	90	100	100
Normalized repro / # females exposed ± SD	29.4 ± 16.0	33.6 ± 4.6	34.9 ± 8.0	37.4 ± 6.8	32.4 ± 10.5	35.7 ± 6.4	37.9 ± 9.8	38.3 ± 4.6
Dissolved O_2 range (mg/L)	7.0 / 6.7	7.1 / 6.8	7.0 / 6.7	7.0 / 6.7	7.0 / 6.7	7.1 / 6.8	7.0 / 6.7	7.1 / 6.8
pH range (SU)	8.4 / 8.3	8.3 / 8.2	8.4 / 8.3	8.4 / 8.3	8.4 / 8.3	8.4 / 8.3	8.4 / 8.3	8.5 / 8.4
Conductivity range (µmho/cm)	1340 / 1149	333 / 291	327 / 285	328 / 286	312 / 279	298 / 271	295 / 265	281 / 257
Temperature range (°C)	26.2 / 24.0	26.7 / 24.5	26.1 / 24.0	25.9 / 24.2	25.9 / 24.8	25.7 / 24.2	26.0 / 23.7	26.0 / 24.3

Statistical Analysis:

Survival:
NOEC (Fisher Exact/Bonferroni-Holm) = 100% DR-2 Site water
IC_{25} (ICp Method) = >100% DR-2 Site water (95% C.I. unavailable)

Normalized Reproduction:
NOEC (Steel Many-One Rank Sum) = 100% DR-2 Site water
IC_{25} (ICp Method) = >100% DR-2 Site water (95% C.I. unavailable)

4.10 *Ceriodaphnia dubia* Chronic Toxicity Test

TEST: 7-day chronic with *Ceriodaphnia dubia* OPERATORS: AW, JMS, JW, TE

Start: 8/11/20 11:25
End: 8/17/20 11:25
Test Substance: DR-6 Site water
Diluent: EPA Moderately hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 16: Summary results of *C. dubia* chronic toxicity test.

Treatment % Site water	HH Recon*	EPA MH Recon*	10*	20*	40*	60*	80*	100*
#alive/#exposed	8/9	9/9	9/9	9/9	9/9	9/9	8/8**	9/9
% survival	88.9	100	100	100	100	100	100	100
Normalized repro / # females exposed ± SD	28.0 ± 14.1	31.7 ± 3.6	34.6 ± 3.3	33.8 ± 8.5	34.9 ± 6.1	30.0 ± 11.8	33.4 ± 3.7	29.6 ± 3.6
Dissolved O_2 range (mg/L)	7.3 / 6.8	7.2 / 6.8	7.4 / 6.8	7.3 / 6.9	7.2 / 6.8	7.1 / 6.8	7.1 / 6.8	7.2 / 6.9
pH range (SU)	8.3 / 8.1	8.5 / 8.3	8.4 / 8.2	8.5 / 8.2	8.4 / 8.3	8.4 / 8.3	8.4 / 8.3	8.4 / 8.3
Conductivity range (µmho/cm)	1330 / 1206	322 / 302	441 / 402	554 / 507	776 / 707	991 / 885	1158 / 1056	1341 / 1227
Temperature range (°C)	26.5 / 22.8	26.0 / 22.6	26.0 / 21.8	26.3 / 22.7	26.6 / 22.3	25.8 / 21.4	25.9 / 23.0	25.2 / 21.8

* Replicate "G" excluded from all concentrations due to poor organism performance.
**Technician error, missing organism; one replicate excluded from all statistical analyses.

Statistical Analysis:

Survival:
NOEC (Fisher Exact/Bonferroni-Holm) = 100% DR-6 Site water
IC_{25} (ICp Method) = >100% DR-6 Site water (95% C.I. unavailable)

Normalized Reproduction:
NOEC (Wilcoxon/Bonferroni Adj) = 100% DR-6 Site water
IC_{25} (ICp Method) = >100% DR-6 Site water (95% C.I. unavailable)

4.11 *Ceriodaphnia dubia* Chronic Toxicity Test

TEST: 7-day chronic with *Ceriodaphnia dubia* OPERATORS: JMS, JW, AW, TE

Start: 8/11/20 11:50
End: 8/18/20 11:15
Test Substance: DR-7 Site water
Diluent: EPA Moderately hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 17: Summary results of *C. dubia* chronic toxicity test.

Treatment % Site water	HH Recon*	EPA MH Recon*	10*	20*	40*	60*	80*	100*
#alive/#exposed	8/9	9/9	9/9	7/9	9/9	9/9	9/9	9/9
% survival	88.9	100	100	77.8	100	100	100	100
Normalized repro / # females exposed ± SD	31.8 ± 12.7	29.0 ± 9.9	37.1 ± 5.6	27.9 ± 16.3	39.3 ± 6.5	39.1 ± 7.0	40.0 ± 5.8	39.7 ± 9.0
Dissolved O_2 range (mg/L)	7.1 6.8	7.0 6.8	7.0 6.8	7.0 6.8	7.1 6.8	7.1 6.7	7.1 6.8	7.1 6.8
pH range (SU)	8.3 8.1	8.5 8.3	8.5 8.3	8.5 8.4	8.5 8.4	8.5 8.4	8.5 8.5	8.6 8.5
Conductivity range (µmho/cm)	1324 1242	348 295	336 312	348 331	371 357	416 392	445 389	472 446
Temperature range (°C)	24.3 22.7	24.7 23.9	25.6 23.9	25.0 24.0	25.0 23.7	25.5 24.0	24.7 22.0	24.9 22.8

*Replicate "G" excluded from all concentrations due to poor organism performance.

Statistical Analysis:

Survival:
NOEC (Fisher Exact/Bonferroni-Holm) = 100% DR-7 Site water
IC_{25} (ICp Method) = >100% DR-7 Site water (95% C.I. unavailable)

Normalized Reproduction:
NOEC (Dunnett Multiple Comparison) = 100% DR-7 Site water
IC_{25} (ICp Method) = >100% DR-7 Site water (95% C.I. unavailable)

4.12 *Ceriodaphnia dubia* Chronic Toxicity Test

TEST: 7-day chronic with *Ceriodaphnia dubia* OPERATORS: AW, TE, CL, JMS

Start: 8/18/20 12:20
End: 8/25/20 11:20
Test Substance: AC3EFF Site water
Diluent: EPA Moderately hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 18: Summary results of *C. dubia* chronic toxicity test.

Treatment % Site water	HH Recon	EPA MH Recon	10	20	40	60	80	100
#alive/#exposed	10/10	10/10	9/10	10/10	10/10	10/10	10/10	10/10
% survival	100	100	90	100	100	100	100	100
Normalized repro / # females exposed ± SD	34.9 ± 6.9	36.7 ± 6.8	31.1 ± 8.7	34.0 ± 8.8	31.3 ± 9.3	33.0 ± 8.7	29.4 ± 10.0	27.2 ± 12.5
Dissolved O_2 range (mg/L)	7.1 / 6.6	6.9 / 6.5	6.9 / 6.6	7.0 / 6.6	6.9 / 6.7	6.9 / 6.7	6.9 / 6.7	7.0 / 6.7
pH range (SU)	8.2 / 8.1	8.4 / 8.3	8.4 / 8.3	8.4 / 8.3	8.4 / 8.3	8.4 / 8.3	8.4 / 8.3	8.4 / 8.4
Conductivity range (µmho/cm)	1749 / 1188	432 / 299	572 / 389	708 / 493	978 / 654	1219 / 826	1481 / 996	1672 / 1139
Temperature range (°C)	27.8 / 23.9	28.6 / 23.9	28.7 / 24.1	28.1 / 24.1	26.9 / 23.7	26.6 / 24.0	26.5 / 23.6	26.7 / 23.6

Statistical Analysis:

Survival:
NOEC (Fisher Exact/Bonferroni-Holm) = 100% AC3EFF Site water
IC_{25} (ICp Method) = >100% AC3EFF Site water (95% C.I. unavailable)

Normalized Reproduction:
NOEC (Steel Many-One Rank Sum) = 100% AC3EFF Site water
IC_{25} (ICp Method) based on EPA MH control = 97.1% AC3EFF Site water (95% C.I. unavailable)
IC25 (ICp Method) based on high hardness control = >100% AC3EFF Site Water (95% C.I. unavailable)

4.13 Water Chemistry Results from Samples Received for Toxicity Tests

Table 19: Wet chemistry on reconstituted water and DR-2 Site water samples for acute and chronic toxicity tests.

Measurement	HH Recon Water 004	HH Recon Water 005	MH Recon Water	100% Effluent Received 8/4/20	100% Effluent Received 8/6/20	100% Effluent Received 8/8/20
Analysis Temperature (°C)	25.0	25.0	25.0	25.0	25.0	25.0
Total Hardness (mg $CaCO_3$/L)	730	760	88	124	128	136
pH (SU)	6.8	8.3	8.2	7.7	7.9	7.9
Alkalinity (mg $CaCO_3$/L)	86	94	62	76	78	80
Conductivity (µmho/cm)	1365	1222	279	231	264	270
Total Dissolved Solids Calculated from Conductivity (mg/L)	--	--	--	113	129	132
Dissolved Oxygen (mg/L)	7.1	7.1	7.2	8.0	8.3	8.5
Ammonia as N (mg NH_3/L)	--	--	--	0.12	0.12	0.09
Un-ionized Ammonia (mg NH_3/L)	--	--	--	<0.10	<0.10	<0.10
Total Residual Chlorine (mg/L)	--	--	--	<0.02	<0.02	<0.02

Table 20: Wet chemistry on reconstituted water and DR-6 Site water samples for acute and chronic toxicity tests.

Measurement	HH Recon Water	MH Recon Water*	100% Effluent Received 8/11/20	100% Effluent Received 8/13/20	100% Effluent Received 8/15/20
Analysis Temperature (°C)	25.0	25.0	25.0	25.0	25.0
Total Hardness (mg $CaCO_3$/L)	760	94	790	770	720
pH (SU)	8.3	8.2	7.5	7.3	7.4
Alkalinity (mg $CaCO_3$/L)	94	62	130	128	130
Conductivity (µmho/cm)	1222	276	1270	1221	1365
Total Dissolved Solids Calculated from Conductivity (mg/L)	--	--	623	598	669
Dissolved Oxygen (mg/L)	7.1	7.2	7.7	7.3	7.4
Ammonia as N (mg NH_3/L)	--	--	0.09	0.04	0.09
Un-ionized Ammonia (mg NH_3/L)	--	--	<0.10	<0.10	<0.10
Total Residual Chlorine (mg/L)	--	--	<0.02	<0.02	<0.02

*Represents an average of two reconstituted waters used.

Table 21: Wet chemistry on reconstituted water and DR-7 Site water samples for acute and chronic toxicity tests.

Measurement	HH Recon Water	MH Recon Water*	100% Effluent Received 8/11/20	100% Effluent Received 8/13/20	100% Effluent Received 8/15/20
Analysis Temperature (°C)	25.0	25.0	25.0	25.0	25.0
Total Hardness (mg $CaCO_3$/L)	760	94	220	230	234
pH (SU)	8.3	8.2	7.6	7.5	7.4
Alkalinity (mg $CaCO_3$/L)	94	62	108	110	116
Conductivity (µmho/cm)	1222	276	435	416	480
Total Dissolved Solids Calculated from Conductivity (mg/L)	--	--	213	204	235
Dissolved Oxygen (mg/L)	7.1	7.2	8.0	8.0	8.6
Ammonia as N (mg NH_3/L)	--	--	0.12	0.03	0.14
Un-ionized Ammonia (mg NH_3/L)	--	--	<0.10	<0.10	<0.10
Total Residual Chlorine (mg/L)	--	--	<0.02	<0.02	<0.02

*Represents an average of two reconstituted waters used.

Table 22: Wet chemistry on reconstituted water and AC3EFF Site water samples for acute and chronic toxicity tests.

Measurement	HH Recon Water	MH Recon Water	100% Effluent Received 8/18/20	100% Effluent Received 8/20/20	100% Effluent Received 8/22/20
Analysis Temperature (°C)	25.0	25.0	25.0	25.0	25.0
Total Hardness (mg $CaCO_3$/L)	760	100	660	640	710
pH (SU)	8.3	8.2	7.3	7.2	7.2
Alkalinity (mg $CaCO_3$/L)	94	62	98	96	94
Conductivity (µmho/cm)	1222	273	1109	1648	1591
Total Dissolved Solids Calculated from Conductivity (mg/L)	--	--	543	808	779
Dissolved Oxygen (mg/L)	7.1	7.2	5.7	4.8	5.1
Ammonia as N (mg NH_3/L)	--	--	0.06	0.04	0.20
Un-ionized Ammonia (mg NH_3/L)	--	--	<0.10	<0.10	<0.10
Total Residual Chlorine (mg/L)	--	--	<0.02	<0.02	<0.02

5.0 References

Tidepool Scientific Software. 2000-2018. CETIS - Comprehensive Environmental Toxicity Information System. V1.9.5.5. McKinleyville, CA.

U.S. Environmental Protection Agency (EPA). 2002a. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. EPA-821-R-02-012. Office of Water, Washington D.C.

U.S. Environmental Protection Agency (EPA). 2002b. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. EPA-821-R-02-013. Office of Water, Washington D.C.

Appendix A

Chain-of-custody forms and laboratory bench sheets from whole effluent toxicity tests

GEI Consultants, Inc./Ecological Division
4601 DTC BLVD., SUITE L100
DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC820-1

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave, suite 2
CITY Anaconda STATE MT ZIP 59711
PHONE # (775) 443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE: TRC (mg/L)	CHLORINE: Date/Time Measured	COMMENTS:
DR-2-20200803		✓	8/3/20	1020	✓	✓			✓				2.02	8/4/20 830	

CHLORINE — Measured by: Client ☐ Lab ✓

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: ☐ COURIER: UPS ✓ FEDEX ☐ OTHER ☐	CONDITION OF SAMPLE ON RECEIPT: Good CUSTODY SEAL INTACT?: YES ✓ NO ☐ N/A ☐	RELINQUISHED BY: Bob Rader DATE/TIME: 8/3/20 @ 1406
TOTAL NUMBER OF CONTAINERS: 4	TEMPERATURE (°C): 4.0 TEMPERATURE IN RANGE (0-6°C): YES ✓ NO ☐ IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐	LABORATORY RECEIVED BY: Tamara [illegible] DATE/TIME: 8/4/20 800
COMMENTS:		

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DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC820-2

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave, Suit 2
CITY Anaconda STATE MT ZIP 59711
PHONE # (775) 443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE CERIO	ACUTE FATHEAD	ACUTE DAPHNIA	ACUTE TROUT	CHRONIC CERIO	CHRONIC FATHEAD	CHRONIC ALGAE	CHRONIC DAPHNIA	CHLORINE TRC (mg/L)	CHLORINE Date/Time Measured	COMMENTS:
DR-2_20200805		✓	8/5/20	0975					✓				<0.02	8/6/20 340	

CHLORINE: Measured by: Client [ ] Lab [ ]

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: [ ] COURIER: UPS [✓] FEDEX [ ] OTHER [ ]	CONDITION OF SAMPLE ON RECEIPT: 2.0°C CUSTODY SEAL INTACT?: YES [X] NO [ ] N/A [ ]	RELINQUISHED BY: Bob Rader [signature] DATE/TIME: 8/5/20 @ 14:00
TOTAL NUMBER OF CONTAINERS: 1	TEMPERATURE (°C): TEMPERATURE IN RANGE (0-6°C): YES [✓] NO [ ] IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES [ ] NO [ ]	LABORATORY RECEIVED BY: [signature] DATE/TIME: 8/6/20 @ 7:30
COMMENTS:		

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GEI Consultants, Inc./Ecological Division
4601 DTC BLVD., SUITE L100
DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC820-3

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave, Suite 2
CITY Anaconda STATE MT ZIP 59711
PHONE # (775) 443-7149
PROJ MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED – ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE – TRC (mg/L)	CHLORINE – Date/Time Measured	COMMENTS:
DR-2-20200807		✓	8/7/20	0910					✓				<0.002	8/8/20 820	

CHLORINE – Measured by: Client [ ] Lab [✓]

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: [ ] COURIER: UPS [✓] FEDEX [ ] OTHER [ ]	CONDITION OF SAMPLE ON RECEIPT: GOOD CUSTODY SEAL INTACT?: YES [✓] NO [ ] N/A [ ]	RELINQUISHED BY: Bob Rader Matt M. Rader DATE/TIME: 8/7/20 @ 14:00
TOTAL NUMBER OF CONTAINERS: 2	TEMPERATURE (°C): 3.0° TEMPERATURE IN RANGE (0-6°C): YES [✓] NO [ ] IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES [ ] NO [ ]	LABORATORY RECEIVED BY: Jimmy Webster DATE/TIME: 8/8/20 800
COMMENTS:		

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DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC 820 - DR6 - 1

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave, Suite 2
CITY Anaconda STATE MT ZIP 59711
PHONE # 775-443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE: TRC (mg/L)	CHLORINE: Date/Time Measured	COMMENTS
DR-6-20200810		✓	8/10/20	1015	✓	✓			✓				<0.02	8/11/20 755	

CHLORINE — Measured by: Client [ ] Lab [X]

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: [ ] COURIER: UPS [✓] FEDEX [ ] OTHER [ ]	CONDITION OF SAMPLE ON RECEIPT: Good CUSTODY SEAL INTACT?: YES [X] NO [ ] N/A [ ]	RELINQUISHED BY: Bob Rader [signature] DATE/TIME: 8/10/20 @ 1400
TOTAL NUMBER OF CONTAINERS: 4	TEMPERATURE (°C): 5.0 TEMPERATURE IN RANGE (0-6°C): YES [X] NO [ ] IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES [ ] NO [ ]	LABORATORY RECEIVED BY: [signature] DATE/TIME: 8/11/20 740
COMMENTS:		

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DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number R1C820-DR-7-1

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave, Suite 2
CITY Anaconda STATE MT ZIP 59711
PHONE # 775-443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE: TRC (mg/L)	CHLORINE: Date/Time Measured	COMMENTS:
DR-7-20200810		✓	8/10/20	1115	✓	✓			✓				<0.02	8/11/20 900	

CHLORINE — Measured by: Client [ ] Lab [X]

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: [ ] COURIER: UPS [✓] FEDEX [ ] OTHER [ ]	CONDITION OF SAMPLE ON RECEIPT: Good CUSTODY SEAL INTACT?: YES [✓] NO [ ] N/A [ ]	RELINQUISHED BY: Bob Rader Robert M. Rader DATE/TIME: 8/10/20 @ 14:00
TOTAL NUMBER OF CONTAINERS: 4	TEMPERATURE (°C): 3.0 TEMPERATURE IN RANGE (0-6°C): YES [✓] NO [ ] IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES [ ] NO [ ]	LABORATORY RECEIVED BY: Amanda Bin DATE/TIME: 8/11/20 740
COMMENTS:		

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DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC 820B- DR-7-3

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave, Suite 2
CITY Anaconda STATE MT ZIP 59701
PHONE # (775) 443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED – ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE – TRC (mg/L)	CHLORINE – Date/Time Measured	COMMENTS:
DR-7-20200814		✓	8/14/20	0830					✓				<0.02	8/15/20 900	

CHLORINE – Measured by: Client ☐ Lab ☒

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: ☐ COURIER: UPS ✓ FEDEX OTHER	CONDITION OF SAMPLE ON RECEIPT: Good CUSTODY SEAL INTACT?: YES ✓ NO ☐ N/A ☐	RELINQUISHED BY: Bob Rader [signature] DATE/TIME: 8/14/20 @ 14:00
TOTAL NUMBER OF CONTAINERS: 2	TEMPERATURE (°C): 1.0 TEMPERATURE IN RANGE (0-6°C): YES ✓ NO ☐ IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐	LABORATORY RECEIVED BY: [signature] DATE/TIME: 8/15/20 810
COMMENTS:		

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BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC 820-DR-6/7 - 2

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave, Suite 2
CITY Anaconda STATE MT ZIP 59711
PHONE # 775-443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE CERIO	ACUTE FATHEAD	ACUTE DAPHNIA	ACUTE TROUT	CHRONIC CERIO	CHRONIC FATHEAD	CHRONIC ALGAE	CHRONIC DAPHNIA	CHLORINE TRC (mg/L)	CHLORINE Date/Time Measured	COMMENTS
DR-6_20200812		✓	8/12/20	0945					✓						
DR-7_20200812		✓	8/12/20	1015					✓				<0.02	8/13/20 830	
													<0.02	8/13/20 855	

Measured by: Client [ ] Lab [X]

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: [ ] COURIER: UPS [X] FEDEX [ ] OTHER [ ]	CONDITION OF SAMPLE ON RECEIPT: Good CUSTODY SEAL INTACT?: YES [X] NO [ ] N/A [ ]	RELINQUISHED BY: Bob Rader [signature] DATE/TIME: 08/12/20 @ 14:00
TOTAL NUMBER OF CONTAINERS: 2	TEMPERATURE (°C): 1.0 TEMPERATURE IN RANGE (0-6°C): YES [X] NO [ ] IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES [ ] NO [ ]	LABORATORY RECEIVED BY: [signature] DATE/TIME: 8/13/20 755
COMMENTS:		

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BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC820B - DR-6 - 3

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave, Suite 2
CITY Anaconda STATE MT ZIP 59711
PHONE # 775-443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Mackenzie Turrin

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE: TRC (mg/L)	CHLORINE: Date/Time Measured	COMMENTS:
DR-6-20200814		✓	8/14/20	8:00					✓				<0.02	8/15/20 850	

CHLORINE — Measured by: Client ☐ Lab ☒

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: ☐ COURIER: UPS ✓ FEDEX ☐ OTHER ☐	CONDITION OF SAMPLE ON RECEIPT: Good CUSTODY SEAL INTACT?: YES ☒ NO ☐ N/A ☐	RELINQUISHED BY: Mackenzie Turrin DATE/TIME: 8/14/20 1400
TOTAL NUMBER OF CONTAINERS: 2	TEMPERATURE (°C): 2.0 TEMPERATURE IN RANGE (0-6°C): YES ☒ NO ☐ IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐	LABORATORY RECEIVED BY: [signature] DATE/TIME: 8/15/20 810
COMMENTS:		

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DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number R1C820C - AC3EFF - 1

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave, Suite 2
CITY Anaconda STATE MT ZIP 59711
PHONE # 775-443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Mackenzie Turrin

TESTS REQUIRED

					ACUTE				CHRONIC				**CHLORINE** Measured by: Client ☐ Lab ☒	
SAMPLE TYPE/SITE	**Composite**	**Grab**	**Date Collected**	**Time Collected**	CERIO	FATHEAD	DAPHNIA	TROUT	CERIO	FATHEAD	ALGAE	DAPHNIA	TRC (mg/L)	Date/Time Measured	COMMENTS:
AC3EFF081720		✓	8/17/20	1020	✓	✓			✓				<0.02	8/18/20 745	

PROJECT INFORMATION	**LABORATORY RECEIVING INFORMATION**	**CLIENT**
CLIENT DROP OFF: ☐ COURIER: UPS ☒ FEDEX ☐ OTHER ☐	CONDITION OF SAMPLE ON RECEIPT: Good CUSTODY SEAL INTACT?: YES ☒ NO ☐ N/A ☐	RELINQUISHED BY: Mackenzie Turrin DATE/TIME: 8/17/2020 @ 1400
TOTAL NUMBER OF CONTAINERS: ~~4~~ 2 MT 8/17/20	TEMPERATURE (°C): 1.0 TEMPERATURE IN RANGE (0-6°C): YES ☒ NO ☐ IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐	**LABORATORY** RECEIVED BY: Tamer Eli DATE/TIME: 8/18/20 740
COMMENTS:		

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DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number R1C820C-AC3EFF-1

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave, Suite 2
CITY Anaconda STATE MT ZIP 59711
PHONE # 775-443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Mackenzie Turrin

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED – ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE – TRC (mg/L)	CHLORINE – Date/Time Measured	COMMENTS
AC3EFF081720		✓	8/17/20	1020	✓	✓			✓				<0.02	8/18/20 755	

CHLORINE – Measured by: Client [ ] Lab [X]

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: [ ] COURIER: UPS [X] FEDEX [ ] OTHER [ ]	CONDITION OF SAMPLE ON RECEIPT: Good CUSTODY SEAL INTACT?: YES [X] NO [ ] N/A [ ]	RELINQUISHED BY: Mackenzie Turrin DATE/TIME: 8/17/2020 @ 1400
TOTAL NUMBER OF CONTAINERS: ~~4~~ 2 MT 8/17/20	TEMPERATURE (°C): 4.0 TEMPERATURE IN RANGE (0-6°C): YES [X] NO [ ] IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES [ ] NO [ ]	LABORATORY RECEIVED BY: Tammie Lui DATE/TIME: 8/18/20 740
COMMENTS:		

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4601 DTC BLVD., SUITE L100
DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC 820 C-AC3EFF-2

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park, Suite 2
CITY Anaconda STATE MT ZIP 59711
PHONE # 775-413-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE TRC (mg/L)	CHLORINE Date/Time Measured	COMMENTS:
AC3EFF081920		✓	8/19/20	1005	✓								<0.02	8/20/20 755	

CHLORINE — Measured by: Client ☐ Lab ☒

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: ☐ COURIER: UPS ✓ FEDEX ☐ OTHER ☐	CONDITION OF SAMPLE ON RECEIPT: Good CUSTODY SEAL INTACT?: YES ☒ NO ☐ N/A ☐	RELINQUISHED BY: Bob Rader [signature] DATE/TIME: 8/19/20 @ 1400
TOTAL NUMBER OF CONTAINERS: 1	TEMPERATURE (°C): 1.0 TEMPERATURE IN RANGE (0-6°C): YES ☒ NO ☐ IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐	LABORATORY RECEIVED BY: [signature] DATE/TIME: 8/20/20 730
COMMENTS:		

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GEI Consultants, Inc./Ecological Division
4601 DTC BLVD., SUITE L100
DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC82IL-AC3EFF-3

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave, Suite 2
CITY Anaconda STATE MT ZIP 59711
PHONE # 775-443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE CERIO	ACUTE FATHEAD	ACUTE DAPHNIA	ACUTE TROUT	CHRONIC CERIO	CHRONIC FATHEAD	CHRONIC ALGAE	CHRONIC DAPHNIA	CHLORINE TRC (mg/L)	CHLORINE Date/Time Measured	COMMENTS
AC3EFF082120		✓	8/21/20	0905	✓								<0.02	8/22/20 830	

CHLORINE: Measured by: Client ☐ Lab ✓

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: ☐ COURIER: UPS ✓ FEDEX ☐ OTHER ☐	CONDITION OF SAMPLE ON RECEIPT: GOOD CUSTODY SEAL INTACT?: YES ✓ NO ☐ N/A ☐	RELINQUISHED BY: Bob Rader [signature] DATE/TIME: 8/21/20 @ 1400
TOTAL NUMBER OF CONTAINERS: 2	TEMPERATURE (°C): 3.0 TEMPERATURE IN RANGE (0-6°C): YES ✓ NO IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐	LABORATORY RECEIVED BY: JIMMY WEBSTER DATE/TIME: 8/22/20 825
COMMENTS:		

Updated 2019

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

RIC820-DR-2

ORGANISM HISTORY

DATE: 8/3/2020

SPECIES: *Pimephales promelas*

AGE: 6 day

LIFE STAGE: Larvae

HATCH DATE: 7/28/2020

BEGAN FEEDING: 7/29/2020

FOOD: *Artemia* sp.

Water Chemistry Record:	**Current**	**Range**
TEMPERATURE:	24°C	--
SALINITY/CONDUCTIVITY:	--	--
TOTAL HARDNESS (as $CaCO_3$):	132 mg/l	--
TOTAL ALKALINITY (as $CaCO_3$):	85 mg/l	--
pH:	7.75	--

Comments:

Facility Supervisor

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

RIC820-DR-6

ORGANISM HISTORY

DATE: 8/10/2020

SPECIES: *Pimephales promelas*

AGE: 6 day

LIFE STAGE: Larvae

HATCH DATE: 8/4/2020

BEGAN FEEDING: 8/5/2020

FOOD: *Artemia* sp.

Water Chemistry Record:	**Current**	**Range**
TEMPERATURE:	24°C	22-26°C
SALINITY/CONDUCTIVITY:	--	--
TOTAL HARDNESS (as $CaCO_3$):	132 mg/l	88-134 mg/l
TOTAL ALKALINITY (as $CaCO_3$):	85 mg/l	85-135 mg/l
pH:	7.75	7.49-8.21

Comments:

Facility Supervisor

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

RIC820-DR-7

ORGANISM HISTORY

DATE: 8/10/2020

SPECIES: *Pimephales promelas*

AGE: 6 day

LIFE STAGE: Larvae

HATCH DATE: 8/4/2020

BEGAN FEEDING: 8/5/2020

FOOD: *Artemia* sp.

Water Chemistry Record:	**Current**	**Range**
TEMPERATURE:	24°C	22-26°C
SALINITY/CONDUCTIVITY:	--	--
TOTAL HARDNESS (as $CaCO_3$):	132 mg/l	88-134 mg/l
TOTAL ALKALINITY (as $CaCO_3$):	85 mg/l	85-135 mg/l
pH:	7.75	7.49-8.21

Comments:

Facility Supervisor

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

RIC 820-AC3EFF

ORGANISM HISTORY

DATE: 8/17/2020

SPECIES: *Pimephales promelas*

AGE: 6 day

LIFE STAGE: Larvae

HATCH DATE: 8/11/2020

BEGAN FEEDING: 8/12/2020

FOOD: *Artemia* sp.

Water Chemistry Record:	**Current**	**Range**
TEMPERATURE:	23°C	--
SALINITY/CONDUCTIVITY:	--	--
TOTAL HARDNESS (as $CaCO_3$):	125mg/l	--
TOTAL ALKALINITY (as $CaCO_3$):	85 mg/l	--
pH:	7.66	--

Comments:

Facility Supervisor

RECONSTITUTED SYNTHETIC LABORATORY WATER CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC 820- DR2

Test Substance: DR-2

Analyst: TE

What test/s will samples be used in? AC C/F + ChC

Test/s Start Date: 5/14/20

BATCH #	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µS)
EPAMH163	25.0	88	8.2	62	7.2	279
H004	25.0	730	6.8	86	7.1	1365
TE ~~H~~H005	25.0	760	TE 8.~~8~~3	94	7.1	1222
AVERAGE VALUE (H)	25.0	745	7.6	90	7.1	1294

COMMENTS:

Data Checked and Approved by Laboratory Manager (Intials): AB

RECONSTITUTED SYNTHETIC LABORATORY WATER CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC 8208-DR-6

Test Substance: DR-6

Analyst: TE

What test/s will samples be used in? Ch C Ac C/F

Test/s Start Date: 8/11/20

BATCH #	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µS)
EPA MH 163	25.0	88	8.2	62	7.2	279
EPA MH 174	25.0	100	8.2	TE 62 ~~68~~	7.2	TE 273 ~~303~~
HH005	25.0	760	8.3	94	7.1	1222
AVERAGE VALUE (EPA MH)	25.0	94	8.2	62	7.2	276

COMMENTS:

Data Checked and Approved by Laboratory Manager (Intials): AR

RECONSTITUTED SYNTHETIC LABORATORY WATER CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC 820B DR-7

Test Substance: DR-7

Analyst: TE

What test/s will samples be used in? Ch C Ac C/F

Test/s Start Date: 8/11/20

BATCH #	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µS)
EPA MH 163	25.0	88	8.2	62	7.2	279
EPA MH 174	25.0	100	8.2	62	7.2	273
HH005	25.0	760	8.3	94	7.1	1222
AVERAGE VALUE (EPA MH)	25.0	94	8.2	62	7.2	276

COMMENTS:

Data Checked and Approved by Laboratory Manager (Intials): AR

RECONSTITUTED SYNTHETIC LABORATORY WATER CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC~~8201~~-AC3EFF

Test Substance: AC3EFF

Analyst: AW

What test/s will samples be used in? Ac C/F Chc

Test/s Start Date: 8/18/20

BATCH #	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µS)
EPA MH 174	25.0	100	8.2	62	7.2	273
~~MH154~~ TE						
~~MH155~~ TE						
~~MH175~~ TE						
HH005	25.0	760	8.3	94	7.1	1222
AVERAGE VALUE	N/A	N/A	N/A	N/A	N/A	N/A

COMMENTS:

Data Checked and Approved by Laboratory Manager (Intials): AK

INITIAL CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC 820 - DR-2

Samples Received: Date/Time 8/4/20 800

Test Substance: DR-2

What test/s will samples be used in? Ac/F + Ch c

Dilution Water: (lab water) or receiving water

SAMPLE TYPE LOG NUMBER DATE COLLECTED	DATE/TIME ANALYZED	DATES USED	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µs)	TDS CALCULATED FROM COND. (mg/L)	TRC (mg/L)	AMMONIA AS N (mg/L)	METER USED	ANALYST
Effluent RIC820-1 8/3/20	8/4/20 1020	8/4/20 – 8/5/20	25.0	6.2 / 124	7.7	3.8 / 76	8.0	231	113	<0.02	0.12	1	TE
Effluent RICO 820-2 8/5/20	8/6/20 1105	8/6/20 – 8/7/20	25.0	6.4 / 128	7.9	3.9 / 78	8.3	264	129	<0.02	0.12	1	JW
Effluent RICO 820-3 8/7/20	8/8/20 855	8/8/20 – 8/9/20	25.0	6.8 / 136	7.9	4.0 / 80	8.5	270	132	<0.02	0.09	1	TE
Average			25.0	129	7.8	78	8.3	255	125	<0.02	0.11		

Site Daily Measurements	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7					
pH/initials	7.7/TE	8.0/JW	7.9/JW	7.8/JW	7.9/TE	7.8/JW	7.7/TE						
pH/initials													
pH/initials													
pH/initials													
pH/initials													

COMMENTS:

Samples stored in refrigerator: N

Data Checked and Approved by Laboratory Manager (Initials): AR

INITIAL CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC 8208-DR-6

Samples Received: Date/Time 8/11/20 740

Test Substance: DR-6

What test/s will samples be used in? AcC/FH, Ch C Dilution Water: lab water or receiving water

SAMPLE TYPE LOG NUMBER DATE COLLECTED	DATE/TIME ANALYZED	DATES USED	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µs)	TDS CALCULATED FROM COND. (mg/L)	TRC (mg/L)	AMMONIA AS N (mg/L)	METER USED	ANALYST
Effluent RIC820-DR6-1 8/10/20	8/11/20 830	8/11/20 – 8/12/20	25.0	7.7x100 / 770	7.5	6.5 / 130	7.7	1270	623	<0.02	0.09	1	JMS
Effluent RIC820-DR-6-2 8/12/20	8/13/20 1355	8/13/20 – 8/14/20	25.0	7.7x100 / 770	7.3	6.4 / 128	7.3	1221	598	<0.02	0.04	1	KG
Effluent RIC820-DR-6-3 8/14/20	8/15/20 420	8/15/20 – 8/16/20	25.0	7.2x100 / 720	7.4	6.5 / 130	7.4	1365	669	<0.02	0.09	1	JMS
Average			25.0	760	7.4	129	7.5	1285	630	<0.02	0.07		

Site Daily Measurements	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7					
pH/initials	7.5/JMS	7.6/AW	7.3/KG	7.4/JMS	7.4/JMS	8.0/AW	7.6/AW						
pH/initials													
pH/initials													
pH/initials													
pH/initials													

COMMENTS:

Samples stored in refrigerator: N

Data Checked and Approved by Laboratory Manager (Initials): AR

INITIAL CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC820B-DR-7

Samples Received: Date/Time 8/11/20 740

Test Substance: DR-7

What test/s will samples be used in? Ac C/F ChC

Dilution Water: lab water or receiving water

SAMPLE TYPE LOG NUMBER DATE COLLECTED	DATE/TIME ANALYZED	DATES USED	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µs)	TDS CALCULATED FROM COND. (mg/L)	TRC (mg/L)	AMMONIA AS N (mg/L)	METER USED	ANALYST
Effluent RIC820-DR-7-1 8/10/20	8/11/20 950	8/11/20 – 8/12/20	25.0	11.0 / 220	7.6	5.4 / 108	8.0	435	213	<0.02	0.12	1	AW
Effluent RIC820-DR-7-2 8/12/20	8/13/20 1335	8/13/20 – 8/14/20	25.0	11.5 / 230	7.5	5.5 / 110	8.0	416	204	<0.02	0.03	1	KG
Effluent RIC820-DR-7-3 8/14/20	8/15/20 930	8/15/20 – 8/17/20	25.0	11.7 / 234	7.4	5.8 / 116	8.6	480	235	<0.02	0.14	1	JMS
Average			25.0	228	7.5	111	8.2	444	217	<0.02	0.10		

Site

Daily Measurements	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7					
pH/initials	7.6/AW	7.6/JMS	7.5/KG	7.6/AW	7.4/JMS	7.5/KW	7.4/AW						
pH/initials													
pH/initials													
pH/initials													
pH/initials													

COMMENTS:

Samples stored in refrigerator: N

Data Checked and Approved by Laboratory Manager (Initials): AR

INITIAL CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC820C- AC3EFF

Samples Received: Date/Time 8/18/20 740

Test Substance: AC3EFF

What test/s will samples be used in? Ac C/F Ch C

Dilution Water: lab water or receiving water

SAMPLE TYPE LOG NUMBER DATE COLLECTED	DATE/TIME ANALYZED	DATES USED	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µs)	TDS CALCULATED FROM COND. (mg/L)	TRC (mg/L)	AMMONIA AS N (mg/L)	METER USED	ANALYST
Effluent RIC820C-AC3EFF-1 8/17/20	8/18/20 950	8/18/20 8/19/20	25.0	6.6x100 / 660	7.3	4.9 / 98	5.7	1109	543	<0.02	0.06	1	TE
Effluent RIC820C-AC3EFF-2 8/19/20	8/20/20 830	8/20/20 8/21/20	25.0	6.4x100 / 640	7.2	4.8 / 96	4.8	1648	808	<0.02	0.04	1	JMS
Effluent RIC820C-AC3EFF-3 8/21/20	8/22/20 910	8/22/20 8/24/20	25.0	7.1x100 / 710	7.2	4.7 / 94	5.1	1591	779	<0.02	0.20	1	TE
									710				
Average			25.0	670	7.2	96	5.2	1449	~~1611~~ AR	<0.02	0.10		

Site Daily Measurements	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7					
pH/initials	7.3/TE	7.8/AW	7.2/JMS	7.2/JMS	7.2/TE	7.2/TE	7.6/LL						
pH/initials													
pH/initials													
pH/initials													
pH/initials													

COMMENTS:

Samples stored in refrigerator: N

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/4/20

FINISH Date: 8/6/20

Dilution Water: EPA MH Recon

Test Substance: DR-2

Client/Project: Rico/RIC 820-DR-2

Organism: C. dubia

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	~~7.2~~ 7.0 (MW)	*			
	Cond. (µS)	~~31~~ 1134 (MW)	*			
	pH	8.2	*			
	Temp. (°C)	21.1	21.4			
0	DO (mg//L)	7.2	*			
	Cond. (µS)	317	*			
	pH	8.2	*			
	Temp. (°C)	21.4	21.6			
10	DO (mg//L)	7.1	*			
	Cond. (µS)	316	*			
	pH	8.1	*			
	Temp. (°C)	20.9	21.1			
20	DO (mg//L)	7.1	*			
	Cond. (µS)	307	*			
	pH	8.1	*			
	Temp. (°C)	21.0	21.0			
40	DO (mg//L)	7.1	*			
	Cond. (µS)	286	*			
	pH	8.1	*			
	Temp. (°C)	20.4	20.5			
60	DO (mg//L)	7.1	*			
	Cond. (µS)	290	*			
	pH	8.2	*			
	Temp. (°C)	20.9	20.4			
80	DO (mg//L)	7.0	*			
	Cond. (µS)	270	*			
	pH	8.2	*			
	Temp. (°C)	21.2	21.2			
Incubator Temperature (°C)		21.5	*			Max: 21.6
Analyst		JW	*			Min: 20.4
Time Analyzed		1450	*			Range: 1.2
Environmental Chamber		S	S			Mean: 21.0 ± 0.6
Meter Number		1	*			

* - Tech Error - Not Recorded (MW)

Data Checked and Approved by Laboratory Manager (Initials): AM

ACUTE TOXICITY CHEMISTRY BENCH SHEET

Page 2/2

START Date: 8/4/20

FINISH Date: 8/6/20

Dilution Water: EPA MH Recon

Test Substance: DR-2

Client/Project: Rico/RIC 820-DR-2

Organism: C. dubia

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
100	DO (mg//L)	7.1	★			
	Cond. (µS)	265	★			
	pH	8.2	★			
	Temp. (°C)	21.3	20.9			
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					

Incubator Temperature (°C)	21.5	★			Max: 21.6
Analyst	JW	★			Min: 20.4
Time Analyzed	1450	★			Range: 1.2
Environmental Chamber	S	S			Mean: 21.0 ± 0.6
Meter Number	1	★			

★-Tech Error - Not Recorded (JW)

Data Checked and Approved by Laboratory Manager (Initials): AL

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/11/20

FINISH Date: 8/13/20

Dilution Water: EPA MH Recon

Test Substance: DR-6

Client/Project: Rico/RIC ~~8208~~-DR-6

Organism: C. dubia

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	7.1	6.8	~~6.8~~		
	Cond. (µS)	1195	1254	~~1199~~		
	pH	8.2	8.2			
	Temp. (°C)	~~26.5~~ 23.0	22.3			
0	DO (mg//L)	7.0	6.8	~~6.8~~		
	Cond. (µS)	296	327	~~298~~		
	pH	8.3	8.4			
	Temp. (°C)	~~26.0~~ 24.6	22.7			
10	DO (mg//L)	7.0	6.9	~~6.8~~		
	Cond. (µS)	396	437	~~411~~		
	pH	8.3	8.3			
	Temp. (°C)	~~26.0~~ 25.2	22.3			
20	DO (mg//L)	7.0	6.9	~~6.8~~		
	Cond. (µS)	492	548			
	pH	8.3	8.4			
	Temp. (°C)	~~26.3~~ 24.9	22.2			
40	DO (mg//L)	7.0	6.9			
	Cond. (µS)	684	755			
	pH	8.3	8.4			
	Temp. (°C)	~~26.0~~ 24.1	22.1			
60	DO (mg//L)	7.0	6.9			
	Cond. (µS)	858	946			
	pH	8.4	8.4			
	Temp. (°C)	~~25.9~~ 24.9	22.5			
80	DO (mg//L)	7.0	6.9			
	Cond. (µS)	1026	1112			
	pH	8.4	8.4			
	Temp. (°C)	~~25.9~~ 23.9	22.1			
Incubator Temperature (°C)		20.0	20.0	~~20.0~~		Max: 25.2
Analyst		AW	AW	~~[illegible]~~		Min: 22.0
Time Analyzed		1605	1125			Range: 3.2
Environmental Chamber		~~[illegible]~~ 4	4	~~4~~		Mean: 23.6 ± 1.6
Meter Number		1	1	~~1~~		

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

Page 2/2

START Date: 8/11/20

FINISH Date: 8/13/20

Dilution Water: EPA MH Recon

Test Substance: DR-6

Client/Project: Rico/RIC 8208-DR-6

Organism: C. dubia

Test Concentration	Chemical Parameter	Day of Test				COMMENTS
		1	2	3	4	
100	DO (mg//L)	7.0	7.0			
	Cond. (µS)	1199	1281			
	pH	8.4	8.3			
	Temp. (°C)	~~25.2~~ AW 23.9	22.0			
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
Incubator Temperature (°C)		20.0	20.0			Max: 25.2
Analyst		AW	AW			Min: 22.0
Time Analyzed		1605	1125			Range: 3.2
Environmental Chamber		U	U			Mean: 23.6±1.6
Meter Number		1	1			

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/15/20

FINISH Date: 8/17/20

Dilution Water: EPA MH Recon

Test Substance: DR-7 (#2)

Client/Project: Rico/RIC820B-DR-7 (#2)

Organism: *C. dubia*

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	7.2	7.5			
	Cond. (µS)	1240	1206			
	pH	8.1	8.1			
	Temp. (°C)	18.3	18.0			
0	DO (mg//L)	7.1	7.5			
	Cond. (µS)	269	277			
	pH	8.2	8.3			
	Temp. (°C)	18.9	19.0			
10	DO (mg//L)	7.2	7.5			
	Cond. (µS)	286	284			
	pH	8.2	8.2			
	Temp. (°C)	19.0	19.4			
20	DO (mg//L)	7.3	7.5			
	Cond. (µS)	316	301			
	pH	8.2	8.3			
	Temp. (°C)	19.0	19.5			
40	DO (mg//L)	7.3	7.5			
	Cond. (µS)	339	330			
	pH	8.23 AW	8.3			
	Temp. (°C)	19.2	19.5			
60	DO (mg//L)	7.3	7.5			
	Cond. (µS)	361	355			
	pH	8.3	8.4			
	Temp. (°C)	19.4	19.5			
80	DO (mg//L)	7.3	7.5			
	Cond. (µS)	389	387			
	pH	8.3	8.4			
	Temp. (°C)	19.5	19.6			
Incubator Temperature (°C)		19.5	19.5			Max: 19.6
Analyst		AW	"			Min: 18.0
Time Analyzed		1110	940			Range: 1.6
Environmental Chamber		Q	Q			Mean: 18.8 ± 0.8
Meter Number		1	1			

Data Checked and Approved by Laboratory Manager (Initials): AN

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/15/20

FINISH Date: 8/17/20

Dilution Water: EPA MH Recon

Test Substance: DR-7 (#2)

Client/Project: Rico/RIC820B-DR-7 (#2)

Organism: *C. dubia*

Test Concentration	Chemical Parameter	Day of Test				COMMENTS
		1	2	3	4	
100	DO (mg//L)	7.3	7.5			
	Cond. (µS)	427	427			
	pH	8.3	8.4			
	Temp. (°C)	19.4	19.6			
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
Incubator Temperature (°C)		19.5	19.5			Max: 19.6
Analyst		AW	cc			Min: 18.0
Time Analyzed		1110	940			Range: 1.6
Environmental Chamber		Q	Q			Mean: 18.8 ± 0.8
Meter Number		1	1			

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/18/20

FINISH Date: 8/20/20

Dilution Water: EPA MH Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC~~520~~c-AC3EFF

Organism: C. dubia

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	7.3	7.2			
	Cond. (µS)	1180	1665			
	pH	8.0	7.9			
	Temp. (°C)	19.6	20.4			
0	DO (mg//L)	7.3	7.1			
	Cond. (µS)	292	411			
	pH	8.2	8.2			
	Temp. (°C)	19.0	21.5			
10	DO (mg//L)	7.2	7.1			
	Cond. (µS)	381	520			
	pH	8.2	8.2			
	Temp. (°C)	19.0	21.7			
20	DO (mg//L)	7.3	7.1			
	Cond. (µS)	480	660			
	pH	8.2	8.2			
	Temp. (°C)	19.2	21.4			
40	DO (mg//L)	7.3	7.1			
	Cond. (µS)	652	912			
	pH	8.2	8.2			
	Temp. (°C)	19.5	20.7			
60	DO (mg//L)	7.3	7.1			
	Cond. (µS)	820	1147			
	pH	8.2	8.2			
	Temp. (°C)	18.8	20.5			
80	DO (mg//L)	7.3	7.1			
	Cond. (µS)	970	1361			
	pH	8.2	8.2			
	Temp. (°C)	19.1	21.5			
Incubator Temperature (°C)		19.5	20.0			Max: 21.7
Analyst		AW	JMS			Min: 18.4
Time Analyzed		1025	1030			Range: 3.3
Environmental Chamber		Q	U			Mean: 20.1 ± 1.7
Meter Number		1	1			

Data Checked and Approved by Laboratory Manager (Initials): AK

Page 2/2

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/18/20

FINISH Date: 8/20/20

Dilution Water: EPA MH Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC8206-AC3EFF

Organism: C. dubia

Test Concentration	Chemical Parameter	Day of Test				COMMENTS
		1	2	3	4	
100	DO (mg//L)	7.3	7.0			
	Cond. (µS)	1127	1600			
	pH	8.2	8.2			
	Temp. (°C)	18.4	21.4			
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
Incubator Temperature (°C)		19.5	20.0			Max: 21.7
Analyst		AW	JMS			Min: 18.4
Time Analyzed		1025	1030			Range: 3.3
Environmental Chamber		Q	U			Mean: 20.1 ± 1.7
Meter Number		1	1			

Data Checked and Approved by Laboratory Manager (Initials): AL

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/4/20

FINISH Date: 8/8/20

Dilution Water: EPA MH Recon

Test Substance: DR-2

Client/Project: Rico/RIC 820-DR-2

Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	6.9	6.6	6.8	7.0	
	Cond. (µS)	~~2912~~ 1135	1229	1205	1237	
	pH	8.1	8.1	8.1	8.1	
	Temp. (°C)	19.3	19.0	19.5	19.8	
0	DO (mg//L)	6.9	6.7	6.9	7.0	
	Cond. (µS)	291	284	278	305	
	pH	7.9	7.8	8.0	8.1	
	Temp. (°C)	20.0	19.2	19.5	19.4	
10	DO (mg//L)	6.9	6.6	6.8	7.0	
	Cond. (µS)	288	281	274	280	
	pH	8.0	7.8	8.0	8.1	
	Temp. (°C)	19.5	19.3	19.7	19.7	
20	DO (mg//L)	6.9	6.5	6.9	7.0	
	Cond. (µS)	286	276	274	274	
	pH	8.0	7.8	8.0	8.0	
	Temp. (°C)	19.5	19.5	19.5	19.6	
40	DO (mg//L)	6.9	6.6	6.9	6.9	
	Cond. (µS)	273	268	256	259	
	pH	8.0	7.9	8.0	8.0	
	Temp. (°C)	19.3	19.0	19.2	19.4	
60	DO (mg//L)	6.9	6.6	6.9	6.9	
	Cond. (µS)	264	259	252	256	
	pH	8.0	7.9	8.0	8.0	
	Temp. (°C)	19.2	19.2	19.2	19.4	
80	DO (mg//L)	6.9	6.5	6.9	6.9	
	Cond. (µS)	251	244	235	243	
	pH	8.0	7.9	8.0	8.0	
	Temp. (°C)	19.8	19.5	19.4	19.5	
Incubator Temperature (°C)		20.0	20.5	20.5	21.5	Max: 20.0
Analyst		MW	MW	MW	TE	Min: 19.0
Time Analyzed		1125	1305	1430	1335	Range: 1.0
Environmental Chamber		U	U	U	U	Mean: ~~0.5~~ AR 19.5 ± 0.5
Meter Number		1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

Page 2/2

START Date: 8/14/20

FINISH Date: 8/18/20

Dilution Water: EPA MH Recon

Test Substance: DR-2

Client/Project: Rico/RIC 820 - DR-2

Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test				COMMENTS
		1	2	3	4	
100	DO (mg//L)	6.9	6.6	6.9	6.9	
	Cond. (µS)	241	234	227	237	
	pH	8.1	8.0	8.1	8.1	
	Temp. (°C)	19.8	19.5	19.8	19.4	
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					

Incubator Temperature (°C)	20.0	20.5	20.5	21.5	Max: 20.0
Analyst	JW	JW	JW	TE	Min: 19.0
Time Analyzed	1125	1305	1430	1335	Range: 1.0
Environmental Chamber	U	U	U	U	Mean: ~~0.5~~ 19.5 ± 0.5 AN
Meter Number	1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AN

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/11/20

FINISH Date: 8/15/20

Dilution Water: EPA MH Recon

Test Substance: DR-6

Client/Project: Rico/RIC 8208DR-6

Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	6.6	6.5	6.8	7.0	
	Cond. (µS)	1212	1194	1199	1263	
	pH	7.9	7.9	7.8	8.0	
	Temp. (°C)	20.0	19.9	19.6	20.0	
0	DO (mg//L)	6.6	6.4	6.8	6.9	
	Cond. (µS)	328	7 AW 300	298	298	
	pH	8.0	8.0	8.0	8.2	
	Temp. (°C)	19.9	19.8	19.6	20.0	
10	DO (mg//L)	6.6	6.4	6.8	6.9	
	Cond. (µS)	416	412	411	420	
	pH	8.0	7.9	8.0	8.1	
	Temp. (°C)	19.5	19.3	19.7	19.8	
20	DO (mg//L)	6.5	6.3	6.8	6.9	
	Cond. (µS)	511	510	501	526	
	pH	8.0	7.9	8.0	8.0	
	Temp. (°C)	19.9	19.5	19.5	19.9	
40	DO (mg//L)	6.5	6.3	6.8	6.9	
	Cond. (µS)	713	710	705	739	
	pH	8.1	8.0	8.1	8.0	
	Temp. (°C)	20.2	19.7	19.2	19.9	
60	DO (mg//L)	6.5	6.3	6.8	6.9	
	Cond. (µS)	895	892	882	930	
	pH	8.1	8.1	8.1	8.1	
	Temp. (°C)	19.7	19.5	19.2	19.8	
80	DO (mg//L)	6.6	6.3	6.8	6.9	
	Cond. (µS)	1070	1061	1065	1119	
	pH	8.1	8.1	8.2	8.1	
	Temp. (°C)	19.6	19.5	20.3	19.5	
Incubator Temperature (°C)		20.0	20.0	20.0	20.0	Max: 20.3
Analyst		AW	AW	JMS	JMS	Min: 19.2
Time Analyzed		1245	1150	1445	1200	Range: 1.1
Environmental Chamber		4	4	4	4	Mean: 19.8 ± 0.6
Meter Number		1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

Page 2/2

START Date: 8/11/20

FINISH Date: 8/15/20

Dilution Water: EPA MH Recon

Test Substance: DR-6

Client/Project: Rico/RIC 8208-DR-6

Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test				COMMENTS
		1	2	3	4	
100	DO (mg//L)	6.7	6.2	6.8	6.9	
	Cond. (µS)	1232	1223	1219	1248	
	pH	8.2	8.1	8.2	8.2	
	Temp. (°C)	19.4	19.5	19.6	19.4	
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					

Incubator Temperature (°C)	20.0	20.0	20.0	20.0	Max: 20.3
Analyst	AW	AW	JMS	JMS	Min: 19.2
Time Analyzed	1245	1150	1445	1200	Range: 1.1
Environmental Chamber	U	U	U	U	Mean: 19.8 ± 0.6
Meter Number	1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AL

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/11/20

FINISH Date: 8/15/20

Dilution Water: EPA MH Recon

Test Substance: DR-7

Client/Project: Rico/RIC8 20B-DR-7

Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	6.8	6.8	6.9	6.9	
	Cond. (µS)	1168	1185	1193	1261	
	pH	7.9	8.0	7.9	7.9	
	Temp. (°C)	19.2	19.7	19.6	19.3	
0	DO (mg//L)	6.6	6.6	6.9	7.0	
	Cond. (µS)	290	299	293	313	
	pH	8.0	8.1	8.1	8.2	
	Temp. (°C)	19.2	19.1	19.8	19.5	
10	DO (mg//L)	6.6	6.3	6.9	6.9	
	Cond. (µS)	294	303	299	312	
	pH	8.0	8.0	8.0	8.1	
	Temp. (°C)	18.7	19.1	19.4	JM 19.5	
20	DO (mg//L)	6.6	6.3	6.9	6.9	
	Cond. (µS)	304	313	309	319	
	pH	8.0	8.0	8.1	8.1	
	Temp. (°C)	19.0	19.0	20.1	19.5	
40	DO (mg//L)	6.6	6.3	6.9	6.9	
	Cond. (µS)	331	337	350	353	
	pH	8.0	8.0	8.1	8.0	
	Temp. (°C)	JM ~~18.6~~ 19.1	18.8	19.4	19.4	
60	DO (mg//L)	6.5	6.3	7.0	6.9	
	Cond. (µS)	361	367	359	378	
	pH	8.1	8.0	8.1	8.1	
	Temp. (°C)	18.9	19.2	19.7	19.3	
80	DO (mg//L)	6.6	6.4	6.9	6.9	
	Cond. (µS)	383	384	384	411	
	pH	8.1	8.1	8.2	8.1	
	Temp. (°C)	19.4	19.5	19.9	20.0	
Incubator Temperature (°C)		20.0	20.0	20.0	20.0	Max: 20.4
Analyst		JMS	JMS	AW	JMS	Min: 18.7
Time Analyzed		935	1535	1435	1155	Range: 1.7
Environmental Chamber		4	4	4	4	Mean: 19.6 ± 0.9
Meter Number		1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AN

Page 2/2

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/11/20

FINISH Date: 8/15/20

Dilution Water: EPA MH Recon

Test Substance: DR-7

Client/Project: Rico/RIC 820B-DR-7

Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test 1	Day of Test 2	Day of Test 3	Day of Test 4	COMMENTS
100	DO (mg//L)	6.6	6.4	6.9	6.9	
	Cond. (µS)	401	409	411	437	
	pH	8.1	8.1	8.2	8.2	
	Temp. (°C)	19.9	19.6	19.7	20.4	
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
Incubator Temperature (°C)		20.0	20.0	20.0	20.0	Max: 20.4
Analyst		JMS	JMS	AW	JMS	Min: 18.7
Time Analyzed		935	1535	1435	1155	Range: 1.7
Environmental Chamber		U	U	U	U	Mean: 19.6±0.9
Meter Number		1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/18/20

FINISH Date: 8/22/20

Dilution Water: EPA MH Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC~~82X~~-AC3EFF

Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	6.6	6.6	6.5	6.6	
	Cond. (µS)	1187	1666	1604	1668	
	pH	7.8	7.8	7.8	7.8	
	Temp. (°C)	20.5	19.3	22.0	22.1	
0	DO (mg//L)	6.7	6.5	6.5	6.6	
	Cond. (µS)	298	428	394	403	
	pH	~~8.2~~ 8.0	8.0	8.0	8.1	
	Temp. (°C)	20.3	19.4	21.3	21.5	
10	DO (mg//L)	6.7	6.4	6.5	6.6	
	Cond. (µS)	380	528	515	530	
	pH	8.0	7.9	8.0	8.1	
	Temp. (°C)	20.4	19.2	22.0	21.3	
20	DO (mg//L)	6.7	6.3	6.5	6.5	
	Cond. (µS)	483	670	634	666	
	pH	8.0	7.9	8.0	8.1	
	Temp. (°C)	20.7	19.5	22.3	22.3	
40	DO (mg//L)	6.7	6.2	6.5	6.6	
	Cond. (µS)	668	934	866	903	
	pH	8.0	7.9	8.0	8.1	
	Temp. (°C)	20.6	19.5	21.5	22.5	
60	DO (mg//L)	6.7	6.2	6.5	6.5	
	Cond. (µS)	979	1171	1096	1153	
	pH	8.0	8.0	8.0	8.1	
	Temp. (°C)	20.8	19.2	22.4	22.7	
80	DO (mg//L)	6.7	6.2	6.4	6.5	
	Cond. (µS)	823	1382	1318	1378	
	pH	8.0	8.0	8.1	8.1	
	Temp. (°C)	20.1	19.3	21.9	22.4	
Incubator Temperature (°C)		20.5	20.0	18.5	18.0	Max: 22.7
Analyst		AW	JMS	JMS	TE	Min: 19.2
Time Analyzed		1505	1435	1415 JMS	1325	Range: 3.5
Environmental Chamber		4	JMS ~~R~~ 4	JMS ~~R~~ R	R	Mean: 21.0 ± 1.8
Meter Number		1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AN

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/18/20

FINISH Date: 8/22/20

Dilution Water: EPA MH Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC820C-AC3EFF

Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test				COMMENTS
		1	2	3	4	
100	DO (mg//L)	6.7	6.3	6.5	6.5	
	Cond. (µS)	1126	1544	1509	1561	
	pH	8.0	8.0	8.1	8.1	
	Temp. (°C)	20.3	19.9	20.8	22.5	
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
Incubator Temperature (°C)		20.5	20.0	18.5	18.0	Max: 22.7
Analyst		AW	JMS	JMS	TE	Min: 19.2
Time Analyzed		1505	1435	1415	1325	Range: 3.5
Environmental Chamber		U	U	R	R	Mean: ~~20~~ 21.0±1.8
Meter Number		1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AR

CHRONIC TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/14/20

FINISH Date: 8/10/20

Dilution Water: EPA MH Recon

Test Substance: DR-2

Client/Project: Rico/RIC 820-DR-2

Organism *C. dubia*

Test Conc.	Chemical Parameter	Day of Test 1	2	3	4	5	6	7		COMMENTS
HH Recon	DO (mg//L)	6.9	6.7	6.9	6.9	6.8	7.0			
	Cond. (µS)	1149	1274	1226	1346	1238	1260			
	pH	8.4	8.3	8.4	8.4	8.3	8.3			
	Temp. (°C)	26.0	26.1	24.0	25.1	26.2	25.7			
0	DO (mg//L)	7.0	7.1	7.0	7.0	6.8	6.9			
	Cond. (µS)	333	302	291	326	300	329			
	pH	8.3	8.3	8.3	8.3	8.2	8.3			
	Temp. (°C)	25.5	25.8	24.5	25.6	26.7	25.5			
10	DO (mg//L)	6.8	6.9	7.0	6.9	6.7	6.8			
	Cond. (µS)	322	302	285	327	293	302			
	pH	8.3	8.3	8.3	8.3	8.3	8.4			
	Temp. (°C)	25.6	25.8	24.0	25.3	26.1	25.0			
20	DO (mg//L)	6.9	6.9	7.0	6.8	6.7	6.8			
	Cond. (µS)	328	298	286	313	294	308			
	pH	8.4	8.4	8.4	8.4	8.3	8.4			
	Temp. (°C)	25.6	25.9	24.2	25.8	25.7	25.0			
40	DO (mg//L)	6.9	6.8	7.0	6.9	6.7	6.8			
	Cond. (µS)	312	285	279	309	288	292			
	pH	8.4	8.4	8.4	8.4	8.3	8.4			
	Temp. (°C)	25.4	25.4	24.8	25.9	25.2	25.1			
60	DO (mg//L)	7.0	6.9	7.1	6.9	6.8	6.8			
	Cond. (µS)	298	275	271	294	278	284			
	pH	8.4	8.4	8.4	8.4	8.3	8.4			
	Temp. (°C)	25.5	25.5	24.2	25.6	25.7	24.9			
80	DO (mg//L)	6.9	6.8	7.0	6.8	6.8	6.7			
	Cond. (µS)	295	266	265	290	282	290			
	pH	8.4	8.3	8.4	8.4	8.3	8.4			
	Temp. (°C)	23.7	25.1	24.1	25.9	26.0	25.5			
Incubator Temperature (°C)		26.0	26.5	26.5	26.0	26.5	26.5			Max: 26.7
Analyst		KW	KW	KW	TE	KW	TE			Min: 23.7
Time Analyzed		1340	1315	1330	1310	1330	1345			Range: 3.0
Environmental Chamber		W	W	W	W	W	W			Mean: 25.2 ± 1.5
Meter Number		1	1	1	1	1	1			

Data Checked and Approved by Laboratory Manager (Initials): AR

Page 2/2

CHRONIC TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/4/20

FINISH Date: 8/10/20

Dilution Water: EPA MH Recon

Test Substance: DR-2

Client/Project: Rico/RIC820 -DR-2

Organism *C. dubia*

Test Conc.	Chemical Parameter	Day of Test 1	2	3	4	5	6	7		COMMENTS
100	DO (mg//L)	7.0	6.8	7.1	6.9	6.8	6.8			
	Cond. (µS)	278	257	259	281	272	281			
	pH	8.5	8.4	8.5	8.4	8.4	8.4			
	Temp. (°C)	25.4	25.3	24.3	26.0	26.0	25.3			
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									

Incubator Temperature (°C)	26.0	26.5	26.5	26.0	26.5	26.5			Max: 26.7
Analyst	MW	MW	MW	TE	MW	TE			Min: 23.7
Time Analyzed	1340	1315	1330	1310	1330	1345			Range: 3.0
Environmental Chamber	W	W	W	W	W	W			Mean: 25.2 ± 1.5
Meter Number	1	1	1	1	1	1			

Data Checked and Approved by Laboratory Manager (Initials): AM

CHRONIC TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/11/20

FINISH Date: 8/17/20

Dilution Water: EPA MH Recon

Test Substance: DR-6

Client/Project: Rico/RIC8208-DR-6

Organism *C. dubia*

Test Conc.	Chemical Parameter	Day of Test 1	2	3	4	5	6	7		COMMENTS
HH Recon	DO (mg//L)	6.8	7.0	7.3	6.9	7.0	6.9			
	Cond. (µS)	1235	1206	1269	1330	1270	1245			
	pH	8.3	8.1	8.2	8.2	8.2	8.1			
	Temp. (°C)	26.5	22.8	24.9	24.7	25.1	25.7			
0	DO (mg//L)	6.8	7.0	7.2	6.8	7.0	6.9			
	Cond. (µS)	319	302	322	318	309	317			
	pH	8.4	8.3	8.5	8.4	8.3	8.3			
	Temp. (°C)	26.0	22.6	25.3	24.3	25.5	25.1			
10	DO (mg//L)	6.8	7.0	7.4	6.8	7.0	7.0			
	Cond. (µS)	420	402	431	433	426	441			
	pH	8.4	8.2	8.4	8.3	8.4	8.3			
	Temp. (°C)	26.0	21.8	25.4	25.4	25.3	25.0			
20	DO (mg//L)	6.9	7.0	7.3	6.9	7.0	7.0			
	Cond. (µS)	527	507	537	554	542	541			
	pH	8.4	8.2	8.5	8.4	8.4	8.4			
	Temp. (°C)	26.3	22.7	25.7	25.3	25.1	24.8			
40	DO (mg//L)	6.8	7.0	7.2	6.9	7.0	7.0			
	Cond. (µS)	725	707	744	776	751	764			
	pH	8.4	8.3	8.4	8.4	8.4	8.4			
	Temp. (°C)	26.6	22.3	25.3	25.9	25.3	24.4			
60	DO (mg//L)	6.8	7.0	7.1	6.8	6.9	7.0			
	Cond. (µS)	924	885	937	991	968	970			
	pH	8.4	8.3	8.4	8.4	8.4	8.4			
	Temp. (°C)	25.8	21.4	25.1	25.1	25.2	24.9			
80	DO (mg//L)	6.9	7.0	7.1	6.8	6.9	7.0			
	Cond. (µS)	1077	1056	1114	1158	1144	1140			
	pH	8.3	8.3	8.4	8.4	8.4	8.4			
	Temp. (°C)	25.9	23.0	24.8	25.1	25.1	25.0			
Incubator Temperature (°C)		26.0	25.0	25.0	25.0	25.0	25.0			Max: 26.6
Analyst		AW	AW	JMS	AW	TE	AW			Min: 21.4
Time Analyzed		1250	1320	1120	1255	1235	1230			Range: 5.2
Environmental Chamber		W	W	W	W	W	W			Mean: 24.0 ± 2.6
Meter Number		1	1	1	1	1	1			

Data Checked and Approved by Laboratory Manager (Initials): AN

Page 2/2

CHRONIC TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/11/20

FINISH Date: 8/17/20

Dilution Water: EPA MH Recon

Test Substance: DR-6

Client/Project: Rico/RIC 820B -DR-6

Organism *C. dubia*

Test Conc.	Chemical Parameter	Day of Test 1	2	3	4	5	6	7		COMMENTS
100	DO (mg//L)	7.0	7.0	7.2	6.9	7.0	7.0			
	Cond. (µS)	1233	1227	1259	1341	1293	1315			
	pH	8.3	8.4	8.4	8.3	8.4	8.4			
	Temp. (°C)	25.2	21.8	24.2	24.4	24.7	25.1			
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
Incubator Temperature (°C)		26.0	25.0	25.0	25.0	25.0	25.0			Max: 26.6
Analyst		AW	AW	JKS	MJ	TE	AW			Min: 21.4
Time Analyzed		1250	1320	1120	1255	1235	1230			Range: 5.2
Environmental Chamber		W	W	W	W	W	W			Mean: 24.0 ± 2.6
Meter Number		1	1	1	1	1	1			

Data Checked and Approved by Laboratory Manager (Initials): AN

CHRONIC TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/11/20

FINISH Date: 8/18/20

Dilution Water: EPA MH Recon

Test Substance: DR-7

Client/Project: Rico/RIC 820-DR-7

Organism *C. dubia*

Test Conc.	Chemical Parameter	Day of Test 1	2	3	4	5	6	7		COMMENTS
HH Recon	DO (mg//L)	7.0	7.1	6.9	7.0	6.9	6.8	6.9		
	Cond. (µS)	1272	1262	1242	1324	1281	1256	1250		
	pH	8.3	8.3	8.3	8.2	8.2	8.1	8.2		
	Temp. (°C)	23.5	22.7	24.1	24.1	23.7	24.3	24.5		
0	DO (mg//L)	6.9	7.0	6.9	7.0	6.9	6.8	6.8		
	Cond. (µS)	348	325	318	309	295	314	311		
	pH	8.4	8.4	8.4	8.5	8.4	8.3	8.3		
	Temp. (°C)	23.6	24.4	24.6	24.4	24.7	24.2	24.9		
10	DO (mg//L)	6.9	7.0	6.9	7.0	6.9	6.8	6.8		
	Cond. (µS)	336	325	325	332	312	326	313		
	pH	8.4	8.4	8.4	8.5	8.3	8.3	8.3		
	Temp. (°C)	25.6	24.8	24.9	24.8	23.9	24.1	24.7		
20	DO (mg//L)	7.0	7.0	7.0	6.9	6.9	6.9	6.8		
	Cond. (µS)	342	337	348	348	351	336	333		
	pH	8.5	8.5	8.4	8.4	8.4	8.4	8.4		
	Temp. (°C)	25.0	24.6	25.0	24.0	24.1	24.3	24.7		
40	DO (mg//L)	7.0	7.1	7.0	7.0	7.0	6.8	6.8		
	Cond. (µS)	371	360	364	369	357	366	362		
	pH	8.5	8.5	8.5	8.5	8.5	8.4	8.4		
	Temp. (°C)	23.9	24.4	25.0	24.5	23.8	23.7	24.6		
60	DO (mg//L)	7.0	7.1	7.0	7.0	7.0	6.9	6.7		
	Cond. (µS)	396	416	392	409	393	395	393		
	pH	8.5	8.5	8.5	8.6	8.5	8.5	8.4		
	Temp. (°C)	25.5	24.2	24.4	24.1	24.0	24.7	24.5		
80	DO (mg//L)	7.0	7.1	7.0	7.0	7.0	6.9	6.8		
	Cond. (µS)	427	389	423	445	438	440	421		
	pH	8.5	8.5	8.5	8.5	8.5	8.5	8.5		
	Temp. (°C)	24.0	22.0	23.6	23.7	23.7	24.7	24.4		
Incubator Temperature (°C)		26.0	25.0	25.0	25.0	25.0	25.0	25.5		Max: 25.56
Analyst		JMS	JMS	AR	AW	AW	AW	TE		Min: 22.0
Time Analyzed		1205	1210	1315	1140	1330	1420	1245		Range: 3.56
Environmental Chamber		W	W	W	W	W	W	W		Mean: 23.8 ± 1.8
Meter Number		1	1	1	1	1	1	1		

Data from day seven excluded from all statistical analyses.

Data Checked and Approved by Laboratory Manager (Initials): AR

CHRONIC TOXICITY CHEMISTRY BENCH SHEET

Page 2/2

START Date: 8/11/20

FINISH Date: 8/18/20

Dilution Water: EPA MH Recon

Test Substance: DR-7

Client/Project: Rico/RIC 82~~0~~8-DR-7

Organism *C. dubia*

Test Conc.	Chemical Parameter	Day of Test 1	2	3	4	5	6	7		COMMENTS
100	DO (mg//L)	7.1	7.1	7.1	7.0	7.1	6.9	6.8		
	Cond. (µS)	452	446	450	472	471	465	460		
	pH	8.6	8.6	8.6	8.6	8.6	8.5	8.5		
	Temp. (°C)	24.9	22.8	24.0	23.7	23.7	24.7	24.7		
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									

	1	2	3	4	5	6	7		
Incubator Temperature (°C)	26.0	25.0	25.0	25.0	25.0	25.0	25.5		Max: 25.~~5~~ 6
Analyst	JMS	JMS	AR	MW	JW	AW	TE		Min: 22.0
Time Analyzed	1205	1210	1315	1140	1330	1420	1245		Range: 3.~~5~~ 6
Environmental Chamber	W	W	W	W	W	W	W		Mean: 23.8 ± 1.8
Meter Number	1	1	1	1	1	1	1		

Data Checked and Approved by Laboratory Manager (Initials): AN

CHRONIC TOXICITY CHEMISTRY BENCH SHEET

START Date: 8/18/20 FINISH Date: 8/25/20

Dilution Water: EPA MH Recon Test Substance: AC3EFF

Client/Project: Rico/RIC820C- AC3 EFF Organism *C. dubia*

Test Conc.	Chemical Parameter	Day of Test 1	2	3	4	5	6	7		COMMENTS
HH Recon	DO (mg//L)	6.9	7.0	6.6	6.7	6.8	7.1	7.1		
	Cond. (µS)	1188	1749	1631	1669	1697	1650	1353		
	pH	8.2	8.1	8.1	8.2	8.1	8.2	8.2		
	Temp. (°C)	24.1	23.9	27.4	26.2	26.4	27.8	27.2		
0	DO (mg//L)	6.8	6.8	6.5	6.7	6.7	6.9	7.0		
	Cond. (µS)	299	432	407	422	432	403	349		
	pH	8.3	8.4	8.3	8.4	8.3	8.4	8.4		
	Temp. (°C)	24.1	23.9	28.6	27.3	28.4	28.6	27.2		
10	DO (mg//L)	6.8	6.9	6.6	6.7	6.7	6.9	6.9		
	Cond. (µS)	389	572	52~~75~~ 53	565	537	529	439		
	pH	8.3	8.3	8.3	8.3	8.3	8.4	8.4		
	Temp. (°C)	24.2	24.1	27.1	27.1	27.9	28.7	27.1		
20	DO (mg//L)	6.8	6.8	6.6	6.8	6.8	7.0	6.9		
	Cond. (µS)	493	708	657	688	689	675	547		
	pH	8.3	8.3	8.3	8.4	8.3	8.4	8.4		
	Temp. (°C)	24.2	24.1	26.9	27.0	27.0	28.1	24.5		
40	DO (mg//L)	6.8	6.1	6.7	6.8	6.8	6.8	6.9		
	Cond. (µS)	654	978	901	947	942	924	753		
	pH	8.3	8.3	8.3	8.3	8.3	8.4	8.4		
	Temp. (°C)	24.3	23.7	26.1	26.2	26.4	26.9	24.5		
60	DO (mg//L)	6.8	6.9	6.7	6.8	6.8	6.9	6.9		
	Cond. (µS)	826	1219	1120	1162	1132	1122	909		
	pH	8.4	8.3	8.3	8.3	8.3	8.4	8.4		
	Temp. (°C)	24.6	24.0	26.4	25.9	26.6	25.3	25.6		
80	DO (mg//L)	6.8	6.9	6.7	6.8	6.8	6.9	6.9		
	Cond. (µS)	996	1481	1346	1409	1388	1351	1143		
	pH	8.4	8.4	8.4	8.4	8.3	8.4	8.4		
	Temp. (°C)	23.7	23.6	26.3	26.3	26.0	26.5	25.7		
Incubator Temperature (°C)		25.0	25.0	25.0	25.0	25.0	25.5	25.5		Max: 28.7
Analyst		AW	JMS	JMS	TE	TE	CC	JMS		Min: 23.6
Time Analyzed		~~1200~~ 1300	1130	1320	1210	1150	1305	1225		Range: 5.1
Environmental Chamber		W	W	U	U	U	U	U		Mean: 26.2 ± 2.6
Meter Number		1	1	1	1	1	1	1		AN

Data from day seven excluded from all statistical analyses.

Data Checked and Approved by Laboratory Manager (Initials): AN

CHRONIC TOXICITY CHEMISTRY BENCH SHEET

Page 2/2

START Date: 8/18/20

FINISH Date: 8/25/20

Dilution Water: EPA MH Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC820C- AC3EFF

Organism *C. dubia*

Test Conc.	Chemical Parameter	Day of Test 1	2	3	4	5	6	7		COMMENTS
100	DO (mg//L)	7.0	6.9	6.7	6.8	6.8	6.9	6.9		
	Cond. (µS)	1139	1672	1546	1602	1552	1571	1296		
	pH	8.4	8.4	8.4	8.4	8.4	8.4	8.4		
	Temp. (°C)	24.0	23.6	26.4	26.7	26.0	26.7	25.9		
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									

Incubator Temperature (°C)	25.0	25.0	25.0	25.0	25.0	25.5	25.5		Max: 28.7
Analyst	AW	JMS	JMS	TE	TE	w	JMS		Min: 23.6
Time Analyzed	1300	1130	1320	1210	1150	1305	1225		Range: 5.1
Environmental Chamber	W	W	U	U	U	U	U		Mean: 26.2± 2.56 AN
Meter Number	1	1	1	1	1	1	1		

Data from day seven excluded from all statistical analyses.

Data Checked and Approved by Laboratory Manager (Initials): AN

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 8/4/20 1445

FINISH Date/Time: 8/6/20 1410

Dilution Water: EPA MH Recon

Test Substance: DR-2

Client/Project: Rico/RIC 820-DR-2

Species: C. dubia

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	5	4	4			19/20 95%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
0	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
10	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
20	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
40	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
60	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
80	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
ANALYST		TE	NW	NW				
TIME FED		840	-	-				
TIME RENEWED		1445	1400	1410				

Template Number 21

Data Checked and Approved by Laboratory Manager (Initials): AN

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 8/4/20 1445

FINISH Date/Time: 8/6/20 1410

Dilution Water: EPA MH Recon

Test Substance: DR-2

Client/Project: Rico/RIC 820-DR-2

Species: C. dubia

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		TE	NW	NW				
TIME FED		840	–	–				
TIME RENEWED		1445	1400	1410				

Template Number 21

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 8/11/20 1345

FINISH Date/Time: 8/13/20 1250

Dilution Water: EPA MH Recon

Test Substance: DR-6

Client/Project: Rico/RIC 820B-DR-6

Species: C. dubia

CONCENTRATION & REPLICATE		Number alive/day of test: Start	24 hr.	48 hr.	72 hr.	96 hr.	#alive/ # exposed (% survival)	COMMENTS
HH Recon	A	5	5	5			17/20 85%	
	B	5	5	5				
	C	5	5	~~5~~ 4				
	D	5	5	~~5~~ 3				
0	A	5	5	5			18/20 90%	
	B	5	5	~~5~~ 4				
	C	5	5	5				
	D	5	5	~~5~~ 4				
10	A	5	5	5			17/19 89.5%	
	B	5	5	~~5~~ 4				
	C	5	4	~~5~~ 4				
	D	5	5	~~5~~ 4				*tech error - 1 missing organism one organism excluded from all statistical analyses.
20	A	5	5	~~5~~ 3			17/20 85%	
	B	5	4	4				
	C	5	5	5				
	D	5	5	5				
40	A	5	5	3			17/20 85%	
	B	5	4	4				
	C	5	5	5				
	D	5	5	5				
60	A	5	5	5			14/20 70%	
	B	5	3	2				
	C	5	3	3				
	D	5	4	4				
80	A	5	4	3			17/20 85%	
	B	5	5	5				
	C	5	4	4				
	D	5	5	5				
ANALYST		JMS	AW	AW				
TIME FED		1125	—	~~535~~ 1250 AW				
TIME RENEWED		1345	1430	~~1260~~ 1250 AW				

Template Number 8

Data Checked and Approved by Laboratory Manager (Initials): AN

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 8/11/20 1345

FINISH Date/Time: 8/13/20 1250

Dilution Water: EPA MH Recon

Test Substance: DR-6

Client/Project: Rico/RIC 8208-DR-6

Species: C. dubia

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	5	4	3			17/20	
	B	5	5	5			85%	
	C	5	5	5				
	D	5	5	4				
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		JMS	AW	AW				
TIME FED		1125	—	—				
TIME RENEWED		1345	1430	1250				

Template Number 8

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 8/15/20 - 930

FINISH Date/Time: 8/17/20 930

Dilution Water: EPA MH Recon

Test Substance: DR-7 (#2)

Client/Project: Rico/RIC820B-DR-7 (#2)

Species: *C. dubia*

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
0	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
10	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
20	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
40	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
60	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
80	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
ANALYST		NL	NW	u				
TIME FED		700	-	-				
TIME RENEWED		930	1040	930				

Template Number 7

Data Checked and Approved by Laboratory Manager (Initials): AN

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 8/15/20 -930

FINISH Date/Time: 8/17/20 930

Dilution Water: EPA MH Recon

Test Substance: DR-7 (#2)

Client/Project: Rico/RIC820B-DR-7 (#2)

Species: *C. dubia*

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		NL	JW	CL				
TIME FED		700	–	–				
TIME RENEWED		930	1040	930				

Template Number 7

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 8/18/20 1045

FINISH Date/Time: 8/20/20 950

Dilution Water: EPA MH Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC820-AC3EFF

Species: C. dubia

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
0	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
10	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
20	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
40	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
60	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
80	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
ANALYST		TE	AW	JMS				
TIME FED		745	–	–				
TIME RENEWED		1045	955	950				

Template Number 21

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 8/18/20 1045

FINISH Date/Time: 8/20/20 950

Dilution Water: EPA MH Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC820c-AC3EFF

Species: C. dubia

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		TE	AW	JMS				
TIME FED		745	-	-				
TIME RENEWED		1045	955	950				

Template Number 21

Data Checked and Approved by Laboratory Manager (Initials): AN

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 8/4/20 1400

FINISH Date/Time: 8/8/20 1340

Dilution Water: EPA MH Recon

Test Substance: DR-2

Client/Project: Rico/RIC 820 – DR-2

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	10	10	10	10	10	39/40	
	B	10	10	10	10	10		
	C	10	10	10	10	10	97.5%	
	D	10	9	9	9	9		
0	A	10	10	10	10	10	39/40	
	B	10	10	10	9	9		
	C	10	10	10	10	10	97.5%	
	D	10	10	10	10	10		
10	A	10	10	10	10	9	39/40	
	B	10	10	10	10	10		
	C	10	10	10	10	10	97.5%	
	D	10	10	10	10	10		
20	A	10	10	10	10	10	38/40	
	B	10	10	10	10	10		
	C	10	10	10	9	9	95%	
	D	10	10	10	10	9		
40	A	10	10	10	9	9	37/40	
	B	10	10	10	8	8		
	C	10	10	10	10	10	92.5%	
	D	10	10	10	10	10		
60	A	10	10	10	10	10	39/40	
	B	10	10	10	10	10		
	C	10	10	10	9	9	97.5%	
	D	10	10	10	10	10		
80	A	10	10	10	10	9	39/40	
	B	10	10	10	10	10		
	C	10	10	10	10	10	97.5%	
	D	10	10	10	10	10		
ANALYST		TE	MW	MW	MW	TE		
TIME FED		755	-	540	-	-		
TIME RENEWED		1400	1120	1330	1445	1340		

Template Number 31

Data Checked and Approved by Laboratory Manager (Initials): AN

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 8/4/20 1400

FINISH Date/Time: 8/8/20 1340

Dilution Water: EPA MH Recon

Test Substance: DR-2

Client/Project: Rico/RIC 820-DR-2

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	10	10	9	9	9	37/40	
	B	10	10	10	10	10		
	C	10	10	10	10	10	92.5%	
	D	10	10	10	9	8		
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		TE	MW	MW	MW	TE		
TIME FED		755	–	540	–	–		
TIME RENEWED		1400	1120	1330	1445	1340		

Template Number 31

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 8/11/20 1010

FINISH Date/Time: 8/15/20 1110

Dilution Water: EPA MH Recon

Test Substance: DR-6

Client/Project: Rico/RIC 8208-DR-6

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	10	10	10	10	9	39/40 97.5%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
0	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
10	A	10	10	10	9	9	39/40 97.5%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
20	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
40	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
60	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
80	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
ANALYST		JMS	AW	AW	JMS	JMS		
TIME FED		710	—	535	—	—		
TIME RENEWED		1010	1300	1200	1445	1110		

Template Number 20

Data Checked and Approved by Laboratory Manager (Initials): AM

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 8/11/20 1010

FINISH Date/Time: 8/15/20 1110

Dilution Water: EPA MH Recon

Test Substance: DR-6

Client/Project: Rico/RIC 8203- DR-6

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	10	10	10	9	9	39/40 97.5%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		JMS	AW	AW	JMS	JMS		
TIME FED		710	—	535	-	-		
TIME RENEWED		1010	1300	1200	1445	1110		

Template Number 20

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 8/11/20 1055

FINISH Date/Time: 8/15/20 1135

Dilution Water: EPA MH Recon

Test Substance: DR-7

Client/Project: Rico/RIC820-DR-7

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
0	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
10	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
20	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
40	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
60	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
80	A	10	10	10	10	10	39/40 97.5%	
	B	10	10	10	10	10		
	C	10	10	9	9	9		
	D	10	10	10	10	10		
ANALYST		AW	JMS	JMS	AW	JMS		
TIME FED		710	–	535	–	–		
TIME RENEWED		1055	940	1450	1435	1135		

Template Number 31

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 8/11/20 1055

FINISH Date/Time: 8/15/20 1135

Dilution Water: EPA MH Recon

Test Substance: DR-7

Client/Project: Rico/RIC820-DR-7

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	10	10	10	10	9	38/40 95%	
	B	10	10	10	10	10		
	C	10	10	10	10	9		
	D	10	10	10	10	10		
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		AW	JMS	JMS	AW	JMS		
TIME FED		710	–	535	–	–		
TIME RENEWED		1055	940	1450	1435	1135		

Template Number 31

Data Checked and Approved by Laboratory Manager (Initials): AW

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 8/18/20 1345

FINISH Date/Time: 8/22/20 1330

Dilution Water: EPA MH Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC 8201-AC3EFF

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
0	A	10	10	~~10~~ 10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
10	A	10	10	10	10	10	38/40 95%	
	B	10	10	10	10	10		
	C	10	10	10	10	9		
	D	10	10	10	10	9		
20	A	10	10	10	9	9	38/40 95%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	9	9		
40	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
60	A	10	10	10	10	9	39/40 97.5%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
80	A	10	10	10	10	10	38/40 95%	
	B	10	10	10	10	9		
	C	10	10	10	10	10		
	D	10	10	9	9	9		
ANALYST		TE	AW	JMS	JMS	TE		
TIME FED		700	~~1000~~ 1000	525	–	–		
TIME RENEWED		1345	1515	1350	1335	1330		

Template Number 31

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 8/18/20 1345

FINISH Date/Time: 8/22/20 1330

Dilution Water: EPA MH Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC820-AC3EFF

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		TE	AW	JMS	JMS	TE		
TIME FED		700	~~1000~~ TE	TE 525	–	–		
TIME RENEWED		1345	1515	1350	1335	1330		

Template Number 31

Data Checked and Approved by Laboratory Manager (Initials): AR

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 8/4/20 1325

FINISH Date/Time: 8/10/20 1305

Dilution Water: EPA MH Recon

Test Substance: DR-2

Client/Project: Rico/RIC 820-DR-2

Begun By: TE

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed
HH Recon	1	0	—	—	—	—	—	—	—	—	0	7.3	MW	1250
	2	0	—	—	—	—	—	—	—	—	0	7.5	MW	1145
	3	6	7	0^	5	7	6	0	6	4	4	7.2	MW	1150
	4	0	9	0	0	17	12	0	—	—	0	8.0	TE	1225
	5	11	0	0	15	0	—	0	13	12	12	7.7	MW	1205
	6	12	20	0	23	22	19	21	17	16	18	6.9	TE	1305
	7													
	8													
TOTALS		29	36	0	43	46	37	1	36	32	34			

NOTES:

^ - Dead/Undeveloped Neonates - Number Not Counted

Summarized Results:

# live adults	mean reprod, ± S.D.	norm. reprod. ± S.D.
10	29.4 ± 16.0	29.4 ± 16.0

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
0	1	0	—	—	—	—	—	—	—	—	0	7.5	MW
	2	0	—	—	—	—	—	—	—	—	0	7.6	MW
	3	6	7	5	6	6	5	7	5	3	5	7.2	MW
	4	11	15	12	10	0	0	11	10	0	9	7.8	TE
	5	0	18	0	13	13	16	0	11	12	0	7.7	MW
	6	16	0	19	0	15	19	18	19	16	17	7.0	TE
	7												
	8												
TOTALS		33	40	36	29	34	40	36	26*	31	31		

NOTES:

Summarized Results:

# live adults	mean reprod, ± S.D.	norm. reprod. ± S.D.
10	33.6 ± 4.6	33.6 ± 4.6

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
10	1	0	—	—	—	—	—	—	—	—	0	7.4	MW
	2	0	—	—	—	—	—	—	—	—	0	7.6	MW
	3	4	8	5	7	5	5	6	5	6	7	7.2	MW
	4	0	11	0	14	1	13	11	11	9	11	7.8	TE
	5	0	0	13	0	16	0	11	0	—	0	7.4	MW
	6	14	23	18	23	20	22	0	18	14	19	6.9	TE
	7												
	8												
TOTALS		18	42	36	44	42	40	28	34	29	36		

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
10	34.9 ± 8.0

Board Used	7/27B				Cup			7/29		
	3	12	24	31	32	58	60	8	31	45

Date/time adults isolated	8/3/20 1400
Date/time neonates harvested	8/9/20 2100

Template number 21 * Fourth brood excluded from totals.

Data Checked and Approved by Laboratory Manager (Initials): AM

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 8/4/20 1325

FINISH Date/Time: 8/10/20 1305

Dilution Water: EPA MH Recon

Test Substance: DR-2

Client/Project: Rico/RIC 820-DR-2

Begun By: TE

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed	NOTES:
20	1	0	—	—	—	—	—	—	—	—	0	7.3	MW	1250	
	2	0	—	—	—	—	—	—	—	—	0	7.6	MW	1145	
	3	7/MW	7/MW	0	6/MW	6/MW	5/MW	7/MW	7/MW	6/MW	9/MW	7.2	MW	1150	
	4	11	12	6	15	11	0	0	13	9	0	7.8	TE	1225	
	5	0	16	13	0	0	15	21	0	0	14	7.3	MW	1205	
	6	18	0	14	18	14	20	27	16	18	18	6.9	TE	1305	Summarized Results:
	7														# live adults / normalized reproduction ± S.D.
	8														
TOTALS		36	35	33	39	31	40	55	36	33	36				10 / 37.4 ± 6.8

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
40	1	0	—	—	—	—	—	—	—	—	0	7.4	MW	
	2	0	—	—	—	—	—	—	—	—	0	7.7	MW	
	3	6/MW	5/MW	4/MW	5/MW	7/MW	5/MW	6/MW	4/MW	5/MW	4/MW	7.3	MW	
	4	0	0d	0	—	0	11	11	0	9	0	7.7	TE	
	5	15	|	13	16	14	0	0	14	0	11	7.4	MW	
	6	21	|	18	16	20	21	17	16	14	16	7.0	TE	Summarized Results:
	7													# live adults / normalized reproduction ± S.D.
	8		|											
TOTALS		42	5d	35	37	41	37	34	34	28	31			9 / 32.4 ± 10.5

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
60	1	0	—	—	—	—	—	—	—	—	0	7.6	MW	
	2	0	—	—	—	—	—	—	—	—	0	8.0	MW	
	3	4/MW	6/MW	4/MW	5/MW	7/MW	6/MW	7/MW	5/MW	6/MW	6/MW	7.3	MW	
	4	0	16	0	11	10	12	0	10	12	12	7.6	TE	
	5	0	0	14	0	—	0	18	0	—	0	7.4	MW	
	6	19	20d	19	18	17	20	22	16	17	18	7.1	TE	Summarized Results:
	7		|											# live adults / normalized reproduction ± S.D.
	8													
TOTALS		23	42d	37	34	34	38	47	31	35	36			9 / 35.7 ± 6.4

Board Used	7/27B				Cup			7/28		
	3	12	24	31	32	58	60	8	31	45

Date/time adults isolated	8/3/20 1400
Date/time neonates harvested	8/3/20 2100

Template number 21

Data Checked and Approved by Laboratory Manager (Initials): AR

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 8/4/20 1325

FINISH Date/Time: 8/10/20 1305

Dilution Water: EPA MH Recon

Test Substance: DR-2

Client/Project: Rico/RIC 820-DR-2

Begun By: TE

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed	NOTES:
80	1	0	—	—	—	—	—	—	—	—	0	7.7	MW	1250	
	2	0	—	—	—	—	—	—	—	—	0	8.0	MW	1145	
	3	7	8	0	7	6	6	7	4	4	5	7.4	MW	1150	
	4	11	0	0	11	0	15	0	10	0	12	7.5	TE	1225	
	5	14	19	8	0	16	9	21	0	15	0	7.5	MW	1205	
	6	14	29	14	22	20	3	22	16	17	21	7.2	TE	1305	Summarized Results:
	7														# live adults / normalized reproduction ± S.D.
	8														
TOTALS		32*	56	22	40	42	33	50	30	36	38				10 / 37.9 ± 9.8

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
100	1	0	—	—	—	—	—	—	—	—	0	8.0	MW	
	2	0	—	—	—	—	—	—	—	—	0	8.5	MW	
	3	3	5	3	6	6	6	8	6	5	6	7.6	MW	
	4	0	12	0	14	10	0	11	14	12	11	7.4	TE	
	5	15	16	13	19	0	15	0	11	0	0	7.6	MW	
	6	26	0	22	0	18	24	23	0	22	21	7.9	TE	Summarized Results:
	7													# live adults / normalized reproduction ± S.D.
	8													
TOTALS		44	33	38	39	34	45	42	31	39	38			10 / 38.3 ± 4.6

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
	1													
	2													
	3													
	4													
	5													
	6													Summarized Results:
	7													# live adults / normalized reproduction ± S.D.
	8													
TOTALS														

Board Used	7/27B				Cup			7/28		
	3	12	24	31	32	58	60	8	31	45

Date/time adults isolated	8/3/20 1400
Date/time neonates harvested	8/3/20 2100

Template number 21

*Fourth brood excluded from totals.

Data Checked and Approved by Laboratory Manager (Initials): AR

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 8/11/20 1125

FINISH Date/Time: 8/17/20 1125

Dilution Water: EPA MH Recon

Test Substance: DR-6

Client/Project: Rico/RIC 8208 -DR-6

Begun By: JMS

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed
HH Recon	1	0	—	—	—	—	0	0d	0d	0	0	7.5	AW	1135
	2	0	—	—	—	—	0			0	0	7.3	AW	1045
	3	0	0	3	4	4	0			6	4	7.8	JMS	1025
	4	6	6	0	12	5	4			11	0	7.4	AW	1210
	5	11	7	13	0	0	8			0	18	7.8	TE	1140
	6	18	0	18	18	14	16			22	24	7.4	AW	1125
	7													
	8													
TOTALS		35	13	34	34	23	28	0d	0d	39	46			

NOTES:

Summarized Results:

# live adults	mean reprod, ± S.D.	norm. reprod. ± S.D.
8/9	~~25.2 ± 16.0~~ AR	~~25.2 ± 16.0~~ AR
	31.5 ± 10.1	28.0 ± 14.1

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
0	1	0	—	—	—	—	0	0d	0	—	0	7.4	AW
	2	0	—	—	—	—	0		0	—	0	7.5	AW
	3	6	3	5	6	0	0		0	5	4	7.6	JMS
	4	0	—	0	8	8	6		6	7	~~0~~ 0	7.1	AW
	5	10	12	12	0	0	7		10	0	12	7.5	TE
	6	18	17	14	19	19	13		16	20	22	7.5	AW
	7												
	8												
TOTALS		34	32	31	33	27	26	0d	32	32	38		

NOTES:

Summarized Results:

# live adults	mean reprod, ± S.D.	norm. reprod. ± S.D.
9/9	~~28.5 ± 10.6~~ AR	~~28.5 ± 10.6~~ AR
	31.7 ± 3.6	31.7 ± 3.6

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
10	1	0	—	—	—	—	0	0d	0	—	0	7.3	AW
	2	0	—	—	—	—	0		0	—	0	7.5	AW
	3	3	4	4	3	4	0		0	6	3	7.6	JMS
	4	0	0	7	7	9	5		4	7	0	7.2	AW
	5	14	12	0	—	0	11		6	0	12	7.5	TE
	6	21	23	22	20	18	19		22	22	23	7.4	AW
	7												
	8												
TOTALS		38	39	33	30	31	35	0d	32	35	38		

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
	34.6 ± 3.3
9/9	~~34.1 ± 11.4~~ AR

Board Used	8/4B			8/4A Clip			8/3B			
	1	50	59	13	23	15	44	55	56	58

Date/time adults isolated	8/10 1400
Date/time neonates harvested	8/10 2200

Template number 9 Replicate G excluded from all statistical analyses.

Data Checked and Approved by Laboratory Manager (Initials): AR

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 8/11/20 1125

FINISH Date/Time: 8/17/20 1125

Dilution Water: EPA MH Recon

Test Substance: DR-6

Client/Project: Rico/RIC 8208 -DR-6

Begun By: JMS

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed
20	1	0	—	—	—	—	—	—	—	—	0	7.3	AW	1135
	2	0	—	—	—	—	—	—	—	—	0	7.4	AW	1045
	3	0	6	4	4	4	5	0	0	3	5	7.5	JMS	1025
	4	0	10	0	12	10	0	6	6	11	0	7.2	JW	1210
	5	0	0	14	0	0	9	10	12	0	17	7.5	TE	1140
	6	16	19	22	17	16	15	21	19	24	24	7.5	AW	1125
	7													
	8													
TOTALS		16	35	40	33	30	29	37	37	38	46			

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
9/9	33.8 ± 8.5
~~AN~~	~~34.1 ± 8.0~~ AN

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
40	1	0	—	—	—	—	—	Od	—	—	0	7.4	AW
	2	0	—	—	—	—	0		0	—	0	7.4	AW
	3	4	6	4	5	3	3		0	8	6	7.6	JMS
	4	0	11	0	12	0	0		7	9	0	7.1	JW
	5	12	0	—	0	10	10		12	0	13	7.5	TE
	6	22	22	20	21	15	16		22	21	20	7.5	AW
	7												
	8												
TOTALS		38	39	24	38	28	29	Od	41	38	39		

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
9/9	34.9 ± 6.1
	~~31.4 ± 12.5~~ AN

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
60	1	0	—	—	—	—	—	—	—	—	0	7.4	AW
	2	Od	0	—	—	—	—	—	—	—	0	7.3	AW
	3		3	5	5	4	0	0	0	6	5	7.7	JMS
	4		0	—	0	12	5	4	6	0	0	7.2	JW
	5		10	11	13	0	11	9	11	12	13	7.6	TE
	6		17	18	12	15	16	18	19	18	23	7.5	AW
	7												
	8												
TOTALS		Od	30	34	30	31	32	31	36	36	41		

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
~~8~~ 9/9	0 30.4 ± 11.8

Board Used	8/4B		JMS	8/4A		Cup		8/3B		
	1	50	59	13	23	15	44	55	56	58

Date/time adults isolated	8/10 1400
Date/time neonates harvested	8/10 2200

Template number 9 Replicate G excluded from all statistical analyses.

Data Checked and Approved by Laboratory Manager (Initials): AN

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 8/11/20 1125

FINISH Date/Time: 8/17/20 1125

Dilution Water: EPA MH Recon

Test Substance: DR-6

Client/Project: Rico/RIC 820B -DR-6

Begun By: JMS

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed
80	1	0					0	0d	0		0	7.3	AW	1135
	2	0					0		0	0d*	0	7.3	AW	1045
	3	0	6	4	7	3	3		0		6	7.6	JMS	1025
	4	4	0	0	5	0	0		7		0	7.2	JW	1210
	5	8	8	11	0	11	9		11		12	7.7	TE	1140
	6	19	18	19	18	17	19		21		21	7.5	AW	1125
	7													
	8													
TOTALS		31	32	34	30	31	31	0d	39	0d	39			

NOTES: *tech error - missing organism; one organism excluded from all statistical analyses.

Summarized Results:

# live adults	normalized reproduction ± S.D.
	33.4 ± 3.7
8/9 8/8 AN	~~26.7 ± 14.4~~ AN

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
100	1	0									0	7.5	AW
	2	0									0	7.7	AW
	3	6	4	3	4	3	5	0	0	3	4	8.0	JMS
	4	0		0	8	7	0	5	5	6	0	7.4	JW
	5	~~8~~ 13	8	11	0	0	10	7	10	0	13	8.0	TE
	6	14	14	13	14	16	17	16	16	20	19	7.6	AW
	7												
	8												
TOTALS		33	26	27	26	26	32	28	31	29	36		

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
	6
8/9 9/9	29.4 ± 3.9 AN AN

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
	1												
	2												
	3												
	4												
	5												
	6												
	7												
	8												
TOTALS													

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.

Board Used	8/4B			8/4A Cup			8/3B			
	1	50	59	13	23	15	44	55	56	58

Date/time adults isolated	8/10	1400
Date/time neonates harvested	8/10	2200

Template number 9 Replicate G excluded from all statistical analyses.

Data Checked and Approved by Laboratory Manager (Initials): AN

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 8/11/20 1150

FINISH Date/Time: 8/18/20 1115

Dilution Water: EPA MH Recon

Test Substance: DR-7

Client/Project: Rico/RIC 820B DR-7

Begun By: AW

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed
HH Recon	1	0d	0	—	—	—	0	0d	0	—	0	6.9	JMS	1110
	2		0	—	—	—	0		0	—	0	7.5	JMS	1125
	3		7	5	5	5	0		0	8	6	6.7	AW	1230
	4		0	—	—	0	5		5	0	0	7.4	JW	1100
	5		10	11	13	8	12		9	14	16	7.2	JW	1240
	6		17	21	17	19	14		18	18	23	7.10	AW	1250
	7		22	0	25	23	0		0	19	0	—	TE	1115
	8													
TOTALS		0d	34	37	35	32	31	0d	32	40	45			

NOTES:

Summarized Results:

# live adults	mean reprod, ± S.D.	norm. reprod. ± S.D.
8/9	35.8 ± 4.8	31.8 ± 12.7

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
0	1	0	—	—	—	—	0	0d	0	—	0	6.7	JMS
	2	0	—	—	—	—	0		0	—	0	7.5	JMS
	3	0	0	5	5	5	0		0	4	5	6.7	AW
	4	4	0	0	0	0	5		5	0	0	7.4	JW
	5	0	11	17	8	15	8		11	10	0	6.9	JW
	6	11	22	17	17	20	12		17	20	7	7.7	AW
	7	17	20	0	0	26	14		0	16	4	—	TE
	8												
TOTALS		15	33	39	30	40	25	0d	33	34	12		

NOTES:

Summarized Results:

# live adults	mean reprod, ± S.D.	norm. reprod. ± S.D.
9/9	29.0 ± 9.9	29.0 ± 9.9

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
10	1	0	—	—	—	—	—	—	—	—	0	6.8	JMS
	2	0	—	—	—	—	—	—	—	—	0	7.4	JMS
	3	5	6	0	7	6	0	—	0	7	4	6.7	AW
	4	0	0	5	0	0	5	0d	4	0	0	7.6	JW
	5	13	15	11	13	12	8		10	12	12	7.0	JW
	6	22	25	21	21	20	16		22	22	15	7.7	AW
	7	23	22	0	26	25	0		0	23	17	—	TE
	8												
TOTALS		40	46	32	41	38	29	0d	36	41	31		

NOTES: •16

Summarized Results:

# live adults	normalized reproduction ± S.D.
9/9	37.1 ± 5.6

Board Used	8/4B			8/4A		8/3B				
	1	50	59	13	23	15	44	55	56	58

Date/time adults isolated	8/10/20 1400
Date/time neonates harvested	8/10/20 2200

Template number 9 Six day survival and reproduction used for all statistical analyses.

Data Checked and Approved by Laboratory Manager (Initials): AR

Replicate G excluded from all statistical analyses.

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 8/11/20 1150

FINISH Date/Time: 8/18/20 1115

Dilution Water: EPA MH Recon

Test Substance: DR-7

Client/Project: Rico/RIC820B-DR-7

Begun By: AW

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed
20	1	0d	0				0	0d	0		0	6.8	JMS	1110
	2		0				0		0		0	7.5	JMS	1125
	3		0d	6	6	7	4		0	6	7	6.8	AW	1230
	4			0			0		4	0	0	7.6	AW	1100
	5			13	12	12	4		6	14	14	7.0	AW	1240
	6			23	18	20	12		16	24	22	7.7	AW	1250
	7			28	22	0	16		0	25	25	—	TE	1115
	8													
TOTALS		0d	6d	42	36	34	20	0d	26	44	43			

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
7/9	27.9 ± 16.3

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
40	1	0					0	0d	0		0	6.8	JMS
	2	0					0		0		0	7.5	JMS
	3	6	6	6	7	4	6		6	6	7	6.8	AW
	4	0					0		0		0	7.6	AW
	5	15	15	10	11	8	10		12	12	15	7.0	AW
	6	20	24	18	22	15	22		23	20	28	7.8	AW
	7	25	24	0	24	18	24		0	29	28	—	TE
	8												
TOTALS		41	45	34	40	27	38	0d	41	38	50		

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
9/9	39.3 ± 6.5

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
60	1	0					0	0d	0		0	6.9	JMS
	2	0					0		0		0	7.7	JMS
	3	5	6	5	7	6	5		0	7	8	6.8	AW
	4	0					0		5	12	0	7.7	AW
	5	13	13	14	12	15	12		11	0	16	7.4	AW
	6	23	9	23	12	26	19		22	20	26	7.8	AW
	7	0	15	25	0	25	23		0	28	21	—	TE
	8												
TOTALS		41	28	42	31	47	36	0d	38	39	50		

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
9/9	39.1 ± 7.6

Board Used	8/4B			8/4A Cup			8/3B			
	1	50	59	13	23	15	44	55	56	58

Date/time adults isolated	8/10/20 1400
Date/time neonates harvested	8/10/20 2200

Template number 9 Six day survival and reproduction used for all statistical analyses.

Data Checked and Approved by Laboratory Manager (Initials): AR

Replicate G excluded from all statistical analyses.

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 8/11/20 1150

FINISH Date/Time: 8/18/20 1115

Dilution Water: EPA MH Recon

Test Substance: DR-7

Client/Project: Rico/RIC820B-DR-7

Begun By: AW

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed
80	1	0	—	—	—	—	0	Od	0	—	0	7.0	JMS	1110
	2	0	—	—	—	—	0	|	0	—	0	7.9	JMS	1125
	3	4	4	6	4	6	0	|	0	7	8	6.8	AW	1230
	4	0	—	—	—	0	6	|	6	0	0	8.1	AW	1100
	5	12	16	15	13	13	8	|	13	14	16	7.3	AW	1240
	6	17	25	17	22	22	18	|	21	20	27	7.8	AW	1250
	7	21	0	22	24	0	0	|	0	—	0	—	TE	1115
	8							|						
TOTALS		33	45	38	39	41	32	Od	40	41	51			

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
9/9	40.0 ± 5.8

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
100	1	0	—	—	—	—	0	Od	0	—	0	7.1	JMS
	2	0	—	—	—	—	0	|	0	—	0	8.3	JMS
	3	0	6	6	6	5	0	|	0	8	8	7.1	AW
	4	4	0	—	—	0	5	|	7	0	~~0~~ 0	8.8	AW
	5	0	14	11	15	10	11	|	14	14	17	8.1	AW
	6	15	25	24	26	22	22	|	19	17	26	7.7	AW
	7	26	0	0	22	25	0	|	0	23	20	—	TE
	8							|					
TOTALS		19	45	41	47	37	38	Od	40	39	51		

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
9/9	39.7 ± 9.0

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
	1												
	2												
	3												
	4												
	5												
	6												
	7												
	8												
TOTALS													

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.

Board Used	8/4B			8/4A		Cup		8/3B		
	1	50	59	13	23	15	44	55	56	58

Date/time adults isolated	8/10/20 1400
Date/time neonates harvested	8/10/20 2200

Template number 9 Six day survival and reproduction used for all statistical analyses.

Data Checked and Approved by Laboratory Manager (Initials): AR

Replicate G excluded from all statistical analyses.

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 8/18/20 1220

FINISH Date/Time: 8/25/20 1120

Dilution Water: EPA MH Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC~~8X~~C-AC3EFF

Begun By: TE

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed	NOTES:
HH Recon	1	0	—	—	—	—	—	—	—	—	0	6.9	AW	1040	
	2	0	—	—	—	—	—	—	—	—	0	7.3	JMS	1045	
	3	0	—	—	—	—	—	—	—	—	0	7.1	JMS	1240	
	4	5	0	5	5	7	5	5	1	4	6	7.3	TE	1115	
	5	15	1	14	13	13	13	14	11	13	13	7.3	TE	1055	
	6	21	16	18	20	18	19	17	18	19	20	7.4	cl	1140	Summarized Results:
	7	0	24	21	0	23	19	19	0	0	0	—	JMS	1120	
	8														# live adults / mean reprod. ± S.D. / norm. reprod. ± S.D.
TOTALS		41	17	37	38	38	37	36	30	36	39				10 / 34.9 ± 6.9 / 34.9 ± 6.9

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
0	1	0	—	—	—	—	—	—	—	—	0	6.9	AW	
	2	0	—	—	—	—	—	—	—	—	0	7.3	JMS	
	3	0	—	—	—	—	—	—	—	—	0	7.6	JMS	
	4	6	0	4	6	5	5	5	6	6	4	7.2	TE	
	5	15	4	9	16	15	13	15	15	13	12	7.3	TE	
	6	22	18	15	21	19	19	22	18	18	21	7.5	cl	Summarized Results:
	7	27	22	19	0	0	0	26	22	23	24	—	JMS	
	8													# live adults / mean reprod. ± S.D. / norm. reprod. ± S.D.
TOTALS		43	22	28	43	39	37	42	39	37	37			10 / 36.7 ± 10.8 / 36.7 ± 10.8

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
10	1	0	—	—	—	—	—	—	—	—	0	6.9	AW	Δ Dead/undeveloped neonates, number not counted
	2	0	—	—	—	—	—	—	—	—	0	7.2	JMS	
	3	0	—	—	—	—	—	—	—	—	0	7.3	JMS	
	4	6	5	4	6	8	3	2	5	5	6	7.1	TE	
	5	14	16	13	11	12	9	10	0	16	12	7.3	TE	
	6	22	20	16	0d	18	19	10	15	13Δ	15	7.3	cl	Summarized Results:
	7	0	24	26	/	25	16	0	20	18Δ	0	—	JMS	
	8													# live adults / normalized reproduction ± S.D.
TOTALS		42	41	33	17d	38	31	22	20	34	33			9 / 31.1 ± 8.7

Board Used	Cup									
8/4A	2	15	20	25	26	57	58	8/4B 35	45	46

Date/time adults isolated	8/18/20 530
Date/time neonates harvested	8/18/20 1100

Template number 21 Six day survival and reproduction used for all statistical analyses.

Data Checked and Approved by Laboratory Manager (Initials): AR

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 8/18/20 1220

FINISH Date/Time: 8/25/20 1120

Dilution Water: EPA MH Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC820-AC3EFF

Begun By: TE

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed
20	1	0	—	—	—	—	—	—	—	—	0	6.9	AW	1040
	2	0	—	—	—	—	—	—	—	—	0	7.0	JMS	1045
	3	0	—	—	—	—	—	—	—	—	0	7.1	JMS	1240
	4	7	8	7	5	5	5	8	4	6	7	7.1	TE	1115
	5	15	13	12	14	11	0	15	12	13	13	7.1	TE	1055
	6	21	19	21	18	16	13	19	16	17	0	7.3	"	1140
	7	0	23	0	18	0	21	27	0	0	22	—	JMS	1120
	8													
TOTALS		43	40	40	37	32	18	42	32	36	20			

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
10	34.0 ± 8.8

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
40	1	0	—	—	—	—	—	—	—	—	0	6.8	AW
	2	0	—	—	—	—	—	—	—	—	0	6.9	JMS
	3	0	—	—	—	—	—	—	—	—	0	6.9	JMS
	4	6	5	7	5	5	5	6	7	6	5	6.6	TE
	5	18	0	14	17	11	9	12	12	11	0	7.0	TE
	6	20	12	18	12	21	15	18	0	20	16	7.3	"
	7	0	21	0	0	27	27	18	17	0	19	—	JMS
	8												
TOTALS		44	17	39	34	37	29	36	19	37	21		

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
10	31.3 ± 9.3

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
60	1	0	—	—	—	—	—	—	—	—	0	6.8	AW
	2	0	—	—	—	—	—	—	—	—	0	6.7	JMS
	3	0	—	—	—	—	—	—	—	—	0	6.8	JMS
	4	5	7	5	6	4	7	6	5	6	6	6.3	TE
	5	12	14	12	11	8	15	0	10	11	19	6.8	TE
	6	0	22	19	19	20	15	13	18	17	18	7.3	"
	7	21	0	0	23	23	26	24	0	0	0	—	JMS
	8												
TOTALS		17	43	36	36	32	37	19	33	34	43		

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
10	33.0 ± 8.7

Board Used	Cup									
8/4A	2	15	20	25	26	57	58	8/4B 35	45	46

Date/time adults isolated	8/19/20 530
Date/time neonates harvested	8/18/20 1100

Template number 21 Six day survival and reproduction used for all statistical analyses.

Data Checked and Approved by Laboratory Manager (Initials): AR

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 8/18/20 1220

FINISH Date/Time: 8/25/20 1120

Dilution Water: EPA MH Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC820c-AC3EFF

Begun By: TE

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed
80	1	0	—	—	—	—	—	—	—	—	0	6.9	AN	1040
	2	0	—	—	—	—	—	—	—	—	0	6.5	JMS	1045
	3	0	—	—	—	—	—	—	—	—	0	6.7	JMS	1240
	4	5	6	6	5	7	6	4	5	6	4	6.2	TE	1115
	5	15	16	0	—	0	15	12	11	10	16	6.8	TE	1055
	6	14	17	10	11	8Δ	19	18	15Δ	14	19	7.3	"	1140
	7	0	0	22	17	9	9Δ	0	0Δ	0	0	—	JMS	1120
	8													
TOTALS		34	39	16	16	15	40	34	31	30	39			

NOTES: Δ Dead/undeveloped neonates, number not counted

Summarized Results:

# live adults	normalized reproduction ± S.D.
10	29.4 ± 10.0

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
100	1	0	—	—	—	—	—	—	—	—	0	6.9	AN
	2	0	—	—	—	—	—	—	—	—	0	6.0	JMS
	3	0	—	—	—	—	—	—	—	—	0	6.1	JMS
	4	6	7	6	5	6	7	6	5	7	8	5.8	TE
	5	0	15	14	0	15	12	13	11	0	14	6.2	TE
	6	13	21	16Δ	0Δ	20	0Δ	1Δ	12Δ	14	18	6.8	"
	7	23	16	0	0	19	0	25	0	23	0	—	JMS
	8												
TOTALS		19	43	36	5	41	19	20	28	21	40		

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
10	27.2 ± 12.5

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
	1												
	2												
	3												
	4												
	5												
	6												
	7												
	8												
TOTALS													

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.

Board Used	Cup									
814A	2	15	20	25	26	57	58	35	45	46
814B										

Date/time adults isolated	8/18/20 530
Date/time neonates harvested	8/18/20 1100

Template number 21 Six day survival and reproduction used for all statistical analyses.

Data Checked and Approved by Laboratory Manager (Initials): AN

CETIS Summary Report

Report Date:	09 Sep-20 14:44 (p 1 of 1)
Test Code/ID:	16DDE37B / 03-8364-0443

Ceriodaphnia 7-d Survival and Reproduction Test — **GEI Consultants, Inc**

Batch ID:	17-7244-7692	**Test Type:**	Reproduction-Survival (6-8d)	**Analyst:**			
Start Date:	04 Aug-20 13:25	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	EPA MH Recon		
Ending Date:	10 Aug-20 13:05	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	6d	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	

Sample ID:	17-8054-0155	**Code:**	RIC820-DR2	**Project:**	Special Studies
Sample Date:	03 Aug-20 10:20	**Material:**	Mining Effluent	**Source:**	Special Studies
Receipt Date:	04 Aug-20 08:00	**CAS (PC):**		**Station:**	DR-2
Sample Age:	27h (4 °C)	**Client:**	Copper Environmental Consulting		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
18-2011-6744	6d Reproduction	Steel Many-One Rank Sum Test		100	>100	n/a	1	23.6%	1
00-3318-2340	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test		100	>100	n/a	1	n/a	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
03-8642-7848	6d Reproduction	Linear Interpolation (ICPIN)	✓	IC5	>100	n/a	n/a	<1	1
			✓	IC10	>100	n/a	n/a	<1	
			✓	IC15	>100	n/a	n/a	<1	
			✓	IC20	>100	n/a	n/a	<1	
			✓	IC25	>100	n/a	n/a	<1	
			✓	IC40	>100	n/a	n/a	<1	
			✓	IC50	>100	n/a	n/a	<1	
08-1021-8244	6d Survival Rate	Linear Interpolation (ICPIN)	✓	EC5	>100	n/a	n/a	<1	1
			✓	EC10	>100	n/a	n/a	<1	
			✓	EC15	>100	n/a	n/a	<1	
			✓	EC20	>100	n/a	n/a	<1	
			✓	EC25	>100	n/a	n/a	<1	
			✓	EC40	>100	n/a	n/a	<1	
			✓	EC50	>100	n/a	n/a	<1	

6d Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	33.6	30.34	36.86	26	40	1.439	4.551	13.54%	0.00%
0	L	10	29.4	17.95	40.85	0	46	5.06	16	54.43%	12.50%
10		10	34.9	29.15	40.65	18	44	2.541	8.034	23.02%	-3.87%
20		10	37.4	32.57	42.23	31	55	2.135	6.753	18.06%	-11.31%
40		10	32.4	24.89	39.91	5	42	3.321	10.5	32.41%	3.57%
60		10	35.7	31.15	40.25	23	47	2.011	6.36	17.82%	-6.25%
80		10	37.9	30.85	44.95	22	56	3.114	9.848	25.98%	-12.80%
100		10	38.3	35	41.6	31	45	1.461	4.62	12.06%	-13.99%

6d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
0	L	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
10		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
20		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
40		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
60		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
80		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

CETIS Summary Report

Report Date:	09 Sep-20 15:59 (p 1 of 1)
Test Code/ID:	26735E89 / 06-4509-5049

Ceriodaphnia 7-d Survival and Reproduction Test — **GEI Consultants, Inc**

Batch ID:	08-0370-2393	**Test Type:**	Reproduction-Survival (6-8d)	**Analyst:**			
Start Date:	11 Aug-20 11:25	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	EPA MH Recon		
Ending Date:	17 Aug-20 11:25	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	6d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	

Sample ID:	07-4976-5546	**Code:**	RIC820-DR6	**Project:**	Special Studies
Sample Date:	10 Aug-20 10:15	**Material:**	Mining Effluent	**Source:**	Special Studies
Receipt Date:	11 Aug-20 07:40	**CAS (PC):**		**Station:**	DR-6
Sample Age:	25h	**Client:**	Copper Environmental Consulting		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
07-8156-1885	6d Reproduction	Wilcoxon/Bonferroni Adj Test		100	>100	n/a	1	24.2%	1
19-5188-6712	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test		100	>100	n/a	1	n/a	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
07-6624-4682	6d Reproduction	Linear Interpolation (ICPIN)	✓	IC5	56.57	18.45	90.56	1.768	1
			✓	IC10	92.55	50.22	n/a	1.081	
			✓	IC15	>100	n/a	n/a	<1	
			✓	IC20	>100	n/a	n/a	<1	
			✓	IC25	>100	n/a	n/a	<1	
			✓	IC40	>100	n/a	n/a	<1	
			✓	IC50	>100	n/a	n/a	<1	
07-2083-6887	6d Survival Rate	Linear Interpolation (ICPIN)		EC5	>100	n/a	n/a	<1	1
				EC10	>100	n/a	n/a	<1	
			✓	EC15	>100	n/a	n/a	<1	
			✓	EC20	>100	n/a	n/a	<1	
			✓	EC25	>100	n/a	n/a	<1	
			✓	EC40	>100	n/a	n/a	<1	
			✓	EC50	>100	n/a	n/a	<1	

6d Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	9	31.67	28.92	34.41	26	38	1.19	3.571	11.28%	0.00%
0	L	9	28	17.13	38.87	0	46	4.714	14.14	50.51%	11.58%
10		9	34.56	32.03	37.08	30	39	1.094	3.283	9.50%	-9.12%
20		9	33.78	27.28	40.27	16	46	2.817	8.452	25.02%	-6.67%
40		9	34.89	30.17	39.6	24	41	2.044	6.133	17.58%	-10.18%
60		9	30	20.93	39.07	0	41	3.933	11.8	39.33%	5.26%
80		8	33.38	30.31	36.44	30	39	1.295	3.662	10.97%	-5.39%
100		9	29.56	26.75	32.36	26	36	1.215	3.644	12.33%	6.67%

6d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	9	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
0	L	9	0.8889	0.6327	1.0000	0.0000	1.0000	0.1111	0.3333	37.50%	11.11%
10		9	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
20		9	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
40		9	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
60		9	0.8889	0.6327	1.0000	0.0000	1.0000	0.1111	0.3333	37.50%	11.11%
80		8	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		9	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

CETIS Summary Report

Report Date:	09 Sep-20 15:42 (p 1 of 1)
Test Code/ID:	1BFFEA9 / 00-2935-9785

Ceriodaphnia 7-d Survival and Reproduction Test — **GEI Consultants, Inc**

Batch ID:	00-1304-1570	**Test Type:**	Reproduction-Survival (6-8d)	**Analyst:**			
Start Date:	11 Aug-20 11:50	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	EPA MH Recon		
Ending Date:	18 Aug-20 11:15	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	6d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	

Sample ID:	01-9187-7698	**Code:**	RIC820-DR7	**Project:**	Special Studies
Sample Date:	10 Aug-20 11:15	**Material:**	Mining Effluent	**Source:**	Special Studies
Receipt Date:	11 Aug-20 07:40	**CAS (PC):**		**Station:**	DR-7
Sample Age:	25h (1 °C)	**Client:**	Copper Environmental Consulting		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
04-1357-8110	6d Reproduction	Dunnett Multiple Comparison Test		100	>100	n/a	1	35.3%	1
12-9537-3504	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test		100	>100	n/a	1	n/a	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
15-1034-8034	6d Reproduction	Linear Interpolation (ICPIN)	✓	IC5	>100	n/a	n/a	<1	1
			✓	IC10	>100	n/a	n/a	<1	
			✓	IC15	>100	n/a	n/a	<1	
			✓	IC20	>100	n/a	n/a	<1	
			✓	IC25	>100	n/a	n/a	<1	
			✓	IC40	>100	n/a	n/a	<1	
			✓	IC50	>100	n/a	n/a	<1	
11-7574-3423	6d Survival Rate	Linear Interpolation (ICPIN)	✓	EC5	>100	n/a	n/a	<1	1
			✓	EC10	>100	n/a	n/a	<1	
			✓	EC15	>100	n/a	n/a	<1	
			✓	EC20	>100	n/a	n/a	<1	
			✓	EC25	>100	n/a	n/a	<1	
			✓	EC40	>100	n/a	n/a	<1	
			✓	EC50	>100	n/a	n/a	<1	

6d Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	9	29	21.41	36.59	12	40	3.291	9.874	34.05%	0.00%
0	L	9	31.78	22	41.56	0	45	4.242	12.73	40.05%	-9.58%
10		9	37.11	32.82	41.4	29	46	1.859	5.578	15.03%	-27.97%
20		9	27.89	15.4	40.38	0	44	5.417	16.25	58.27%	3.83%
40		9	39.33	34.35	44.31	27	50	2.16	6.481	16.48%	-35.63%
60		9	39.11	33.72	44.5	28	50	2.336	7.008	17.92%	-34.87%
80		9	40	35.57	44.43	32	51	1.922	5.766	14.42%	-37.93%
100		9	39.67	32.74	46.6	19	51	3.005	9.014	22.72%	-36.78%

6d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	9	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
0	L	9	0.8889	0.6327	1.0000	0.0000	1.0000	0.1111	0.3333	37.50%	11.11%
10		9	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
20		9	0.7778	0.4388	1.0000	0.0000	1.0000	0.1470	0.4410	56.69%	22.22%
40		9	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
60		9	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
80		9	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		9	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

CETIS Summary Report

EPA MH Control

Report Date: 16 Sep-20 14:57 (p 1 of 1)
Test Code/ID: 56413248 / 14-4711-3288

Ceriodaphnia 7-d Survival and Reproduction Test — **GEI Consultants, Inc**

Batch ID:	03-9392-2332	**Test Type:**	Reproduction-Survival (6-8d)	**Analyst:**		
Start Date:	18 Aug-20 12:20	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water	
Ending Date:	24 Aug-20 11:20	**Species:**	Ceriodaphnia dubia	**Brine:**		
Test Length:	5d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**

Sample ID:	13-9327-4487	**Code:**	RIC820-AC3EFF	**Project:**	Special Studies
Sample Date:	17 Aug-20 10:20	**Material:**	Mining Effluent	**Source:**	Special Studies
Receipt Date:	18 Aug-20 07:40	**CAS (PC):**		**Station:**	AC3EFF
Sample Age:	26h (1 °C)	**Client:**	Copper Environmental Consulting		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
20-0399-1743	6d Reproduction	Steel Many-One Rank Sum Test		100	>100	n/a	1	26.8%	1
19-2307-3871	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test		100	>100	n/a	1	n/a	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
10-6517-7333	6d Reproduction	Linear Interpolation (ICPIN)	✓	IC5	4.422	2.377	64.95	22.62	1
			✓	IC10	8.843	4.754	91.08	11.31	
			✓	IC15	66.95	7.131	n/a	1.494	
			✓	IC20	80.36	9.508	n/a	1.244	
			✓	IC25	97.05	53.88	n/a	1.03	
			✓	IC40	>100	n/a	n/a	<1	
			✓	IC50	>100	n/a	n/a	<1	
10-1750-4890	6d Survival Rate	Linear Interpolation (ICPIN)		EC5	>100	n/a	n/a	<1	1
				EC10	>100	n/a	n/a	<1	
				EC15	>100	n/a	n/a	<1	
				EC20	>100	n/a	n/a	<1	
				EC25	>100	n/a	n/a	<1	
			✓	EC40	>100	n/a	n/a	<1	
			✓	EC50	>100	n/a	n/a	<1	

6d Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	36.7	31.87	41.53	22	43	2.135	6.75	18.39%	0.00%
0	L	10	34.9	29.96	39.84	17	41	2.183	6.903	19.78%	4.90%
10		10	31.1	24.86	37.34	17	42	2.759	8.724	28.05%	15.26%
20		10	34	27.74	40.26	18	43	2.769	8.756	25.75%	7.36%
40		10	31.3	24.63	37.97	17	44	2.948	9.322	29.78%	14.71%
60		10	33	26.75	39.25	17	43	2.765	8.743	26.49%	10.08%
80		10	29.4	22.21	36.59	15	40	3.177	10.05	34.17%	19.89%
100		10	27.2	18.28	36.12	5	43	3.943	12.47	45.85%	25.89%

6d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
0	L	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
10		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
20		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
40		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
60		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
80		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

CETIS Summary Report High Hardness Control

Report Date:	16 Sep-20 14:57 (p 1 of 1)
Test Code/ID:	56413248 / 14-4711-3288

Ceriodaphnia 7-d Survival and Reproduction Test — **GEI Consultants, Inc**

Batch ID:	03-9392-2332	**Test Type:**	Reproduction-Survival (6-8d)	**Analyst:**		
Start Date:	18 Aug-20 12:20	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water	
Ending Date:	24 Aug-20 11:20	**Species:**	Ceriodaphnia dubia	**Brine:**		
Test Length:	5d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**

Sample ID:	13-9327-4487	**Code:**	RIC820-AC3EFF	**Project:**	Special Studies
Sample Date:	17 Aug-20 10:20	**Material:**	Mining Effluent	**Source:**	Special Studies
Receipt Date:	18 Aug-20 07:40	**CAS (PC):**		**Station:**	AC3EFF
Sample Age:	26h (1 °C)	**Client:**	Copper Environmental Consulting		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
17-1587-7677	6d Reproduction	Steel Many-One Rank Sum Test		100	>100	n/a	1	28.3%	1
10-5976-3746	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test		100	>100	n/a	1	n/a	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
14-1597-0063	6d Reproduction	Linear Interpolation (ICPIN)		IC5	7.426	3.216	n/a	13.47	1
				IC10	65.38	6.431	n/a	1.529	
				IC15	78.07	9.647	n/a	1.281	
				IC20	93.45	38.87	n/a	1.07	
				IC25	>100	n/a	n/a	<1	
			✓	IC40	>100	n/a	n/a	<1	
			✓	IC50	>100	n/a	n/a	<1	
20-7974-8594	6d Survival Rate	Linear Interpolation (ICPIN)		EC5	>100	n/a	n/a	<1	1
				EC10	>100	n/a	n/a	<1	
				EC15	>100	n/a	n/a	<1	
				EC20	>100	n/a	n/a	<1	
				EC25	>100	n/a	n/a	<1	
			✓	EC40	>100	n/a	n/a	<1	
			✓	EC50	>100	n/a	n/a	<1	

6d Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	36.7	31.87	41.53	22	43	2.135	6.75	18.39%	0.00%
0	L	10	34.9	29.96	39.84	17	41	2.183	6.903	19.78%	4.90%
10		10	31.1	24.86	37.34	17	42	2.759	8.724	28.05%	15.26%
20		10	34	27.74	40.26	18	43	2.769	8.756	25.75%	7.36%
40		10	31.3	24.63	37.97	17	44	2.948	9.322	29.78%	14.71%
60		10	33	26.75	39.25	17	43	2.765	8.743	26.49%	10.08%
80		10	29.4	22.21	36.59	15	40	3.177	10.05	34.17%	19.89%
100		10	27.2	18.28	36.12	5	43	3.943	12.47	45.85%	25.89%

6d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
0	L	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
10		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
20		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
40		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
60		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
80		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

GEI Consultants

Consulting
Engineers and
Scientists

Whole Effluent Toxicity Testing Report

Copper Environmental Consulting - Rico

Submitted to:
Kevin Pfeifer
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Submitted by:
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January 28, 2021
Project 2003718
Report prepared by: MH/JMS

1.0 Test Summary

Enclosed are the results of the acute and chronic *Ceriodaphnia dubia* tests and the acute *Pimephales promelas* tests performed in November and December 2020 and January 2021 on the DR-2, DR-3, DR-6, DR-7, and AC3EFF sites. Acute and chronic toxicity test procedures followed methods described in EPA documentation (EPA 2002a and 2002b).

The chronic *C. dubia* test for the AC3EFF site was originally initiated concurrently with the acute *C. dubia* and *P. promelas* tests on November 17, 2020. However, the percent minimum significant difference (PMSD) exceeded the upper boundary set by the EPA of 47% indicating an invalid test and was rescheduled for December 8, 2020. In addition, the acute *C. dubia* test for the DR-2 site was originally initiated December 1, 2020. However, the EPA hard reconstituted (EPA hard recon) water control (dilution water control) did not meet performance criteria (<90% survival) and was rescheduled for January 8, 2021.

Daily temperatures were taken in the test chambers for the duration of all tests. The temperature in the acute DR-6 *C. dubia* test differed by 4.7°C and the temperature in the chronic DR-6 *C. dubia* test differed by 3.3°C.

A high hardness reconstituted (HH recon) water was tested to isolate whether potential effects on the organisms in the various site waters may be due in part to the ionic composition of the water. The high hardness water was created to match the ion composition of the DR-6 site based on a specific timeframe targeted by Rico. The survival of 85% in the HH recon control in the DR-2 test did not meet control performance criteria of ≥90%.

There were no significant effects on survival in the acute DR-2, AC3EFF, DR-6, and DR-7 *C. dubia* tests, however, significant effects were detected on survival in the acute DR-3 *C. dubia* test with an LC_{50} of 23.8% effluent (95% C.I. 16.9 to 30.3). Control performance criteria were met in all acute *C. dubia* tests.

There were no significant effects in the acute *P. promelas* tests for any site and control performance criteria were met.

There were no significant effects on survival or reproduction in the chronic AC3EFF, DR-2, or DR-7 *C. dubia* tests. Chronic testing was not conducted for the DR-3 site. There were no significant effects on survival in the chronic DR-6 *C. dubia* test, however, there were significant effects on reproduction with an IC_{25} of 75.2% effluent (95% C.I. 65.6 to 82.7) and a NOEC of 60% effluent. The IC_{25} for reproduction calculated by the statistical software was determined to be anomalous due to smoothing error. The IC_{25} was recalculated manually per EPA methodology (EPA 2002) and determined to be 76.5% effluent (95% C.I. unavailable). Control performance criteria were met in all chronic *C. dubia* tests.

Report approved by:

Ashley Romero, Laboratory Manager	Natalie Love, Laboratory Director

2.0 Test Conditions

2.1 *Ceriodaphnia dubia* 48-hour acute toxicity test

Method: EPA-821-R-02-012 -- Methods for measuring the acute toxicity of effluents . . .

Test Duration: 48 hours

Sample Collection Procedure: grab

Sample Collection Dates: 11/5/20, 11/16/20, 11/30/20, 1/7/21

Dilution water: EPA hard reconstituted water

Acclimation: cultured in moderately hard reconstituted water

Age of organisms at start: <24 hours old

Feeding: none

End Point: mortality

Start date and time:	DR-2	1/8/21	12:45
	DR-3	11/6/20	13:00
	DR-6	12/1/20	12:00
	DR-7	12/1/20	13:10
	AC3EFF	11/17/20	10:55
End date and time:	DR-2	1/10/21	12:10
	DR-3	11/8/20	12:35
	DR-6	12/3/20	11:20
	DR-7	12/3/20	13:05
	AC3EFF	11/19/20	10:45

Type of exposure chamber: 30 mL disposable plastic cup

Volume of exposure chamber: 25 mL

Number of animals exposed/chamber: 5

Number of replicates/treatment: 4

Test temperature:	DR-2	21.7°C ± 0.8°C
	DR-3	20.2°C ± 1.1°C
	DR-6	22.8°C ± 2.4°C
	DR-7	22.6°C ± 0.6°C
	AC3EFF	21.4°C ± 0.7°C

EPA recommended range: 20.0°C ± 1.0°C

Standard toxicant used: NaCl

2.2 *Pimephales promelas* 96-hour acute toxicity test

Method: EPA-821-R-02-012 -- Methods for measuring the acute toxicity of effluents . . .

Test Duration: 96 hours

Sample Collection Procedure: grab

Sample Collection Date: 11/5/20, 11/16/20, 11/30/20

Dilution water: EPA hard reconstituted water

Age of organisms at start: 7 days old

Feeding: before 48-hour solution renewal

End Point: mortality

Start date and time:	DR-2	12/1/20	11:25
	DR-3	11/6/20	11:40
	DR-6	12/1/20	11:20
	DR-7	12/1/20	12:05
	AC3EFF	11/17/20	10:10
End date and time:	DR-2	12/5/20	11:50
	DR-3	11/10/20	11:05
	DR-6	12/5/20	11:55
	DR-7	12/5/20	12:15
	AC3EFF	11/21/20	10:35

Type of exposure chamber: 9 oz. disposable plastic cup

Volume of exposure chamber: 200 mL

Number of animals exposed/chamber: 10

Number of replicates/treatment: 4

Test temperature:	DR-2	19.3°C ± 0.6°C
	DR-3	20.6°C ± 1.0°C
	DR-6	19.4°C ± 1.3°C
	DR-7	20.1°C ± 0.9°C
	AC3EFF	19.5°C ± 1.1°C

EPA recommended range: 20.0°C ± 1.0°C

Standard toxicant used: NaCl

2.3 *Ceriodaphnia dubia* 7-day toxicity test to estimate chronic toxicity

Method: EPA-821-R-02-013 -- Short-Term Method for Estimating Chronic Toxicity. . .

Test Duration: until at least 60% of control organisms release 3 broods

Sample Collection Procedure: grab

Sample Collection Date: DR-2/DR-6/DR-7 11/30/20, 12/2/20, 12/4/20
AC3EFF 12/7/20, 12/9/20, 12/11/20

Dilution water: EPA hard reconstituted water

Age of organisms at start: <24 hours old

Feeding: 0.1 mL YCT/0.1 mL *Selenastrum* daily

End Point: mortality, normalized reproduction

Start Date and Time:	DR-2	12/1/20	12:35
	DR-6	12/1/20	11:30
	DR-7	12/1/20	12:05
	AC3EFF	12/8/20	12:00
End Date and Time:	DR-2	12/8/20	11:40
	DR-6	12/8/20	11:10
	DR-7	12/8/20	11:20
	AC3EFF	12/14/20	11:30

Type of exposure chamber: 30 mL disposable plastic cup

Volume of exposure chamber: 15 mL

Number of animals exposed/chamber: 1

Number of replicates/treatment: 10

Test temperature:	DR-2	23.9°C ± 1.5°C
	DR-6	23.8°C ± 1.7°C
	DR-7	24.5°C ± 1.1°C
	AC3EFF	23.3°C ± 1.5°C

EPA recommended range: 25.0°C ± 1.0°C

Standard toxicant used: NaCl

3.0 QA/QC Summary

3.1 Sample QA/QC

Client: Copper Environmental Consulting - Rico

Date tests start: 11/6/20, 11/17/20, 12/1/20, 12/8/20, 1/8/21

Chain of custody received.....Yes

Chain of custody completed.....Yes

Samples received within holding times.....Yes

Samples at correct temperature (0-6°C or sampled same day received).....Yes

Samples used within 36 hours of collection.....Yes

3.2 Test Acceptability

Control performance criteria met (Tables 1 & 2) .....Yes

Table 1: Acute control performance criteria requirements and test results by species.

Test Species	Site	Survival	
		Test (%)	Acceptable (%)
C. dubia	DR-2	95	90
	DR-3	100	
	DR-6	100	
	DR-7	90	
	AC3EFF	100	
P. promelas	DR-2	100	90
	DR-3	97.5	
	DR-6	90	
	DR-7	100	
	AC3EFF	95	

Table 2: Chronic control performance criteria requirements and test results by species.

Test Species	Site	Survival		Reproduction	
		Test (%)	Acceptable (%)	Test (#)	Acceptable (#)
C. dubia	DR-2	100	≥80	31.0	≥15.0
	DR-6	100		36.4	
	DR-7	100		34.9	
	AC3EFF	90		29.7	

Tests renewed within acceptable timeframe .....Yes

At least 60% of control organisms in chronic *C. dubia* test released at least 3 broods .....Yes

3.3 Statistical QA/QC

Percent minimum significant difference (PMSD) below upper bound for chronic tests (Table 3).....Yes

Table 3: Chronic control calculated and allowable PMSD upper bounds by species.

Test Species	Site	Calculated PMSD	EPA PMSD Upper Bound
C. dubia	DR-2	20	47
	DR-6	21	
	DR-7	15	
	AC3EFF	41	

3.4 Reference Toxicant Summary

Most recent reference toxicant tests met performance requirements (Tables 4-9).....Yes

Most recent reference toxicant tests within control chart requirements.....Yes

Table 4: Acute *Ceriodaphnia dubia* reference toxicant test with NaCl, conducted November 3 to 5, 2020.

g NaCl/L	Control	1.5	2.0	2.5	3.0	3.5
#alive/#exposed	19/20	16/20	13/19*	9/20	3/20	0/20
% survival	95	80	68.4	45	15	0

*Technician error, accidental death; one organism excluded from all statistical analyses.

Survival:
48 hour LC_{50} (Probit) = 2.43 g NaCl/L (95% C.I. 2.08 to 2.64)

Note: This is within our accepted performance range (2.15 to 3.31) determined by 20 previous reference tests performed.

Table 5: Acute *Ceriodaphnia dubia* reference toxicant test with NaCl, conducted December 8 to 10, 2020.

g NaCl/L	Control	1.5	2.0	2.5	3.0	3.5
#alive/#exposed	19/20	19/20	18/20	11/20	3/20	0/20
% survival	95	95	90	55	15	0

Survival:
48 hour LC_{50} (Spearman-Kärber) = 2.55 g NaCl/L (95% C.I. 2.40 to 2.70)

Note: This is within our accepted performance range (2.12 to 3.31) determined by 20 previous reference tests performed.

Table 6: Acute *Ceriodaphnia dubia* reference toxicant test with NaCl, conducted January 5 to 7, 2021.

g NaCl/L	Control	1.5	2.0	2.5	3.0	3.5
#alive/#exposed	20/20	20/20	19/20	18/20	9/20	5/20
% survival	100	100	95	90	45	25

Survival:
48 hour LC_{50} (Probit) = 2.98 g NaCl/L (95% C.I. 2.74 to 3.25)

Note: This is within our accepted performance range (2.16 to 3.30) determined by 20 previous reference tests performed.

Table 7: Acute *Pimephales promelas* reference toxicant test with NaCl, conducted November 3 to 7, 2020.

g NaCl/L	Control	5.0	6.0	7.0	8.0	9.0
#alive/#exposed	39/40	40/40	39/40	36/40	17/40	2/40
% survival	97.5	100	97.5	90	42.5	5

Survival:
96 hour LC_{50} (Trimmed Spearman-Kärber) = 7.86 g NaCl/L (95% C.I. 7.66 to 8.06)

Note: This is within our accepted performance range (6.94 to 8.66) determined by 20 previous reference tests performed.

Table 8: Acute *Pimephales promelas* reference toxicant test with NaCl, conducted December 8 to 12, 2020.

g NaCl/L	Control	5.0	6.0	7.0	8.0	9.0
#alive/#exposed	39/40	40/40	40/40	35/40	16/40	0/40
% survival	97.5	100	100	87.5	40	0

Survival:
96 hour LC_{50} (Spearman-Kärber) = 7.74 g NaCl/L (95% C.I. 7.55 to 7.93)

Note: This is within our accepted performance range (6.96 to 8.67) determined by 20 previous reference tests performed.

Table 9: Chronic *Ceriodaphnia dubia* reference toxicant test with NaCl, conducted December 8 to 14, 2020.

Mg NaCl/L	Control	150	300	600	1200	2400
#alive/#exposed	10/10	10/10	10/10	10/10	10/10	3/10
% survival	100	100	100	100	100	30
Normalized reproduction ±SD	35.8 ± 8.5	31.5 ± 10.4	36.8 ± 6.0	35.4 ± 6.2	25.7 ± 7.8	0.0 ± 0.0

Normalized Reproduction:
IC_{25} (ICp Method) = 1122 mg NaCl/L (95% C.I. 830.5 to 1326)

Note: This is within our accepted performance range (449.4 to 1288.1) determined by 20 previous reference tests performed.

4.0 Results

4.1 *Ceriodaphnia dubia* Acute Toxicity Test

TEST: 48-hour acute with *Ceriodaphnia dubia* OPERATORS: AW, TE

Start: 1/8/21 12:45
End: 1/10/21 12:10
Test Substance: DR-2 Site water
Diluent: EPA hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 10: Summary results of *C. dubia* acute toxicity test.

Treatment % Site water	HH Recon	EPA H Recon	10	20	40	60	80	100
#alive/#exposed	17/20	19/20	19/20	19/20	19/20	20/20	17/20	19/20
% survival	85	95	95	95	95	100	85	95
Dissolved O_2 range (mg/L)	7.3 7.2	7.2 7.2	7.2 7.2	7.1 7.1	7.2 7.1	7.2 7.1	7.2 7.1	7.2 7.1
pH range (SU)	8.2 8.1	8.5 8.4	8.5 8.5	8.5 8.5	8.5 8.5	8.5 8.5	8.5 8.5	8.5 8.5
Conductivity range (µmho/cm)	1221 1207	576 520	514 499	497 490	467 458	447 435	421 409	394 384
Temperature range (°C)	22.5 21.6	21.3 21.0	21.1 20.9	21.2 20.9	21.4 21.0	21.3 21.0	21.6 21.1	22.0 21.7

Statistical Analysis:

LC_{50} (Probit) = >100% DR-2 Site water (95% C.I. unavailable)

4.2 *Ceriodaphnia dubia* Acute Toxicity Test

TEST: 48-hour acute with *Ceriodaphnia dubia* OPERATORS: LAG, JW, TE

Start: 11/6/20 13:00
End: 11/8/20 12:35
Test Substance: DR-3 Site water
Diluent: EPA hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 11: Summary results of *C. dubia* acute toxicity test.

Treatment % Site water	HH Recon	EPA H Recon	10	20	40	60	80	100
#alive/#exposed	19/20	20/20	19/20	8/20	6/20	1/20	2/20	0/20
% survival	95	100	95	40	30	5	10	0
Dissolved O_2 range (mg/L)	7.0 6.9	7.0 6.9	6.9 6.9	6.9 6.9	6.9 6.9	6.9 6.9	6.9 6.9	6.9 6.9
pH range (SU)	8.2 8.1	8.5 8.5	8.5 8.4	8.4 8.4	8.4 8.4	8.3 8.3	8.3 8.2	8.3 8.2
Conductivity range (µmho/cm)	1252 1240	546 544	624 612	689 682	822 813	941 937	1074 1058	1169 1158
Temperature range (°C)	20.8 19.7	21.0 19.4	21.2 19.2	21.0 19.2	20.9 19.2	20.8 19.2	20.9 19.1	21.2 19.1

Statistical Analysis:

LC_{50} (Probit) = 23.8% DR-3 Site water (95% C.I. 16.9 to 30.3)

4.3 *Ceriodaphnia dubia* Acute Toxicity Test

TEST: 48-hour acute with *Ceriodaphnia dubia* OPERATORS: AW, CL

Start: 12/1/20 12:00
End: 12/3/20 11:20
Test Substance: DR-6 Site water
Diluent: EPA hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 12: Summary results of *C. dubia* acute toxicity test.

Treatment % Site water	HH Recon	EPA H Recon	10	20	40	60	80	100
#alive/#exposed	19/20	20/20	19/20	20/20	14/15*	19/20	8/10**	12/15*
% survival	95	100	95	100	93.3	95	80	80
Dissolved O_2 range (mg/L)	7.3 7.2	7.3 7.2	7.2 7.2	7.3 7.2	7.2 7.2	7.2 7.2	7.3 7.1	7.3 7.2
pH range (SU)	8.2 8.1	8.4 8.4	8.4 8.4	8.4 8.4	8.4 8.4	8.4 8.3	8.3 8.2	8.3 8.2
Conductivity range (µmho/cm)	1365 1225	616 536	700 604	788 693	948 836	1146 974	1247 1112	1418 1235
Temperature range (°C)	23.6 20.4	25.1 21.0	24.7 21.2	24.3 21.5	24.2 21.0	22.8 21.2	23.7 21.4	22.6 21.1

*Technician error, missing organisms; one replicate excluded from all statistical analyses.
**Technician error, missing organisms; two replicates excluded from all statistical analyses.

Statistical Analysis:

LC_{50} (Probit) = >100% DR-6 Site water (95% C.I. unavailable)

4.4 *Ceriodaphnia dubia* Acute Toxicity Test

TEST: 48-hour acute with *Ceriodaphnia dubia* OPERATORS: TE, JW, JMS

Start: 12/1/20 13:10
End: 12/3/20 13:05
Test Substance: DR-7 Site water
Diluent: EPA hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 13: Summary results of *C. dubia* acute toxicity test.

Treatment % Site water	HH Recon	EPA H Recon	10	20	40	60	80	100
#alive/#exposed	20/20	18/20	19/20	20/20	18/20	20/20	18/20	19/20
% survival	100	90	95	100	90	100	90	95
Dissolved O_2 range (mg/L)	7.2 7.1	7.1 7.1	7.1 7.0	7.0 7.0	7.1 7.0	7.1 7.0	7.1 7.0	7.1 7.0
pH range (SU)	8.3 8.1	8.4 8.4	8.4 8.4	8.5 8.4	8.5 8.4	8.4 8.4	8.4 8.3	8.2 8.2
Conductivity range (µmho/cm)	1344 1172	610 508	602 525	609 533	629 557	646 578	659 590	669 604
Temperature range (°C)	22.7 22.0	22.6 22.0	22.5 22.0	23.0 22.0	22.4 22.1	23.1 22.2	22.4 22.1	22.4 22.1

Statistical Analysis:

LC_{50} (Probit) = >100% DR-7 Site water (95% C.I. unavailable)

4.5 *Ceriodaphnia dubia* Acute Toxicity Test

TEST: 48-hour acute with *Ceriodaphnia dubia* OPERATORS: CL, JW, LAG

Start: 11/17/20 10:55
End: 11/19/20 10:45
Test Substance: AC3EFF Site water
Diluent: EPA hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 14: Summary results of *C. dubia* acute toxicity test.

Treatment % Site water	HH Recon	EPA H Recon	10	20	40	60	80	100
#alive/#exposed	20/20	20/20	19/20	20/20	19/20	20/20	20/20	20/20
% survival	100	100	95	100	95	100	100	100
Dissolved O_2 range (mg/L)	7.2 7.1	7.1 7.0	7.1 7.0	7.1 7.0	7.1 7.0	7.1 7.0	7.1 7.0	7.0 7.0
pH range (SU)	8.2 8.1	8.4 8.4	8.4 8.4	8.4 8.4	8.4 8.3	8.3 8.3	8.3 8.3	8.2 8.2
Conductivity range (µmho/cm)	1371 1331	605 577	669 644	743 716	888 857	1006 987	1143 1121	1270 1230
Temperature range (°C)	21.1 20.7	22.0 21.4	21.1 21.1	21.4 21.0	21.7 21.3	21.8 21.6	21.8 21.8	21.5 21.3

Statistical Analysis:

LC_{50} (Probit) = >100% AC3EFF Site water (95% C.I. unavailable)

4.6 *Pimephales promelas* Acute Toxicity Test

TEST: 96-hour acute with *Pimephales promelas* OPERATORS: JMS, LAG, TE, JW

Start: 12/1/20 11:25
End: 12/5/20 11:50
Test Substance: DR-2 Site water
Diluent: EPA hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 15: Summary results of *P. promelas* acute toxicity test.

Treatment % Site water	HH Recon	EPA H Recon	10	20	40	60	80	100
#alive/#exposed	40/40	40/40	40/40	40/40	35/40	37/40	39/40	38/40
% survival	100	100	100	100	87.5	92.5	97.5	95
Dissolved O_2 range (mg/L)	7.0 6.8	7.0 6.7	7.0 6.6	7.0 6.6	7.0 6.7	7.0 6.6	7.0 6.7	7.0 6.7
pH range (SU)	8.2 8.1	8.3 8.3	8.3 8.3	8.3 8.3	8.3 8.3	8.3 8.3	8.3 8.3	8.3 8.3
Conductivity range (µmho/cm)	1341 1199	545 515	560 503	536 482	512 456	475 429	441 394	405 361
Temperature range (°C)	19.8 19.4	19.8 19.5	19.7 19.5	19.5 19.4	19.5 18.7	19.4 19.3	19.9 19.3	19.7 19.3

Statistical Analysis:

LC_{50} (Probit) = >100% DR-2 Site water (95% C.I. unavailable)

4.7 *Pimephales promelas* Acute Toxicity Test

TEST: 96-hour acute with *Pimephales promelas* OPERATORS: LAG, TE, CL

Start: 11/6/20 11:40
End: 11/10/20 11:05
Test Substance: DR-3 Site water
Diluent: EPA hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 16: Summary results of *P. promelas* acute toxicity test.

Treatment % Site water	HH Recon	EPA H Recon	10	20	40	60	80	100
#alive/#exposed	37/40	39/40	37/40	39/40	37/40	38/40	37/40	37/40
% survival	92.5	97.5	92.5	97.5	92.5	95	92.5	92.5
Dissolved O_2 range (mg/L)	6.6 5.1	6.4 5.4	6.5 5.2	6.5 5.2	6.5 5.2	6.5 5.1	6.5 5.2	6.5 5.6
pH range (SU)	8.2 8.0	8.3 8.1	8.2 8.1	8.2 8.0	8.1 7.9	8.1 7.9	8.0 7.8	8.0 7.8
Conductivity range (µmho/cm)	1270 1179	574 513	613 584	680 651	819 775	938 897	1046 1000	1167 1116
Temperature range (°C)	20.9 19.7	21.3 20.2	21.6 19.8	20.8 19.8	20.5 19.9	20.4 19.9	20.4 19.7	20.9 19.6

Statistical Analysis:

LC_{50} (Probit) = >100% DR-3 Site water (95% C.I. unavailable)

4.8 *Pimephales promelas* Acute Toxicity Test

TEST: 96-hour acute with *Pimephales promelas* OPERATORS: CL, LAG, JW, TE

Start: 12/1/20 11:20
End: 12/5/20 11:55
Test Substance: DR-6 Site water
Diluent: EPA hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 17: Summary results of *P. promelas* acute toxicity test.

Treatment % Site water	HH Recon	EPA H Recon	10	20	40	60	80	100
#alive/#exposed	38/40	36/40	39/40	37/40	37/40	39/40	39/40	39/40
% survival	95	90	97.5	92.5	92.5	97.5	97.5	97.5
Dissolved O_2 range (mg/L)	7.1 6.6	7.3 6.7	7.2 6.7	7.1 6.7	7.2 6.7	7.2 6.7	7.1 6.7	7.1 6.7
pH range (SU)	8.2 8.1	8.3 8.3	8.3 8.2	8.3 8.2	8.3 8.2	8.3 8.2	8.2 8.2	8.2 8.2
Conductivity range (µmho/cm)	1353 1192	570 511	675 599	744 672	913 815	1077 952	1221 1094	1341 1216
Temperature range (°C)	20.7 18.9	20.7 19.0	19.6 19.3	20.6 18.1	20.5 18.6	20.6 19.2	20.5 19.5	20.7 19.4

Statistical Analysis:

LC_{50} (Probit) = >100% DR-6 Site water (95% C.I. unavailable)

4.9 *Pimephales promelas* Acute Toxicity Test

TEST: 96-hour acute with *Pimephales promelas* OPERATORS: TE, JW, JMS, AW

Start: 12/1/20 12:05
End: 12/5/20 12:15
Test Substance: DR-7 Site water
Diluent: EPA hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 18: Summary results of *P. promelas* acute toxicity test.

Treatment % Site water	HH Recon	EPA H Recon	10	20	40	60	80	100
#alive/#exposed	40/40	40/40	40/40	40/40	39/40	39/40	40/40	40/40
% survival	100	100	100	100	97.5	97.5	100	100
Dissolved O_2 range (mg/L)	6.9 6.7	6.9 6.5	6.9 6.5	6.9 6.5	6.9 6.4	6.9 6.4	6.9 6.4	6.9 6.5
pH range (SU)	8.2 8.1	8.3 8.3	8.3 8.2	8.3 8.2	8.3 8.2	8.3 8.2	8.3 8.2	8.3 8.2
Conductivity range (µmho/cm)	1332 1192	583 515	583 524	590 529	618 555	641 575	664 597	686 616
Temperature range (°C)	20.2 19.6	20.9 19.6	20.1 19.6	20.3 19.4	20.0 19.2	20.2 19.3	20.4 19.4	20.3 19.5

Statistical Analysis:

LC_{50} (Probit) = >100% DR-7 Site water (95% C.I. unavailable)

4.10 *Pimephales promelas* Acute Toxicity Test

TEST: 96-hour acute with *Pimephales promelas* OPERATORS: AW, CL, JW

Start: 11/17/20 10:10
End: 11/21/20 10:35
Test Substance: AC3EFF Site water
Diluent: EPA hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 19: Summary results of *P. promelas* acute toxicity test.

Treatment % Site water	HH Recon	EPA H Recon	10	20	40	60	80	100
#alive/#exposed	40/40	38/40	39/40	38/40	39/40	38/40	39/40	40/40
% survival	100	95	97.5	95	97.5	95	97.5	100
Dissolved O_2 range (mg/L)	7.0 6.7	7.0 6.7	6.9 6.4	6.9 6.4	7.0 6.4	7.0 6.4	7.0 6.4	6.9 6.3
pH range (SU)	8.2 8.1	8.4 8.3	8.3 8.2	8.3 8.2	8.2 8.1	8.2 8.1	8.2 8.1	8.1 8.0
Conductivity range (µmho/cm)	1329 1257	570 530	659 618	731 678	963 809	997 839	1122 1058	1232 1158
Temperature range (°C)	20.3 19.2	20.5 18.9	19.8 19.2	19.4 18.4	20.0 18.8	20.3 18.9	20.2 19.2	20.3 19.6

Statistical Analysis:

LC_{50} (Probit) = >100% AC3EFF Site water (95% C.I. unavailable)

4.11 *Ceriodaphnia dubia* Chronic Toxicity Test

TEST: 7-day chronic with *Ceriodaphnia dubia* OPERATORS: AW, CL, BK, TE, MH

Start: 12/1/20 12:35
End: 12/8/20 11:40
Test Substance: DR-2 Site water
Diluent: EPA hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 20: Summary results of *C. dubia* chronic toxicity test.

Treatment % Site water	HH Recon	EPA H Recon	10	20	40	60	80	100
#alive/#exposed	10/10	10/10	9/10	10/10	10/10	10/10	10/10	10/10
% survival	100	100	90	100	100	100	100	100
Normalized repro / # females exposed ± SD	31.3 ± 4.5	31.0 ± 2.7	29.8 ± 8.3	30.8 ± 4.2	30.8 ± 4.5	31.9 ± 3.4	30.1 ± 8.7	29.6 ± 5.1
Dissolved O_2 range (mg/L)	7.2 6.7	7.1 6.7	7.0 6.7	7.1 6.7	7.1 6.7	7.2 6.7	7.2 6.6	7.2 6.6
pH range (SU)	8.4 8.3	8.5 8.4	8.5 8.5	8.6 8.4	8.6 8.5	8.6 8.5	8.6 8.5	8.6 8.5
Conductivity range (µmho/cm)	1423 1273	631 557	624 543	584 533	550 498	515 459	480 438	451 401
Temperature range (°C)	25.2 22.7	25.3 23.9	25.1 23.2	25.0 23.5	25.2 22.4	24.9 23.3	25.3 22.6	24.6 22.8

Statistical Analysis:

Survival:
NOEC (Fisher Exact/Bonferroni-Holm) = 100% DR-2 Site water
IC_{25} (ICp Method) = >100% DR-2 Site water (95% C.I. unavailable)

Normalized Reproduction:
NOEC (Steel Many-One Rank Sum) = 100% DR-2 Site water
IC_{25} (ICp Method) = >100% DR-2 Site water (95% C.I. unavailable)

4.12 *Ceriodaphnia dubia* Chronic Toxicity Test

TEST: 7-day chronic with *Ceriodaphnia dubia* OPERATORS: AW, JW, NL, TE, CL, MH

Start: 12/1/20 11:30
End: 12/8/20 11:10
Test Substance: DR-6 Site water
Diluent: EPA hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 21: Summary results of *C. dubia* chronic toxicity test.

Treatment % Site water	HH Recon	EPA H Recon	10	20	40	60	80	100
#alive/#exposed	10/10	10/10	10/10	10/10	10/10	10/10	10/10	10/10
% survival	100	100	100	100	100	100	100	100
Normalized repro / # females exposed ± SD	31.7 ± 9.0	36.4 ± 4.2	37.4 ± 5.7	32.9 ± 8.4	32.5 ± 7.7	33.5 ± 5.7	26.0 ± 9.6	12.6 ± 8.9
Dissolved O_2 range (mg/L)	7.2 6.7	7.2 6.8	7.3 6.7	7.2 6.7	7.1 6.7	7.1 6.7	7.1 6.7	7.1 6.7
pH range (SU)	8.4 8.3	8.6 8.4	8.5 8.4	8.5 8.4	8.5 8.4	8.5 8.4	8.5 8.4	8.5 8.4
Conductivity range (µmho/cm)	1455 1237	641 560	737 648	843 747	1003 887	1143 1008	1298 1147	1428 1294
Temperature range (°C)	25.4 24.2	24.3 22.1	24.7 23.0	25.0 23.2	24.7 23.3	25.0 23.8	25.1 23.6	24.7 23.0

Statistical Analysis:

Survival:
NOEC (Fisher Exact/Bonferroni-Holm) = 100% DR-6 Site water
IC_{25} (ICp Method) = >100% DR-6 Site water (95% C.I. unavailable)

Normalized Reproduction:
NOEC (Steel Many-One Rank Sum) = 60% DR-6 Site water
Approved: Smoothed IC_{25} (Manual Calculation) = 76.5% DR-6 Site water (95% C.I. unavailable)
Not Used: IC_{25} (ICp Method) = 75.2% DR-6 Site water (95% C.I. 65.6 to 82.7)

4.13 *Ceriodaphnia dubia* Chronic Toxicity Test

TEST: 7-day chronic with *Ceriodaphnia dubia* OPERATORS: JMS, LAG, JW, AW, BK

Start: 12/1/20 12:05
End: 12/8/20 11:20
Test Substance: DR-7 Site water
Diluent: EPA hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 22: Summary results of *C. dubia* chronic toxicity test.

Treatment % Site water	HH Recon	EPA H Recon	10	20	40	60	80	100
#alive/#exposed	10/10	10/10	10/10	10/10	10/10	10/10	10/10	10/10
% survival	100	100	100	100	100	100	100	100
Normalized repro / # females exposed ± SD	29.2 ± 5.5	34.9 ± 3.1	35.6 ± 4.2	36.2 ± 3.6	37.3 ± 5.5	36.9 ± 4.2	38.2 ± 4.3	35.1 ± 8.1
Dissolved O_2 range (mg/L)	7.0 6.8	6.9 6.7	7.0 6.6	7.1 6.7	7.2 6.7	7.1 6.6	7.3 6.7	7.2 6.7
pH range (SU)	8.4 8.3	8.5 8.4	8.6 8.4	8.6 8.4	8.7 8.5	8.6 8.5	8.6 8.5	8.6 8.3
Conductivity range (µmho/cm)	1391 1272	615 555	620 561	623 567	643 577	672 580	688 600	710 616
Temperature range (°C)	25.0 23.4	25.3 24.0	25.4 24.1	25.5 24.4	25.5 24.5	25.4 24.4	25.5 24.5	25.6 24.0

Statistical Analysis:

Survival:
NOEC (Fisher Exact/Bonferroni-Holm) = 100% DR-7 Site water
IC_{25} (ICp Method) = >100% DR-7 Site water (95% C.I. unavailable)

Normalized Reproduction:
NOEC (Steel Many-One Rank Sum) = 100% DR-7 Site water
IC_{25} (ICp Method) = >100% DR-7 Site water (95% C.I. unavailable)

4.14 *Ceriodaphnia dubia* Chronic Toxicity Test

TEST: 7-day chronic with *Ceriodaphnia dubia* OPERATORS: AR, TE, JW, JMS, LAG

Start: 12/8/20 12:00
End: 12/14/20 11:30
Test Substance: AC3EFF Site water
Diluent: EPA hard reconstituted water
Client/Project: Copper Environmental Consulting - Rico

Table 23: Summary results of *C. dubia* chronic toxicity test.

Treatment % Site water	HH Recon	EPA H Recon	10	20	40	60	80	100
#alive/#exposed	9/10	9/10	10/10	9/10	10/10	10/10	10/10	10/10
% survival	90	90	100	90	100	100	100	100
Normalized repro / # females exposed ± SD	24.7 ± 12.3	29.7 ± 12.7	30.1 ± 12.6	32.3 ± 13.8	33.7 ± 12.3	33.2 ± 10.2	35.4 ± 6.9	35.9 ± 11.8
Dissolved O_2 range (mg/L)	7.0 6.7	7.0 6.7	7.0 6.7	7.0 6.7	7.0 6.7	7.1 6.8	7.2 6.8	7.2 6.9
pH range (SU)	8.3 8.2	8.6 8.4	8.5 8.4	8.5 8.4	8.5 8.4	8.5 8.4	8.5 8.4	8.4 8.3
Conductivity range (µmho/cm)	1408 1287	610 552	699 635	802 715	889 820	1041 955	1150 1053	1284 1166
Temperature range (°C)	24.5 23.4	24.7 21.8	24.5 23.0	24.5 22.8	24.3 24.0	24.2 23.6	24.4 23.6	24.6 23.6

Statistical Analysis:

Survival:
NOEC (Fisher Exact/Bonferroni-Holm) = 100% AC3EFF Site water
IC_{25} (ICp Method) = >100% AC3EFF Site water (95% C.I. unavailable)

Normalized Reproduction:
NOEC (Steel Many-One Rank Sum) = 100% AC3EFF Site water
IC_{25} (ICp Method) = >100% AC3EFF Site water (95% C.I. unavailable)

4.15 Water Chemistry Results from Samples Received for Toxicity Tests

Table 24: Wet chemistry on reconstituted water and DR-2 Site water samples for acute *P. promelas* test and chronic *C. dubia* toxicity test.

Measurement	HH Recon Water	EPA H Recon Water	100% Effluent Received 12/1/20	100% Effluent Received 12/3/20	100% Effluent Received 12/5/20
Analysis Temperature (°C)	25.0	25.0	25.0	25.0	25.0
Total Hardness (mg $CaCO_3$/L)	720	170	198	210	218
pH (SU)	8.3	8.5	7.7	7.6	7.7
Alkalinity (mg $CaCO_3$/L)	98	116	118	128	130
Conductivity (µmho/cm)	1184	506	376	460	432
Total Dissolved Solids Calculated from Conductivity (mg/L)	--	--	184	225	212
Dissolved Oxygen (mg/L)	7.5	7.5	9.5	9.2	9.4
Ammonia as N (mg NH_3/L)	--	--	0.11	0.05	0.05
Un-ionized Ammonia (mg NH_3/L)	--	--	<0.10	<0.10	<0.10
Total Residual Chlorine (mg/L)	--	--	<0.02	<0.02	<0.02

Table 25: Wet chemistry on reconstituted water and DR-2 Site water samples for acute *C. dubia* toxicity test.

Measurement	HH Recon Water	EPA H Recon Water	100% Effluent Received 1/8/21
Analysis Temperature (°C)	25.0	25.0	20.0
Total Hardness (mg $CaCO_3$/L)	710	164	210
pH (SU)	8.3	8.4	7.7
Alkalinity (mg $CaCO_3$/L)	94	114	124
Conductivity (µmho/cm)	1168	489	410
Total Dissolved Solids Calculated from Conductivity (mg/L)	--	--	201
Dissolved Oxygen (mg/L)	7.2	7.3	9.2
Ammonia as N (mg NH_3/L)	--	--	0.24
Un-ionized Ammonia (mg NH_3/L)	--	--	<0.10
Total Residual Chlorine (mg/L)	--	--	<0.02

Table 26: Wet chemistry on reconstituted water and DR-3 Site water samples for acute toxicity tests.

Measurement	HH Recon Water	EPA H Recon Water	100% Effluent Received 11/6/20
Analysis Temperature (°C)	25.0	25.0	20.0
Total Hardness (mg $CaCO_3$/L)	730	166	720
pH (SU)	8.3	8.4	7.1
Alkalinity (mg $CaCO_3$/L)	96	116	104
Conductivity (µmho/cm)	1237	512	1118
Total Dissolved Solids Calculated from Conductivity (mg/L)	--	--	548
Dissolved Oxygen (mg/L)	6.9	7.1	6.3
Ammonia as N (mg NH_3/L)	--	--	0.05
Un-ionized Ammonia (mg NH_3/L)	--	--	<0.10
Total Residual Chlorine (mg/L)	--	--	<0.02

Table 27: Wet chemistry on reconstituted water and DR-6 Site water samples for acute and chronic toxicity tests.

Measurement	HH Recon Water	EPA H Recon Water	100% Effluent Received 12/1/20	100% Effluent Received 12/3/20	100% Effluent Received 12/5/20
Analysis Temperature (°C)	25.0	25.0	25.0	25.0	25.0
Total Hardness (mg $CaCO_3$/L)	720	170	710	720	760
pH (SU)	8.3	8.5	7.3	7.4	7.2
Alkalinity (mg $CaCO_3$/L)	98	116	122	126	140
Conductivity (µmho/cm)	1184	506	1259	1422	1334
Total Dissolved Solids Calculated from Conductivity (mg/L)	--	--	617	696	656
Dissolved Oxygen (mg/L)	7.5	7.5	9.2	9.2	9.1
Ammonia as N (mg NH_3/L)	--	--	0.06	0.05	0.07
Un-ionized Ammonia (mg NH_3/L)	--	--	<0.10	<0.10	<0.10
Total Residual Chlorine (mg/L)	--	--	<0.02	<0.02	<0.02

Table 28: Wet chemistry on reconstituted water and DR-7 Site water samples for acute and chronic toxicity tests.

Measurement	HH Recon Water	EPA H Recon Water	100% Effluent Received 12/1/20	100% Effluent Received 12/3/20	100% Effluent Received 12/5/20
Analysis Temperature (°C)	25.0	25.0	25.0	25.0	25.0
Total Hardness (mg $CaCO_3$/L)	720	170	352	314	370
pH (SU)	8.3	8.5	7.4	7.5	7.2
Alkalinity (mg $CaCO_3$/L)	98	116	166	156	170
Conductivity (µmho/cm)	1184	506	654	667	682
Total Dissolved Solids Calculated from Conductivity (mg/L)	--	--	321	327	335
Dissolved Oxygen (mg/L)	7.5	7.5	9.6	9.0	9.5
Ammonia as N (mg NH_3/L)	--	--	0.05	0.05	0.06
Un-ionized Ammonia (mg NH_3/L)	--	--	<0.10	<0.10	<0.10
Total Residual Chlorine (mg/L)	--	--	<0.02	<0.02	<0.02

Table 29: Wet chemistry on reconstituted water and AC3EFF Site water samples for acute toxicity tests.

Measurement	HH Recon Water	EPA H Recon Water	100% Effluent Received 11/17/20
Analysis Temperature (°C)	25.0	25.0	25.0
Total Hardness (mg $CaCO_3$/L)	730	168	650
pH (SU)	8.3	8.5	7.5
Alkalinity (mg $CaCO_3$/L)	100	114	88
Conductivity (µmho/cm)	1194	516	1164
Total Dissolved Solids Calculated from Conductivity (mg/L)	--	--	570
Dissolved Oxygen (mg/L)	7.5	7.4	8.3
Ammonia as N (mg NH_3/L)	--	--	0.09
Un-ionized Ammonia (mg NH_3/L)	--	--	<0.10
Total Residual Chlorine (mg/L)	--	--	<0.02

Table 30: Wet chemistry on reconstituted water and AC3EFF Site water samples for chronic toxicity test.

Measurement	HH Recon Water	EPA H Recon Water	100% Effluent Received 12/8/20	100% Effluent Received 12/10/20	100% Effluent Received 12/12/20
Analysis Temperature (°C)	25.0	25.0	25.0	25.0	25.0
Total Hardness (mg $CaCO_3$/L)	720	170	570	690	630
pH (SU)	8.3	8.5	7.5	7.4	7.4
Alkalinity (mg $CaCO_3$/L)	98	116	90	90	90
Conductivity (µmho/cm)	1184	506	1182	1267	1142
Total Dissolved Solids Calculated from Conductivity (mg/L)	--	--	578	621	562
Dissolved Oxygen (mg/L)	7.5	7.5	7.4	7.1	6.8
Ammonia as N (mg NH_3/L)	--	--	0.08	0.08	0.06
Un-ionized Ammonia (mg NH_3/L)	--	--	<0.10	<0.10	<0.10
Total Residual Chlorine (mg/L)	--	--	<0.02	<0.02	<0.02

5.0 References

Tidepool Scientific Software. 2000-2018. CETIS - Comprehensive Environmental Toxicity Information System. V1.9.5.5. McKinleyville, CA.

U.S. Environmental Protection Agency (EPA). 2002a. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. EPA-821-R-02-012. Office of Water, Washington D.C.

U.S. Environmental Protection Agency (EPA). 2002b. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. EPA-821-R-02-013. Office of Water, Washington D.C.

Appendix A

Chain-of-custody forms and laboratory bench sheets from whole effluent toxicity tests

GEI Consultants, Inc./Ecological Division
4601 DTC BLVD., SUITE L100
DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC121-DR-2-1

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave, Suite 2
CITY Anaconda STATE MT ZIP 59711
PHONE # (775) 443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER M. Turrin

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE: TRC (mg/L)	CHLORINE: Date/Time Measured	COMMENTS:
DR-2_20210107		✓	1/7/21	1100	✓										

CHLORINE — Measured by: Client ☐ Lab ☐

PROJECT INFORMATION

CLIENT DROP OFF: ☑
COURIER:
UPS ☑ FEDEX ☐ OTHER ☐

TOTAL NUMBER OF CONTAINERS: 1

LABORATORY RECEIVING INFORMATION

CONDITION OF SAMPLE ON RECEIPT: good

CUSTODY SEAL INTACT?: YES ☒ NO ☐ N/A ☐

TEMPERATURE (°C): -1.0 °C

TEMPERATURE IN RANGE (0-6°C): YES ☐ NO ☒
IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☒

COMMENTS: SMALL ~1 INCH PIECE OF ICE PRESENT IN SPOUT / CAP OF THE CUBIE - LAG 1/8
12 FTY 033 IS 9084 1507

CLIENT
RELINQUISHED BY: Mackenzie Turrin / GEC
DATE/TIME: 01/07/21 @ 1300

LABORATORY
RECEIVED BY: LAUREN GOULET
DATE/TIME: 1/8/21 730

GEI Consultants, Inc./Ecological Division
4601 DTC BLVD., SUITE L100
DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number R1C1220-1

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E. Park Ave
CITY Anaconda STATE MT ZIP 59711
PHONE # 775-443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE (Measured by: Client ☐ Lab ☒): TRC (mg/L)	Date/Time Measured	COMMENTS:
DR-2_20201130		✓	11/30/20	1005	✓	✓			✓						
DR-7_20201130		✓	11/30/20	1210	✓	✓			✓						
DR-6_20201130		✓	11/30/20	1110	✓	✓			✓						

PROJECT INFORMATION

CLIENT DROP OFF: ✓
COURIER:
UPS ✓ FEDEX ☐ OTHER ☐

TOTAL NUMBER OF CONTAINERS: 15

LABORATORY RECEIVING INFORMATION

CONDITION OF SAMPLE ON RECEIPT: good
CUSTODY SEAL INTACT?: YES ☒ NO ☐ N/A ☐

TEMPERATURE (°C): 1.5
TEMPERATURE IN RANGE (0-6°C): YES ☒ NO ☐
IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐

CLIENT
RELINQUISHED BY: Mackenzie Turin / CEC
DATE/TIME: 11/30/20 @ 1400

LABORATORY
RECEIVED BY: [signature]
DATE/TIME: 12/1/20 840

COMMENTS: 1Z F7Y 033 15 9979 3875; 1Z F7Y 033 15 9742 3867; 1Z F7Y 033 15 9628 6697; 1Z F7Y 033 99369486

Updated 2019

GEI Consultants, Inc./Ecological Division
4601 DTC BLVD., SUITE L100
DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC1220 = ~~DR2~~ MH -1

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E. Park Ave
CITY Anaconda STATE MT ZIP 59711
PHONE # 775-443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE CERIO	ACUTE FATHEAD	ACUTE DAPHNIA	ACUTE TROUT	CHRONIC CERIO	CHRONIC FATHEAD	CHRONIC ALGAE	CHRONIC DAPHNIA	CHLORINE TRC (mg/L)	CHLORINE Date/Time Measured	COMMENTS:
DR-2_20201130		✓	11/30/20	1210	✓	✓			✓				<0.02	12/1/20 855	
DR-7_20201130		✓	11/30/20	1005	✓	✓			✓						
DR-6_20201130		✓	11/30/20	1110	✓	✓			✓						

CHLORINE — Measured by: Client [ ] Lab [X]

PROJECT INFORMATION

CLIENT DROP OFF: ✓
COURIER:
UPS ✓ FEDEX [ ] OTHER [ ]

TOTAL NUMBER OF CONTAINERS: 15

LABORATORY RECEIVING INFORMATION

CONDITION OF SAMPLE ON RECEIPT: good
CUSTODY SEAL INTACT?: YES [X] NO [ ] N/A [ ]

TEMPERATURE (°C): 2.0
TEMPERATURE IN RANGE (0-6°C): YES [X] NO [ ]
IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES [ ] NO [ ]

CLIENT
RELINQUISHED BY: Mackenzie Turrin / CEC
DATE/TIME: 11/30/20 @ 1400

LABORATORY
RECEIVED BY: [signature]
DATE/TIME: 12/1/20 840

COMMENTS: 1Z F7Y 033 15 9979 3875; 1Z F7Y 033 15 9742 3867; 1Z F7Y 033 15 9628 6697; 1Z F7Y 033 9936 9486

Updated 2019

GEI Consultants, Inc./Ecological Division
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DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC1220 ~~DR6~~ MH -1

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E. Park Ave
CITY Anaconda STATE MT ZIP 59711
PHONE # 775-443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED – ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE – TRC (mg/L)	CHLORINE – Date/Time Measured	COMMENTS:
DR-2_20201130		✓	11/30/20	1005	✓	✓			✓				<0.02	12/1/20 905	
DR-7_20201130		✓	11/30/20	1210	✓	✓			✓						
DR-6_20201130		✓	11/30/20	1110	✓	✓			✓						

CHLORINE: Measured by: Client ☐ Lab ☒

PROJECT INFORMATION

CLIENT DROP OFF: ✓
COURIER:
UPS ✓ FEDEX ☐ OTHER ☐

TOTAL NUMBER OF CONTAINERS: 15

LABORATORY RECEIVING INFORMATION

CONDITION OF SAMPLE ON RECEIPT: good

CUSTODY SEAL INTACT?: YES ☒ NO ☐ N/A ☐

TEMPERATURE (°C): 1.0

TEMPERATURE IN RANGE (0-6°C): YES ☒ NO ☐
IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐

CLIENT RELINQUISHED BY: Mackenzie Turrin / CEC

DATE/TIME: 11/30/20 @ 1400

LABORATORY RECEIVED BY: [illegible]

DATE/TIME: 12/1/20 840

COMMENTS: 1Z F7Y 033 15 9979 3875; 1Z F7Y 033 15 9742 3867; 1Z F7Y 033 15 9628 6697; 1Z F7Y 033 9936 9486

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DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number R1C1220 ~~DR-T-1~~ MH

CLIENT/PROJECT: Copper Environmental Consulting
ADDRESS: 406 E. Park Ave
CITY: Anaconda STATE: MT ZIP: 59711
PHONE #: 775-443-7149
PROJ. MANAGER: Kevin Pfeifer SAMPLER: Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED – ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE – TRC (mg/L)	CHLORINE – Date/Time Measured	COMMENTS:
DR-2_20201130		✓	11/30/20	1210	✓	✓			✓				<0.02	12/1/20 910	
DR-7_20201130		✓	11/30/20	1005	✓	✓			✓						
DR-6_20201130		✓	11/30/20	1110	✓	✓			✓						

Measured by: Client ☐ Lab ☒

PROJECT INFORMATION

CLIENT DROP OFF: ✓
COURIER:
UPS ✓ FEDEX ☐ OTHER ☐

TOTAL NUMBER OF CONTAINERS: 15

LABORATORY RECEIVING INFORMATION

CONDITION OF SAMPLE ON RECEIPT: good
CUSTODY SEAL INTACT?: YES ✓ NO ☐ N/A ☐

TEMPERATURE (°C): 1.5
TEMPERATURE IN RANGE (0-6°C): YES ☒ NO ☐
IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐

CLIENT
RELINQUISHED BY: Mackenzie Turrin / CEC
DATE/TIME: 11/30/20 @ 1400

LABORATORY
RECEIVED BY: [illegible]
DATE/TIME: 12/1/20 840

COMMENTS: 1Z F7Y 033 15 9979 3875; 1Z F7Y 033 15 9742 3867; 1Z F7Y 033 15 9628 6697; 1Z F7Y 033 99369486

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DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC1220-2

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E. Park Ave
CITY Anaconda STATE MT ZIP 59711
PHONE # 775-443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Roder

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE CERIO	ACUTE FATHEAD	ACUTE DAPHNIA	ACUTE TROUT	CHRONIC CERIO	CHRONIC FATHEAD	CHRONIC ALGAE	CHRONIC DAPHNIA	CHLORINE TRC (mg/L)	CHLORINE Date/Time Measured	COMMENTS:
DR-7-20201202		✓	12/2/20	1150					✓				<0.02	12/3/20 840	
DR-6-20201202		✓	12/2/20	1220									<0.02	12/3/20 835	
DR-2-20201202		✓	12/2/20	1255									<0.02	12/3/20 830	

Measured by: Client ☐ Lab ☒

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: ☑ COURIER: UPS ☑ FEDEX ☐ OTHER ☐	CONDITION OF SAMPLE ON RECEIPT: Good CUSTODY SEAL INTACT?: YES ☑ NO ☐ N/A ☐	RELINQUISHED BY: Mackenzie Turrin / CEC DATE/TIME: 12/02/20 @ 1400
TOTAL NUMBER OF CONTAINERS: (3gal+3qt) 6	TEMPERATURE (°C): 1.0 TEMPERATURE IN RANGE (0-6°C): YES ☒ NO ☐ IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐	LABORATORY RECEIVED BY: JIMMY WEBSTER DATE/TIME: 12/3/20 815
COMMENTS: 1ZF7Y03315 9126 2435		

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DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC 1220 ~~DR 2 - 3~~

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave
CITY Anaconda STATE MT ZIP 59711
PHONE # 775 443 7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE (Measured by: Client ☐ Lab ☒): TRC (mg/L)	Date/Time Measured	COMMENTS:
DR-2_20201204		✓	12/4/20	1200					✓				<0.02	12/5/20 1020	
DR-6_20201204		✓	12/4/20	1130					✓				<0.02	12/5/20 1025	
DR-7_20201204		✓	12/4/20	1100					✓				<0.02	12/5/20 1030	

PROJECT INFORMATION

CLIENT DROP OFF: ☐
COURIER:
UPS ☑ FEDEX ☐ OTHER ☐

TOTAL NUMBER OF CONTAINERS: 6

LABORATORY RECEIVING INFORMATION

CONDITION OF SAMPLE ON RECEIPT: Good
CUSTODY SEAL INTACT?: YES ☒ NO ☐ N/A ☐

TEMPERATURE (°C): 4.0
TEMPERATURE IN RANGE (0-6°C): YES ☒ NO ☐
IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐

CLIENT
RELINQUISHED BY: Bob Rader / CEC [signature]
DATE/TIME: 12/04/20 @ 1400

LABORATORY
RECEIVED BY: [signature]
DATE/TIME: 12/5/20 945

COMMENTS:
12 FTY 033 4L9684 1500

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GEI Consultants, Inc./Ecological Division
4601 DTC BLVD., SUITE L100
DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC 1120 -DR-3 +AM

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave
CITY Anaconda STATE MT ZIP 59711
PHONE # (775) 443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE (Measured by: Client ☐ Lab ☒): TRC (mg/L)	Date/Time Measured	COMMENTS:
DR-3A_20201105		✓	11/5/20	0950	✓	✓							<0.02	11/6/20 745	

PROJECT INFORMATION

CLIENT DROP OFF: ☐
COURIER:
UPS ☒ FEDEX ☐ OTHER ☐

TOTAL NUMBER OF CONTAINERS: 24

LABORATORY RECEIVING INFORMATION

CONDITION OF SAMPLE ON RECEIPT: good

CUSTODY SEAL INTACT?: YES ☒ NO ☐ N/A ☐

TEMPERATURE (°C): 2.0/1.0

TEMPERATURE IN RANGE (0-6°C): YES ☒ NO ☐
IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐

COMMENTS: split between two coolers
1Z F7Y 033 1 5906 5407; 1Z F7Y 033 1 5931 6 1595

CLIENT
RELINQUISHED BY: Bob Rader [signature]
DATE/TIME: 11/5/20 @ 1400

LABORATORY
RECEIVED BY: LAUREN GOULET [signature]
DATE/TIME: 11/6/20 730

Updated 2019

GEI Consultants, Inc./Ecological Division
4601 DTC BLVD., SUITE L100
DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC1120-DR-3

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave
CITY Anaconda STATE MT ZIP 59711
PHONE # (775) 443-7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE: TRC (mg/L)	CHLORINE: Date/Time Measured	COMMENTS:
DR-3A_20201105		✓	11/5/20	0950	✓	✓							<0.02	11/6/20 745	

CHLORINE — Measured by: Client ☐ Lab ☒

PROJECT INFORMATION

CLIENT DROP OFF: ☐
COURIER:
UPS ☒ FEDEX ☐ OTHER ☐

TOTAL NUMBER OF CONTAINERS: 24

LABORATORY RECEIVING INFORMATION

CONDITION OF SAMPLE ON RECEIPT: good

CUSTODY SEAL INTACT?: YES ☒ NO ☐ N/A ☐

TEMPERATURE (°C): 2.0/1.0

TEMPERATURE IN RANGE (0-6°C): YES ☒ NO ☐
IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐

COMMENTS: split between two coolers
1Z F7Y 033 1590 6 5407; 1Z F7Y 033 1593 6 1595

CLIENT
RELINQUISHED BY: Bob Rader [signature]
DATE/TIME: 11/5/20 @ 1400

LABORATORY
RECEIVED BY: LAUREN GOULET [signature]
DATE/TIME: 11/6/20 730

Updated 2019

GEI Consultants, Inc./Ecological Division
4601 DTC BLVD., SUITE L100
DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC1120 - AC3EFF - 1

CLIENT/PROJECT COPPER ENVIRONMENTAL CONSULTING
ADDRESS 406 E PARK AVE
CITY ANACONDA STATE MT ZIP 59711
PHONE # (775) 443 - 7149
PROJ. MANAGER KEVIN PFEIFER SAMPLER BOB RADER

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE TRC (mg/L)	CHLORINE Date/Time Measured	COMMENTS:
AC3EFF111620		✓	11/16/20	1040	✓	✓			✓				<0.02	11/17/20 800	

CHLORINE: Measured by: Client ☐ Lab ☒

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: ☐ COURIER: UPS ☒ FEDEX ☐ OTHER ☐	CONDITION OF SAMPLE ON RECEIPT: Good CUSTODY SEAL INTACT?: YES ☒ NO ☐ N/A ☐	RELINQUISHED BY: Bob Rader / CEC [signature] DATE/TIME: 11/16/20 @ 1400
TOTAL NUMBER OF CONTAINERS: 4	TEMPERATURE (°C): 2.0/3.0 TEMPERATURE IN RANGE (0-6°C): YES ☒ NO ☐ IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐	LABORATORY RECEIVED BY: LAUREN MOULET [signature] DATE/TIME: 11/17/20 750 LMG
COMMENTS: 1ZF74033159598743 1; 1ZF74033159895 6647		

Updated 2019

GEI Consultants, Inc./Ecological Division
4601 DTC BLVD., SUITE L100
DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC1220-AC3EFF-1

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave
CITY Anaconda STATE MT ZIP 59701
PHONE # 775 443 7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE: TRC (mg/L)	CHLORINE: Date/Time Measured	COMMENTS:
~~AC3-EFF 20201207~~		✓	RR 12/7/20							✓			<0.02	12/8/20 830	
AC3EFF-20201207		✓	12/7/20	1035	✓	✓			✓						

Measured by: Client [ ] Lab [✓]

PROJECT INFORMATION

CLIENT DROP OFF: [ ]
COURIER:
UPS [✓] FEDEX [ ] OTHER [ ]

TOTAL NUMBER OF CONTAINERS: 5

LABORATORY RECEIVING INFORMATION

CONDITION OF SAMPLE ON RECEIPT: Good

CUSTODY SEAL INTACT?: YES [✓] NO [ ] N/A [ ]

TEMPERATURE (°C): 2.0

TEMPERATURE IN RANGE (0-6°C): YES [✓] NO [ ]
IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES [ ] NO [ ]

CLIENT
RELINQUISHED BY: Bob Rader / CEC [signature]
DATE/TIME: 12/7/20 @ 1400

LABORATORY
RECEIVED BY: [signature]
DATE/TIME: 12/8/20 740

COMMENTS: 1ZF7Y0331598089914
1ZF7Y0331598447929

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DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number R1C1220 -AC3EFF- 1

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave
CITY Anaconda STATE MT ZIP 59701
PHONE # 775 443 7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE CERIO	ACUTE FATHEAD	ACUTE DAPHNIA	ACUTE TROUT	CHRONIC CERIO	CHRONIC FATHEAD	CHRONIC ALGAE	CHRONIC DAPHNIA	CHLORINE TRC (mg/L)	CHLORINE Date/Time Measured	COMMENTS:
~~AC3-EFF 20201207~~		✓	RR 12/7/20							✓			<0.02	12/8/20 830	
AC3EFF-20201207		✓	12/7/20	1035	✓	✓			✓						

CHLORINE: Measured by: Client [ ] Lab [✓]

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: [ ] COURIER: UPS [✓] FEDEX [ ] OTHER [ ]	CONDITION OF SAMPLE ON RECEIPT: Good CUSTODY SEAL INTACT?: YES [✓] NO [ ] N/A [ ]	RELINQUISHED BY: Bob Rader / CEC [signature] DATE/TIME: 12/7/20 @ 1400
TOTAL NUMBER OF CONTAINERS: 5	TEMPERATURE (°C): 2.0 TEMPERATURE IN RANGE (0-6°C): YES [✓] NO [ ] IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES [ ] NO [ ]	LABORATORY RECEIVED BY: [signature] DATE/TIME: 12/8/20 740
COMMENTS: 1ZF7Y0331598089914 1ZF7Y0331598447929		

Updated 2019

GEI Consultants, Inc./Ecological Division
4601 DTC BLVD., SUITE L100
DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC1220-AC3EFF-2

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave
CITY Anaconda STATE MT ZIP 59711
PHONE # 775 443 7149
PROJ. MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED: ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE (Measured by: Client ☐ Lab ☑): TRC (mg/L)	Date/Time Measured	COMMENTS:
AC3EFF120920		✓	12/9/20	0945					✓				<0.02	12/10/20 800	

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: ☐ COURIER: UPS ☑ FEDEX ☐ OTHER ☐	CONDITION OF SAMPLE ON RECEIPT: Good CUSTODY SEAL INTACT?: YES ☑ NO ☐ N/A ☐	RELINQUISHED BY: Mackenzie Turrin / CEC DATE/TIME: 12/9/20 @ 2pm
TOTAL NUMBER OF CONTAINERS: 2	TEMPERATURE (°C): 2.0 TEMPERATURE IN RANGE (0-6°C): YES ☑ NO ☐ IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐	LABORATORY RECEIVED BY: [signature] DATE/TIME: 12/10/20 725
COMMENTS: 1Z F7Y0331590676642		

Updated 2019

GEI Consultants, Inc./Ecological Division
4601 DTC BLVD., SUITE L100
DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number RIC1220-AC3EFF-3

CLIENT/PROJECT Copper Environmental Consulting
ADDRESS 406 E Park Ave
CITY Anaconda STATE MT ZIP 59711
PHONE # 775 443 7149
PROJECT MANAGER Kevin Pfeifer SAMPLER Bob Rader

SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	TESTS REQUIRED – ACUTE: CERIO	ACUTE: FATHEAD	ACUTE: DAPHNIA	ACUTE: TROUT	CHRONIC: CERIO	CHRONIC: FATHEAD	CHRONIC: ALGAE	CHRONIC: DAPHNIA	CHLORINE – TRC (mg/L) (Measured by: Client ☐ Lab ☑)	Date/Time Measured	COMMENTS:
AC3Eff 121120		✓	12/11/20	1050					✓				<0.02	12/12/20 855	

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: ☐ COURIER: UPS ☑ FEDEX ☐ OTHER ☐	CONDITION OF SAMPLE ON RECEIPT: GOOD CUSTODY SEAL INTACT?: YES ☑ NO ☐ N/A ☐	RELINQUISHED BY: Bob Rader [signature] DATE/TIME: 12/11/20 @ 1400
TOTAL NUMBER OF CONTAINERS: 2	TEMPERATURE (°C): 2.0 TEMPERATURE IN RANGE (0-6°C): YES ☑ NO ☐ IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐	LABORATORY RECEIVED BY: JIMMY WEBSTER DATE/TIME: 12/12/20 845
COMMENTS: 1ZF7Y033 41 9125 8454		

Updated 2019

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

RIC1220

ORGANISM HISTORY

DATE: 11/30/2020

SPECIES: *Pimephales promelas*

AGE: 6 day

LIFE STAGE: Larvae

HATCH DATE: 11/24/2020

BEGAN FEEDING: 11/25/2020

FOOD: *Artemia* sp.

Water Chemistry Record:	**Current**	**Range**
TEMPERATURE:	23°C	--
SALINITY/CONDUCTIVITY:	--	--
TOTAL HARDNESS (as $CaCO_3$):	117 mg/l	--
TOTAL ALKALINITY (as $CaCO_3$):	85 mg/l	--
pH:	7.80	--

Comments:

Facility Supervisor

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

AQUATIC BIO SYSTEMS ABS INC.

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

RIC1120-3EFF

ORGANISM HISTORY

DATE: 11/16/2020

SPECIES: *Pimephales promelas*

AGE: 6 day

LIFE STAGE: Larvae

HATCH DATE: 11/10/2020

BEGAN FEEDING: 11/11/2020

FOOD: *Artemia* sp.

Water Chemistry Record:	**Current**	**Range**
TEMPERATURE:	22°C	--
SALINITY/CONDUCTIVITY:	--	--
TOTAL HARDNESS (as $CaCO_3$):	118 mg/l	--
TOTAL ALKALINITY (as $CaCO_3$):	95 mg/l	--
pH:	7.91	--

Comments:

Facility Supervisor

INITIAL CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC121-DR-2

Samples Received: Date/Time 1/8/21 730 ~~RIC121-DR-2~~ LAG

Test Substance: DR-2

What test/s will samples be used in? Ac C

Dilution Water: lab water or receiving water

SAMPLE TYPE LOG NUMBER DATE COLLECTED	DATE/TIME ANALYZED	DATES USED	ANALYSES TEMP (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µs)	TDS CALCULATED FROM COND. (mg/L)	TRC (mg/L)	AMMONIA AS N (mg/L)	METER USED	ANALYST
EFFLUENT RIC121-DR-2 1/7/21	1/8/21 950	1/8/21 1/9/21	20.0	(0.5) 210	7.7	(0.2) 124	9.2	410	201	<0.02	0.24	1	LAG

Site Daily Measurements	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7					
pH/initials	7.7 / LAG	7.7 / MW											
pH/initials													
pH/initials													
pH/initials													
pH/initials													

COMMENTS:

Samples stored in refrigerator: N

Data Checked and Approved by Laboratory Manager (Initials): AR

INITIAL CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC1220-DR-2

Samples Received: Date/Time 12/1/20 840

Test Substance: DR-2

What test/s will samples be used in? Ch C, Ac C/F

Dilution Water: (lab water) or receiving water

SAMPLE TYPE LOG NUMBER DATE COLLECTED	DATE/TIME ANALYZED	DATES USED	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µs)	TDS CALCULATED FROM COND. (mg/L)	TRC (mg/L)	AMMONIA AS N (mg/L)	METER USED	ANALYST
EFFLUENT RIC-DR-2-1 11/30/20	12/1/20 945	12/1/20 – 12/2/20	25.0	9.9 198	7.7	5.9 118	9.5	376	184	<0.02	0.11	1	AW
Effluent RIC-DR-2-2 12/2/20	12/3/20 915	12/3/20 – 12/4/20	25.0	10.5 210	7.6	6.4 128	9.2	460	225	<0.02	0.05	1	MW
Effluent RIC DR-2-3 12/4/20	12/5/20 1050	12/5/20 – 12/7/20	25.0	10.9 218	7.7	6.5 130	9.4	432	212	<0.02	0.05	1	TE
Average			25.0	209	7.7	125	9.4	423	207	<0.02	0.07		

Site Daily Measurements	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7					
pH/initials 1st Shipment	7.7/AW	7.9/LAG	~~7.6~~ 8.0/MW	8.0/MW	–								
pH/initials 2nd/2nd Shipment			7.6/MW	7.9/MW	7.7/TE	7.8/MW	7.8/MW						
pH/initials													
pH/initials													
pH/initials													

COMMENTS:

Samples stored in refrigerator: N

Data Checked and Approved by Laboratory Manager (Initials): AR

INITIAL CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC1120-DR-3

Samples Received: Date/Time 11/6/20 730

Test Substance: DR-3

What test/s will samples be used in? Ac C/FH

Dilution Water: lab water or receiving water

SAMPLE TYPE LOG NUMBER DATE COLLECTED	DATE/TIME ANALYZED	DATES USED	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µs)	TDS CALCULATED FROM COND. (mg/L)	TRC (mg/L)	AMMONIA AS N (mg/L)	METER USED	ANALYST
Effluent DR3 RIC1120-DR3-1 11/5/20	11/6/20 925	11/6/20 11/7/20	20.0 ~~25.0~~	7.2×100 / 720	7.1	5.2 / 104	6.3	1118	548	<0.02	0.05	1	AW

Site Daily Measurements	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7					
pH/initials	7.1/AW	*	7.0/MW	7.3/W									
pH/initials													
pH/initials													
pH/initials													
pH/initials													

COMMENTS: * tech error - not recorded

Samples stored in refrigerator: N

Data Checked and Approved by Laboratory Manager (Initials): AR

INITIAL CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC1220 -DR-6

Samples Received: Date/Time 12/1/20 840

Test Substance: DR-6

What test/s will samples be used in? Ac C/FH, Ch C

Dilution Water: (lab water) or receiving water

SAMPLE TYPE LOG NUMBER DATE COLLECTED	DATE/TIME ANALYZED	DATES USED	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µs)	TDS CALCULATED FROM COND. (mg/L)	TRC (mg/L)	AMMONIA AS N (mg/L)	METER USED	ANALYST
EFFLUENT RIC-DR-6-1 11/30/20	12/1/20 1000	12/1/20 – 12/2/20	25.0	7.1 x 100 / 710	7.3 / 7.2 AW	6.1 / 122	9.2	1259	617	<0.02	0.06	1	AW
Effluent RIC-DR-6-2 12/2/20	12/3/20 920	12/3/20 – 12/4/20	25.0	7.2 x 100 / 720	7.4	6.3 / 126	9.2	1422	696	<0.02	0.05	1	JW
Effluent RIC-DR-6-3 12/4/20	12/5/20 1100	12/5/20 – 12/7/20	25.0	7.6 x 100 / 760	7.2	7.0 / 140	9.1	1334	656	<0.02	0.07	1	TE
Average			25.0	730	7.3	129	9.2	1338	656	<0.02	0.06		

Site

Daily Measurements	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7					
pH/initials 1ST Shipment	7.3 AW / 7.2 AW	7.2 / JMS	7.4 / JW	7.5 / JW									
3rd / pH/initials 2nd Shipment			7.4 / JW	7 ~~7.8~~ / LAG	7.2 / TE	7.2 / JW	7.4 / u						
pH/initials													
pH/initials													
pH/initials													

COMMENTS:

Samples stored in refrigerator: N

Data Checked and Approved by Laboratory Manager (Initials): AR

INITIAL CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC1220-DR-7

Samples Received: Date/Time 12/1/20 840

Test Substance: DR-7

What test/s will samples be used in? Ch C, Ac C/F

Dilution Water: (lab water) or receiving water

SAMPLE TYPE LOG NUMBER DATE COLLECTED	DATE/TIME ANALYZED	DATES USED	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µs)	TDS CALCULATED FROM COND. (mg/L)	TRC (mg/L)	AMMONIA AS N (mg/L)	METER USED	ANALYST
EFFLUENT RIC-DR7-1 11/20/20	12/1/20 1010	12/1/20 12/2/20	25.0	17.6 / 352	7.4	8.3 / 166	9.6	654	321	<0.02	0.05	1	AW
Effluent RIC-DR-7-2 12/2/20	12/3/20 930	12/3/20 12/4/20	25.0	15.1 / 314	7.5	7.8 / 156	9.0	667	327	<0.02	0.05	1	MW
Effluent RIC-DR-7-3 12/4/20	12/5/20 1105	12/5/20 12/7/20	25.0	18.5 / 370	7.2	8.5 / 170	9.5	682	335	<0.02	0.06	1	TE
Average			25.0	345	7.4	164	9.4	668	328	<0.02	0.05		

Site

Daily Measurements	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7					
pH/initials 1st Shipment	7.4/AW	7.5/MW	7.~~5~~3/MW										
3rd/ pH/initials 2nd Shipment			7.5/MW	7.7/AW	7.2/TE	7.2/TE	7.2/u						
pH/initials													
pH/initials													
pH/initials													

COMMENTS:

Samples stored in refrigerator: N

Data Checked and Approved by Laboratory Manager (Initials): AR

INITIAL CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC1120B-AC3EFF

Samples Received: Date/Time 11/17/20 750

Test Substance: AC3EFF

What test/s will samples be used in? Ac C/F; Ch C

Dilution Water: lab water or receiving water

SAMPLE TYPE LOG NUMBER DATE COLLECTED	DATE/TIME ANALYZED	DATES USED	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µs)	TDS CALCULATED FROM COND. (mg/L)	TRC (mg/L)	AMMONIA AS N (mg/L)	METER USED	ANALYST
EFFLUENT RIC1120-ACEFF-1 11/16/20	11/17/20 910	11/17/20 11/18/20	25.0	6.5x100 / 650	7.5	4.4 / 88	8.3	1164	570	<0.02	0.09	1	AW
Effluent RIC1120-ACEFF-2 11/18/20	11/19/20 900	11/19/20 11/20/20	25.0	6.4x100 / 640	7.6	4.3 / 86	6.8	1199	588	<0.02	0.12	1	LAG
Effluent RIC1120-ACEFF-3 11/20/20	11/21/20 915	11/21/20 11/23/20	25.0	5.9x100 / 590	7.7	4.5 / 90	6.8	1199	588	<0.02	0.05	1	MW
		11/25/20											
Average			25.0	627	7.6	88	7.3	1187	582	<0.02	0.09		

Site Daily Measurements	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7					
pH/initials	7.5/AW	7.5/LG	7.6/LAG	7.5/LAG	7.7/MW	7.6/AW	7.4/LG	7.3/GM					
pH/initials 1st Shipment (ACF) Day 3,4	Day 3 7.6/LG	Day 4 7.9/LAG											
pH/initials													
pH/initials													
pH/initials													

COMMENTS:

Samples stored in refrigerator: N

Data Checked and Approved by Laboratory Manager (Initials): AR

INITIAL CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC1220B-AC3EFF

Samples Received: Date/Time 12/8/20 740

Test Substance: AC3EFF

What test/s will samples be used in? Ch C

Dilution Water: (lab water) or receiving water

SAMPLE TYPE LOG NUMBER DATE COLLECTED	DATE/TIME ANALYZED	DATES USED	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µs)	TDS CALCULATED FROM COND. (mg/L)	TRC (mg/L)	AMMONIA AS N (mg/L)	METER USED	ANALYST
Effluent ~~AC3EFF~~ RIC1220B-1 12/7/20	12/8/20 920	12 12/8/20 – 12/9/20	25.0	5.7x100 / 570	7.5	4.5 / 90	7.4	1182	578	<0.02	0.08	1	BK
Effluent RIC1220B-2 12/9/20	12/10/20 830	12/10/20 – 12/11/20	25.0	6.9x100 / 690	7.4	4.5 / 90	7.1	1267	621	<0.02	0.08	1	JMG
Effluent RIC1220B-3 12/11/20	12/12/20 1025	12/12/20 – 12/13/20	25.0	6.3x100 / 630	7.4	4.5 / 90	6.8	1142	562	<0.02	0.06	1	JW
Average			25.0	630	7.4	90	7.1	1197	587	<0.02	0.07		

Site

Daily Measurements	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7					
pH/initials	7.4/LL	7.4/JMG	7.4/JMG	7.5/LL	7.4/JW	7.4/JW	7.4/TE						
pH/initials													
pH/initials													
pH/initials													
pH/initials													

COMMENTS:

Samples stored in refrigerator: N

Data Checked and Approved by Laboratory Manager (Initials): AR

RECONSTITUTED SYNTHETIC LABORATORY WATER CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC121-DR-2

Test Substance: DR-2

Analyst: TC

What test/s will samples be used in? Ac C

Test/s Start Date: 1/8/21

BATCH #	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µS)
EPA ~~M~~ LAG HARD H001	25.0	164	8.4	114	7.3	489
HH	25.0	710	8.3	94	7.2	1168
AVERAGE VALUE	—	—	—	—	—	—

COMMENTS:

Data Checked and Approved by Laboratory Manager (Intials): AR

RECONSTITUTED SYNTHETIC LABORATORY WATER CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC1220 -DR-2

Test Substance: DR-2

What test/s will samples be used in? Ch C, Ac C/F

Analyst: AW

Test/s Start Date: 12/1/20

BATCH #	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µS)
H007	25.0	170	8.5	116	7.5	506
Rico HH	25.0	720	8.3	98	7.5	1184
AVERAGE VALUE	—	—	—	—	—	—

COMMENTS:

Data Checked and Approved by Laboratory Manager (Intials): AR

RECONSTITUTED SYNTHETIC LABORATORY WATER CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC1120-DR-3

Test Substance: DR-3

What test/s will samples be used in? Ac C/FH

Analyst: MH

Test/s Start Date: 11/6/20

BATCH #	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µS)
~~MH244~~	~~25.0~~	~~96~~	~~8.2~~	~~70~~	~~7.1~~	~~315~~ MH
H005	25.0	166	8.4	116	7.1	512
HH Rico	25.0	730	8.3	96	6.9	1237
AVERAGE VALUE	~~25.0~~	~~96~~	~~8.2~~	~~70~~ MH	~~7.1~~	~~315~~

COMMENTS:

Data Checked and Approved by Laboratory Manager (Intials): AR

RECONSTITUTED SYNTHETIC LABORATORY WATER CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC 1220-DR-6

Test Substance: DR-6

Analyst: AW

What test/s will samples be used in? Ch C, Ac C/F

Test/s Start Date: 12/1/20

BATCH #	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µS)
H007	25.0	170	8.5	116	7.5	506
Rico HH	25.0	720	8.3	98	7.5	1184
AVERAGE VALUE	–	–	–	–	–	–

COMMENTS:

Data Checked and Approved by Laboratory Manager (Intials): AR

RECONSTITUTED SYNTHETIC LABORATORY WATER CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC1220 -DR-7

Test Substance: DR-7

Analyst: AW

What test/s will samples be used in? Ch C, Ac C/F

Test/s Start Date: 12/1/20

~~H00~~ JM BATCH #	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µS)
H007	25.0	170	8.5	116	7.5	506
Rico HH	25.0	720	8.3	98	7.5	1184
AVERAGE VALUE	—	—	—	—	—	—

COMMENTS:

Data Checked and Approved by Laboratory Manager (Intials): AR

RECONSTITUTED SYNTHETIC LABORATORY WATER CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC1120B-AC3EFF

Test Substance: AC3EFF

Analyst: AW

What test/s will samples be used in? Chc, AcC/E

Test/s Start Date: 11/17/20

BATCH #	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µS)
H006	25.0	168	8.5	114	7.4	516
~~MH246~~ AW						
Rico HH	25.0	730	8.3	100	7.5	1194
AVERAGE VALUE	—	—	—	—	—	—

COMMENTS:

Data Checked and Approved by Laboratory Manager (Intials): AR

RECONSTITUTED SYNTHETIC LABORATORY WATER CHEMISTRY BENCH SHEET

Client/Project: Rico/RIC1220B-AC3EFF

Test Substance: AC3EFF

Analyst: AW

What test/s will samples be used in? Ch C

Test/s Start Date: 12/8/20

BATCH #	ANALYSES TEMP. (°C)	TOTAL HARDNESS (mg/L)	pH (SU)	TOTAL ALKALINITY (mg/L)	D.O. (mg/L)	COND. (µS)
~~MH267~~	~~25.0~~	~~98~~	~~MH 8.2~~	~~70~~	~~7.3~~	~~317~~
~~H007~~ AW						
~~MH282~~	~~25.0~~	~~94~~	~~8.3~~	~~MH 70~~	~~7.2~~	~~310~~
HH RiCO	25.0	720	8.3	98	7.5	1184
H007	25.0	170	8.5	116	7.5	506
AVERAGE VALUE	—	—	—	—	—	—

COMMENTS:

Data Checked and Approved by Laboratory Manager (Intials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 1/8/21

FINISH Date: 1/10/21

Dilution Water: EPA Hard Recon

Test Substance: DR-2

Client/Project: Rico/RIC121-DR-2

Organism: *C. dubia*

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	7.3	7.2			
	Cond. (µS)	1221	1207			
	pH	8.2	8.1			
	Temp. (°C)	21.6	22.5			
0	DO (mg//L)	7.2	7.2			
	Cond. (µS)	576	520			
	pH	8.4	8.5			
	Temp. (°C)	21.3	21.0			
10	DO (mg//L)	7.2	7.2			
	Cond. (µS)	514	499			
	pH	8.5	8.5			
	Temp. (°C)	21.1	20.9			
20	DO (mg//L)	7.1	7.1			
	Cond. (µS)	497	496			
	pH	8.5	8.5			
	Temp. (°C)	21.2	20.9			
40	DO (mg//L)	7.2	7.1			
	Cond. (µS)	467	458			
	pH	8.5	8.5			
	Temp. (°C)	21.0	21.4			
60	DO (mg//L)	7.2	7.1			
	Cond. (µS)	447	435			
	pH	8.5	8.5			
	Temp. (°C)	21.0	21.3			
80	DO (mg//L)	7.2	7.1			
	Cond. (µS)	421	409			
	pH	8.5	8.5			
	Temp. (°C)	21.1	21.6			
Incubator Temperature (°C)		20.0	20.0			Max: 22.5
Analyst		TE	TE			Min: 20.9
Time Analyzed		1430	1225			Range: 1.6
Environmental Chamber		P	P			Mean: 21.7 ± 0.8
Meter Number		1	1			

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

2/2

START Date: 1/8/21

FINISH Date: 1/10/21

Dilution Water: EPA Hard Recon

Test Substance: DR-2

Client/Project: Rico/RIC121-DR-2

Organism: *C. dubia*

Test Concentration	Chemical Parameter	Day of Test				COMMENTS
		1	2	3	4	
100	DO (mg//L)	7.2	7.1			
	Cond. (µS)	394	384			
	pH	8.5	8.5			
	Temp. (°C)	21.7	22.0			
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
Incubator Temperature (°C)		20.0	20.0			Max: 22.5
Analyst		TE	TE			Min: 20.9
Time Analyzed		~~TE12~~ 1430	1225			Range: 1.6
Environmental Chamber		P	P			Mean: 21.7 ± 0.3
Meter Number		1	1			

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

1/72

START Date: 11/6/20

FINISH Date: 11/8/20

Dilution Water: EPA Hard Recon

Test Substance: DR-3

Client/Project: Rico/RIC1120-DR-3

Organism: C. dubia

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	7.0	6.9			
	Cond. (µS)	1240	1252			
	pH	8.2	8.1			
	Temp. (°C)	19.7	20.8			
0	DO (mg//L)	7.0	6.9			
	Cond. (µS)	544	546			
	pH	8.5	8.5			
	Temp. (°C)	19.4	21.0			
10	DO (mg//L)	6.9	6.9			
	Cond. (µS)	612	624			
	pH	8.4	8.5			
	Temp. (°C)	19.2	21.2			
20	DO (mg//L)	6.9	6.9			
	Cond. (µS)	682	689			
	pH	8.4	8.4			
	Temp. (°C)	19.2	21.0			
40	DO (mg//L)	6.9	6.9			
	Cond. (µS)	813	822			
	pH	8.4	8.4			
	Temp. (°C)	19.2	20.9			
60	DO (mg//L)	6.9	6.9			
	Cond. (µS)	941	937			
	pH	8.3	8.3			
	Temp. (°C)	19.2	20.8			
80	DO (mg//L)	6.9	6.9			
	Cond. (µS)	1058	1074			
	pH	8.3	8.2			
	Temp. (°C)	19.1	20.9			
Incubator Temperature (°C)		21.0	21.0			Max: 21.2
Analyst		LAG	TE			Min: 19.1
Time Analyzed		1405	1310			Range: 2.1
Environmental Chamber		V	V			Mean: 20.2 ± 1.1
Meter Number		1	1			

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 11/6/20

FINISH Date: 11/8/20

Dilution Water: EPA Hard Recon

Test Substance: DR-3

Client/Project: Rico/RIC1120-DR-3

Organism: C. dubia

Test Concentration	Chemical Parameter	Day of Test				COMMENTS
		1	2	3	4	
100	DO (mg//L)	6.9	6.9			
	Cond. (µS)	1158	1169			
	pH	8.3	8.2			
	Temp. (°C)	19.1	21.2			
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
Incubator Temperature (°C)		21.0	21.0			Max: 21.2
Analyst		LAG	TE			Min: 19.1
Time Analyzed		1405	1310			Range: 2.1
Environmental Chamber		V	V			Mean: 20.2 ± 1.1
Meter Number		1	1			

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 12/1/20 FINISH Date: 12/3/20

Dilution Water: Hard Recon Test Substance: DR-6

Client/Project: Rico/RIC1220 -DR-6 Organism: C. dubia

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	7.3	7.2			
	Cond. (µS)	1225	1365			
	pH	8.2	8.1			
	Temp. (°C)	23.6	20.4			
0	DO (mg//L)	7.3	7.2			
	Cond. (µS)	536	616			
	pH	8.4	8.4			
	Temp. (°C)	25.1	21.0			
10	DO (mg//L)	7.2	7.2			
	Cond. (µS)	604	700			
	pH	8.4	8.4			
	Temp. (°C)	24.7	21.2			
20	DO (mg//L)	7.3	7.2			
	Cond. (µS)	693	788			
	pH	8.4	8.4			
	Temp. (°C)	24.3	21.5			
40	DO (mg//L)	7.2	7.2			
	Cond. (µS)	836	948			
	pH	8.4	8.4			
	Temp. (°C)	24.2	21.0			
60	DO (mg//L)	7.2	7.2			
	Cond. (µS)	974	1146			
	pH	8.4	8.3			
	Temp. (°C)	22.8	21.2			
80	DO (mg//L)	7.3	7.1			
	Cond. (µS)	1112	1247			
	pH	8.3	8.2			
	Temp. (°C)	23.7	21.4			
Incubator Temperature (°C)		19.0	18.0			Max: 25.1
Analyst		AW	AW			Min: 20.4
Time Analyzed		1100	1155			Range: 4.7
Environmental Chamber		R	R			Mean: 22.8 ± 2.4
Meter Number		1	1			

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 12/1/20

FINISH Date: 12/3/20

Dilution Water: Hard Recon

Test Substance: DR-6

Client/Project: Rico/RIC 1220 -DR-6

Organism: C. dubia

Test Concentration	Chemical Parameter	Day of Test				COMMENTS
		1	2	3	4	
100	DO (mg//L)	7.3	7.2			
	Cond. (µS)	1235	1418			
	pH	8.3	8.2			
	Temp. (°C)	22.6	21.1			
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
Incubator Temperature (°C)		19.0	18.0			Max: 25.1
Analyst		AW	AW			Min: 20.4
Time Analyzed		1100	1155			Range: 4.7
Environmental Chamber		R	R			Mean: 22.8±2.4
Meter Number		1	1			

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 12/1/20

FINISH Date: 12/3/20

Dilution Water: Hard Recon

Test Substance: DR-7

Client/Project: Rico/RIC1220-DR-7

Organism: C. dubia

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	7.1	7.2			
	Cond. (µS)	1172	1344			
	pH	8.3	8.1			
	Temp. (°C)	LAB ~~23.4~~ 22.7	22.0			
0	DO (mg//L)	7.1	7.1			
	Cond. (µS)	508	610			
	pH	8.4	8.4			
	Temp. (°C)	LAB ~~24.4~~ 22.6	22.0			
10	DO (mg//L)	7.1	7.0			
	Cond. (µS)	525	602			
	pH	8.4	8.4			
	Temp. (°C)	22.5	22.0			
20	DO (mg//L)	7.0	7.0			
	Cond. (µS)	533	609			
	pH	8.4	8.5			
	Temp. (°C)	23.0	22.0			
40	DO (mg//L)	7.1	7.0			
	Cond. (µS)	557	629			
	pH	8.4	8.5			
	Temp. (°C)	22.4	22.1			
60	DO (mg//L)	7.1	7.0			
	Cond. (µS)	578	646			
	pH	8.4	8.4			
	Temp. (°C)	23.1	22.2			
80	DO (mg//L)	7.1	7.0			
	Cond. (µS)	590	659			
	pH	8.4	8.3			
	Temp. (°C)	22.4	22.1			
Incubator Temperature (°C)		19.0	18.0			Max: 23.1
Analyst		MW	JMJ			Min: 22.0
Time Analyzed		1255	1330			Range: 1.1
Environmental Chamber		R	R			Mean: 22.6 ± 0.6
Meter Number		1	1			

Data Checked and Approved by Laboratory Manager (Initials): AR

2/2

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 12/1/20

FINISH Date: 12/3/20

Dilution Water: Hard Recon

Test Substance: DR-7

Client/Project: Rico/RIC1220-DR-7

Organism: C. dubia

Test Concentration	Chemical Parameter	Day of Test 1	Day of Test 2	Day of Test 3	Day of Test 4	COMMENTS
100	DO (mg//L)	7.1	7.0			
	Cond. (µS)	1004	669			
	pH	8.2	8.2			
	Temp. (°C)	22.4	22.1			
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
Incubator Temperature (°C)		19.0	18.0			Max: 23.1
Analyst		WV	JKS			Min: 22.0
Time Analyzed		1255	1330			Range: 1.1
Environmental Chamber		R	R			Mean: 22.6±0.6
Meter Number		1	1			

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 11/17/20

FINISH Date: 11/19/20

Dilution Water: EPA Hard Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC1120B-AC3EFF

Organism: C. dubia

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	7.1	7.2			
	Cond. (µS)	1371	1331			
	pH	8.2	8.1			
	Temp. (°C)	21.1	20.7			
0	DO (mg//L)	7.0	7.1			
	Cond. (µS)	605	577			
	pH	8.4	8.4			
	Temp. (°C)	21.4	22.0			
10	DO (mg//L)	7.0	7.1			
	Cond. (µS)	669	644			
	pH	8.4	8.4			
	Temp. (°C)	21.1	21.1			
20	DO (mg//L)	7.0	7.1			
	Cond. (µS)	743	716			
	pH	8.4	8.4			
	Temp. (°C)	21.0	21.4			
40	DO (mg//L)	7.0	7.1			
	Cond. (µS)	888	857			
	pH	8.4	8.3			
	Temp. (°C)	21.3	21.7			
60	DO (mg//L)	7.0	7.1			
	Cond. (µS)	1006	987			
	pH	8.3	8.3			
	Temp. (°C)	21.6	21.8			
80	DO (mg//L)	7.0	7.1			
	Cond. (µS)	1143	1121			
	pH	8.3	8.3			
	Temp. (°C)	21.8	21.8			
Incubator Temperature (°C)		19.0	19.0			Max: ~~21.8~~ 22.0
Analyst		AW	AW			Min: 20.7
Time Analyzed		1115	1115			Range: ~~1.1~~ 1.3
Environmental Chamber		R	R			Mean: 21.~~3~~ 4 ± 0.~~6~~ 7
Meter Number		1	1			

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 11/17/20

FINISH Date: 11/19/20

Dilution Water: EPA Hard Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC1120B-AC3EFF

Organism: MG ~~P. promelas~~ C. dubia

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
100	DO (mg//L)	7.0	7.0			
	Cond. (µS)	1270	1230			
	pH	8.2	8.2			
	Temp. (°C)	21.5	21.3			
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
Incubator Temperature (°C)		19.0	19.0			Max: ~~21.8~~ MH 22.0 Min: 20.7 Range: ~~1.1~~ MH 1.3 Mean: 21.~~3~~ 4 ± 0.~~6~~ 7 MH
Analyst		AW	AW			
Time Analyzed		1115	1115			
Environmental Chamber		R	R			
Meter Number		1	1			

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 12/1/20

FINISH Date: 12/5/20

Dilution Water: Hard Recon

Test Substance: DR-2

Client/Project: Rico/RIC\220 -DR-2

Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	6.9	6.8	7.0	7.0	
	Cond. (µS)	1199	1341	1262	1229	
	pH	8.1	8.1	8.2	8.2	
	Temp. (°C)	19.8	19.4	19.7	19.5	
0	DO (mg//L)	6.9	6.7	7.0	7.0	
	Cond. (µS)	515	528	545	524	
	pH	8.3	8.3	8.3	8.3	
	Temp. (°C)	19.7	19.5	19.8	19.6	
10	DO (mg//L)	6.9	6.6	7.0	7.0	
	Cond. (µS)	503	560	522	518	
	pH	8.3	8.3	8.3	8.3	
	Temp. (°C)	19.7	19.6	19.5	19.6	
20	DO (mg//L)	6.9	6.6	7.0	7.0	
	Cond. (µS)	482	536	497	493	
	pH	8.3	8.3	8.3	8.3	
	Temp. (°C)	19.5	19.5	19.5	19.4	
40	DO (mg//L)	6.9	6.7	7.0	7.0	
	Cond. (µS)	456	512	474	466	
	pH	8.3	8.3	8.3	8.3	
	Temp. (°C)	18.7	19.3	19.5	19.2	
60	DO (mg//L)	6.9	6.6	7.0	7.0	
	Cond. (µS)	429	475	441	432	
	pH	8.3	8.3	8.3	8.3	
	Temp. (°C)	19.3	19.3	19.4	19.3	
80	DO (mg//L)	6.8	6.7	7.0	7.0	
	Cond. (µS)	394	441	406	391	
	pH	8.3	8.3	8.3	8.3	
	Temp. (°C)	19.5	19.3	19.6	19.9	
Incubator Temperature (°C)		20.5	21.0	20.5	~~25.0~~ 20.5	Max: 19.9
Analyst		LAG	JMS	LAG	JW	Min: 18.7
Time Analyzed		1230	1040	1425	1220	Range: 1.2
Environmental Chamber		U	U	U	U	Mean: 19.3 ± 0.6
Meter Number		1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

2/2

START Date: 12/1/20

FINISH Date: 12/5/20

Dilution Water: Hard Recon

Test Substance: DR-2

Client/Project: Rico/RIC1220-DR-2

Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test				COMMENTS
		1	2	3	4	
100	DO (mg//L)	6.8	6.7	7.0	7.0	
	Cond. (µS)	361	405	400	367	
	pH	8.3	8.3	8.3	8.3	
	Temp. (°C)	19.3	19.5	19.6	19.7	
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
Incubator Temperature (°C)		20.5	21.0	20.5	20.5	Max: 19.9
Analyst		LAG	JNS	LAG	MW	Min: 18.7
Time Analyzed		1230	1040	1425	1220	Range: 1.2
Environmental Chamber		U	U	U	U	Mean: 19.3±0.6
Meter Number		1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

1/2

START Date: 11/6/20

FINISH Date: 11/10/20

Dilution Water: EPA Hard Recon

Test Substance: DR-3

Client/Project: Rico/RIC1120-DR-3

Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	5.9	5.1	5.9	6.6	
	Cond. (µS)	~~5~~ 1179	1228	1214	1270	
	pH	8.2	8.0	8.0	8.1	
	Temp. (°C)	20.4	20.9	20.5	19.7	
0	DO (mg//L)	6.1	5.4	6.0	6.4	
	Cond. (µS)	513	527	526	574	
	pH	8.1	8.2	8.2	8.3	
	Temp. (°C)	20.3	21.0	21.3	20.2	
10	DO (mg//L)	5.5	5.2	6.1	6.5	
	Cond. (µS)	585	608	584	613	
	pH	8.1	8.1	8.2	8.2	
	Temp. (°C)	20.3	20.2	21.6	19.8	
20	DO (mg//L)	5.6	5.2	6.1	6.5	
	Cond. (µS)	651	676	651	680	
	pH	8.0	8.0	8.1	8.2	
	Temp. (°C)	20.4	20.5	20.8	19.8	
40	DO (mg//L)	5.8	5.2	6.2	6.5	
	Cond. (µS)	~~8~~ 779	810	784	819	
	pH	8.0	7.9	8.0	8.1	
	Temp. (°C)	20.3	20.2	20.5	19.9	
60	DO (mg//L)	~~5.8~~	5.1	6.0	6.5	
	Cond. (µS)	~~1000~~	931	904	938	
	pH	8.1	7.9	7.9	8.1	
	Temp. (°C)	20.4	20.1	20.3	19.9	
80	DO (mg//L)	6.1	5.2	6.0	6.5	
	Cond. (µS)	1000	1038	1011	1046	
	pH	8.0	7.8	7.8	8.0	
	Temp. (°C)	20.4	20.1	20.4	19.7	
Incubator Temperature (°C)		21.0	21.0	21.0	20.0	Max: 21.6
Analyst		LAG	TE	TE	u	Min: 19.6
Time Analyzed		1350	1330	910	1330	Range: 2.0
Environmental Chamber		V	V	V	U	Mean: 20.6 ± 1.0
Meter Number		1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

2/2

START Date: 11/6/20
FINISH Date: 11/10/20
Dilution Water: EPA Hard Recon
Test Substance: DR-3
Client/Project: Rico/RIC1120-DR-3
Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test				COMMENTS
		1	2	3	4	
100	DO (mg//L)	6.2	5.6	6.2	6.5	
	Cond. (µS)	1116	1153	1130	1167	
	pH	8.0	7.8	7.8	8.0	
	Temp. (°C)	20.7	20.8	20.9	19.6	
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					

Incubator Temperature (°C)	21.0	21.0	21.0	20.0	Max: 21.6
Analyst	LAG	TE	TE	u	Min: 19.6
Time Analyzed	1350	1330	910	1330	Range: 2.0
Environmental Chamber	V	V	V	u	Mean: 20.6±1.0
Meter Number	1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 12/1/20 FINISH Date: 12/5/20

Dilution Water: Hard Recon Test Substance: DR-6

Client/Project: Rico/RIC1220 -DR-6 Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	6.9	6.6	7.1	7.1	* Tech error - not recorded
	Cond. (µS)	1192	1353	1218	1228	
	pH	8.1	*	8.2	8.2	
	Temp. (°C)	19.6	18.9	19.6	20.7	
0	DO (mg//L)	7.0	6.7	7.1	7.3	
	Cond. (µS)	511	570	520	517	
	pH	8.3	8.3	8.3	8.3	
	Temp. (°C)	19.3	19.0	19.7	20.7	
10	DO (mg//L)	7.0	6.7	7.0	7.2	
	Cond. (µS)	599	675	604	605	
	pH	8.3	8.2	8.3	8.3	
	Temp. (°C)	19.3	19.3	19.6	19.6	
20	DO (mg//L)	6.9	6.7	7.1	7.1	
	Cond. (µS)	677	744	672	681	
	pH	8.2	8.2	8.3	8.3	
	Temp. (°C)	18.1	19.4	19.7	20.6	
40	DO (mg//L)	6.9	6.7	7.1	7.2	
	Cond. (µS)	815	913	832	841	
	pH	8.2	8.2	8.3	8.3	
	Temp. (°C)	18.6	19.0	19.1	20.5	
60	DO (mg//L)	6.9	6.7	7.0	7.2	
	Cond. (µS)	952	1077	970	974	
	pH	8.2	8.2	8.3	8.2	
	Temp. (°C)	19.2	19.3	19.7	20.6	
80	DO (mg//L)	6.9	6.7	7.0	7.1	
	Cond. (µS)	1096	1221	1094	1095	
	pH	8.2	8.2	8.2	8.2	
	Temp. (°C)	19.6	19.5	19.8	20.5	
Incubator Temperature (°C)		20.5	21.0	20.5	20.5	Max: 20.7
Analyst		LAG	MV	LAG	NL	Min: 18.1
Time Analyzed		1140	1105	1245	1150	Range: 2.6
Environmental Chamber		U	U	U	U	Mean: 19.4 ± 1.3
Meter Number		1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AR

2/2

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 12/1/20

FINISH Date: 12/5/20

Dilution Water: Hard Recon

Test Substance: DR-6

Client/Project: Rico/RIC1220 -DR-6

Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test				COMMENTS
		1	2	3	4	
100	DO (mg//L)	6.9	6.7	7.0	7.1	
	Cond. (µS)	1216	1341	1218	1235	
	pH	8.2	8.2	8.2	8.2	
	Temp. (°C)	19.7	19.4	19.6	20.7	
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
Incubator Temperature (°C)		20.5	21.0	20.5	20.5	Max: 20.7
Analyst		LAG	IW	LAG	NL	Min: 18.1
Time Analyzed		1140	1105	1245	1150	Range: 2.6
Environmental Chamber		U	U	U	U	Mean: 19.4±1.3
Meter Number		1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 12/1/20 FINISH Date: 12/5/20

Dilution Water: Hard Recon Test Substance: DR-7

Client/Project: Rico/RIC1220-DR-7 Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	6.7	6.7	6.9	6.9	
	Cond. (µS)	1192	1332	1232	1251	
	pH	8.1	8.1	8.1	8.2	
	Temp. (°C)	20.0	19.9	19.6	20.2	
0	DO (mg//L)	6.9	6.5	6.9	6.9	
	Cond. (µS)	515	583	542	520	
	pH	8.3	8.3	8.3	8.3	
	Temp. (°C)	19.6	20.1	19.6	20.9	
10	DO (mg//L)	6.7	6.5	6.9	6.9	
	Cond. (µS)	524	583	540	539	
	pH	8.3	8.2	8.3	8.3	
	Temp. (°C)	19.6	19.9	19.6	20.1	
20	DO (mg//L)	6.7	6.5	6.9	6.8	
	Cond. (µS)	529	590	548	544	
	pH	8.3	8.2	8.3	8.3	
	Temp. (°C)	19.9	19.8	19.4	20.3	
40	DO (mg//L)	6.7	6.4	6.9	6.8	
	Cond. (µS)	555	618	572	565	
	pH	8.3	8.2	8.3	8.3	
	Temp. (°C)	19.6	20.0	19.2	19.7	
60	DO (mg//L)	6.7	6.4	6.9	6.9	
	Cond. (µS)	575	641	592	589	
	pH	8.3	8.2	8.3	8.3	
	Temp. (°C)	19.8	20.0	19.3	20.2	
80	DO (mg//L)	6.7	6.4	6.9	6.8	
	Cond. (µS)	597	664	612	604	
	pH	8.3	8.2	8.3	8.3	
	Temp. (°C)	19.9	20.1	19.4	20.4	
Incubator Temperature (°C)		20.5	21.0	20.5	20.5	Max: 20.9
Analyst		NW	JMS	AW	TE	Min: 19.2
Time Analyzed		1250	1210	1340	1225	Range: 1.7
Environmental Chamber		U	U	U	U	Mean: 20.1 ± 0.9
Meter Number		1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AR

2/2

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 12/1/20

FINISH Date: 12/5/20

Dilution Water: Hard Recon

Test Substance: DR-7

Client/Project: Rico/RIC1220 -DR-7

Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test				COMMENTS
		1	2	3	4	
100	DO (mg//L)	6.8	6.5	6.9	6.8	
	Cond. (µS)	666	686	634	627	
	pH	8.3	8.2	8.3	8.3	
	Temp. (°C)	19.8	20.2	19.5	20.3	
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
Incubator Temperature (°C)		20.5	21.0	20.5	20.5	Max: 20.9
Analyst		JW	JMS	AW	TE	Min: 19.2
Time Analyzed		1250	1210	1340	1225	Range: 1.7
Environmental Chamber		U	U	U	U	Mean: 20.1±0.9
Meter Number		1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 11/17/20 FINISH Date: 11/21/20

Dilution Water: EPA Hard Recon Test Substance: AC3EFF

Client/Project: Rico/RIC1120B-AC3EFF Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test 1	2	3	4	COMMENTS
HH Recon	DO (mg//L)	6.9	6.7	6.7	7.0	
	Cond. (µS)	1329	1269	1257	1258	
	pH	8.1	8.2	8.1	8.2	
	Temp. (°C)	19.3	19.2	20.3	19.5	
0	DO (mg//L)	6.9	6.7	6.7	7.0	
	Cond. (µS)	570	551	541	530	
	pH	8.3	8.3	8.3	8.4	
	Temp. (°C)	19.7	18.9	20.5	18.9	
10	DO (mg//L)	6.8	6.4	6.7	6.9	
	Cond. (µS)	659	629	618	629	
	pH	8.2	8.2	8.3	8.3	
	Temp. (°C)	19.6	19.2	19.8	19.2	
20	DO (mg//L)	6.8	6.4	6.7	6.9	
	Cond. (µS)	731	699	678	693	
	pH	8.2	8.2	8.2	8.3	
	Temp. (°C)	18.4	18.9	19.4	19.2	
40	DO (mg//L)	6.9	6.4	6.7	7.0	
	Cond. (µS)	864	963	809	825	
	pH	8.2	8.1	8.2	8.2	
	Temp. (°C)	19.6	18.8	20.0	19.1	
60	DO (mg//L)	6.9	6.4	6.7	7.0	
	Cond. (µS)	997	839	936	944	
	pH	8.1	8.2	8.2	8.2	
	Temp. (°C)	20.3	18.9	19.7	19.1	
80	DO (mg//L)	6.8	6.4	6.8	7.0	
	Cond. (µS)	1122	1084	1058	1077	
	pH	8.1	8.1	8.1	8.2	
	Temp. (°C)	20.2	19.2	20.2	19.5	
Incubator Temperature (°C)		20.0	20.0	19.5	21.0	Max: 20.5
Analyst		u	u	AW	AW	Min: 18.4
Time Analyzed		920	945	940	1045	Range: 2.1
Environmental Chamber		U	U	U	U	Mean: 19.5 ± 1.1
Meter Number		1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AR

2/2

ACUTE TOXICITY CHEMISTRY BENCH SHEET

START Date: 11/17/20

FINISH Date: 11/21/20

Dilution Water: EPA Hard Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC1120B-AC3EFF

Organism: P. promelas

Test Concentration	Chemical Parameter	Day of Test				COMMENTS
		1	2	3	4	
100	DO (mg//L)	6.8	6.3	6.8	6.9	
	Cond. (µS)	1232	1179	1158	1169	
	pH	8.1	8.0	8.1	8.1	
	Temp. (°C)	20.3	19.6	19.6	19.8	
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
	DO (mg//L)					
	Cond. (µS)					
	pH					
	Temp. (°C)					
Incubator Temperature (°C)		20.0	20.0	19.5	21.0	Max: 20.5
Analyst		u	u	AW	YW	Min: 18.4
Time Analyzed		920	945	940	1045	Range: 2.1
Environmental Chamber		U	U	U	U	Mean: 19.5±1.1
Meter Number		1	1	1	1	

Data Checked and Approved by Laboratory Manager (Initials): AR

CHRONIC TOXICITY CHEMISTRY BENCH SHEET

START Date: 12/1/20

FINISH Date: 12/8/20

Dilution Water: Hard Recon

Test Substance: DR-2

Client/Project: Rico/RIC1220 -DR-2

Organism: *C. dubia*

Test Conc.	Chemical Parameter	Day of Test 1	2	3	4	5	6	7		COMMENTS
HH Recon	DO (mg//L)	7.0	6.8	~~7.1~~ *	7.1	7.2	6.9	6.7		~~*7.1~~ BK *7.0
	Cond. (µS)	1273	1423	~~1318~~ °	1319	1331	1275	1277		~~°45~~ °1334
	pH	8.3	8.3	8.4	☆	8.3	8.3	8.4		☆Tech Error-not recorded
	Temp. (°C)	23.1	24.1	22.7	24.7	23.0	25.2	24.8		
0	DO (mg//L)	6.8	6.7	~~7.1~~ *	7.1	7.0	6.9	7.0		*6.9
	Cond. (µS)	558	631	~~526~~ °	573	~~57~~ 577	557	568		°576
	pH	8.4	8.4	8.5	8.5	8.5	8.4	8.4		
	Temp. (°C)	24.8	24.3	24.7	23.9	25.0	25.3	24.3		
10	DO (mg//L)	6.8	6.7	~~7.0~~ *	7.0	7.0	6.9	6.8		*7.0
	Cond. (µS)	561	624	~~604~~ °	564	565	543	554		°599
	pH	8.5	8.5	8.5	8.5	8.5	8.5	8.5		
	Temp. (°C)	24.9	24.4	23.9	23.2	25.1	24.8	23.7		
20	DO (mg//L)	6.8	6.7	~~7.1~~	7.1	7.0	6.8	6.7		*7.0
	Cond. (µS)	535	584	~~672~~ °	555	548	533	545		°565
	pH	8.5	8.4	8.6	8.5	8.5	8.5	8.5		
	Temp. (°C)	23.5	24.5	24.5	23.8	24.4	25.0	24.2		
40	DO (mg//L)	6.8	6.7	7.1	7.1	7.1	6.9	6.7		°531
	Cond. (µS)	498	550	~~832~~ °	518	516	501	507		
	pH	8.5	8.5	8.6	8.6	8.5	8.5	8.5		
	Temp. (°C)	23.0	24.9	22.4	23.4	25.0	25.2	24.7		
60	DO (mg//L)	6.8	6.7	7.1	7.2	7.1	6.9	6.7		°503
	Cond. (µS)	459	515	~~976~~ °	494	493	478	482		
	pH	8.5	8.5	8.6	8.5	8.5	8.5	8.5		
	Temp. (°C)	24.0	24.6	23.6	23.3	24.3	24.8	24.9		
80	DO (mg//L)	6.8	6.7	7.1	7.2	7.2	6.9	6.6		
	Cond. (µS)	438	475	480	473	469	452	458		
	pH	8.5	8.5	8.6	8.5	8.6	8.5	8.5		
	Temp. (°C)	24.4	24.6	25.3	22.6	24.8	25.1	24.8		
Incubator Temperature (°C)		24.0	24.5	19.5	24.0	24.0	24.0	24.0		Max: 25.3
Analyst		LG	LG	~~LG~~ BK	TE	TE	BK	BK		Min: 22.4
Time Analyzed		1235	1115	~~1245~~ °	1325	1335	1320	1215		Range: 2.9
Environmental Chamber		T	T	T	T	T	T	T		Mean: 23.9 ± 1.5
Meter Number		1	1	1	1	1	1	1		

°1320

Data Checked and Approved by Laboratory Manager (Initials): AR

CHRONIC TOXICITY CHEMISTRY BENCH SHEET

2/2

START Date: 12/1/20

FINISH Date: 12/8/20

Dilution Water: Hard Recon

Test Substance: DR-2

Client/Project: Rico/RIC 1220 -DR-2

Organism: *C. dubia*

Test Conc.	Chemical Parameter	Day of Test 1	2	3	4	5	6	7		COMMENTS
100	DO (mg//L)	6.8	6.7	7.1	7.2	7.2	6.9	6.6		
	Cond. (µS)	401	442	451	435	451	429	435		
	pH	8.5	8.5	8.6	8.5	8.6	8.5	8.5		
	Temp. (°C)	24.6	23.8	24.0	23.9	22.8	24.5	24.0		
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
Incubator Temperature (°C)		24.0	24.5	19.5	24.0	24.0	24.0	24.0		
Analyst		LAG	LL	BK	TE	TE	BK	BK		Max: 25.3
Time Analyzed		1235	1115	1320	1325	1335	1320	1215		Min: 22.4
Environmental Chamber		T	T	T	T	T	T	T		Range: 2.9
Meter Number		1	1	1	1	1	1	1		Mean: 23.9 ±1.5

Data Checked and Approved by Laboratory Manager (Initials): AR

GEI Consultants, Inc./ Ecological Division

2017

CHRONIC TOXICITY CHEMISTRY BENCH SHEET

START Date: 12/1/20

FINISH Date: 12/8/20

Dilution Water: Hard Recon

Test Substance: DR-6

Client/Project: Rico/RIC1220 -DR-6

Organism: *C. dubia*

Test Conc.	Chemical Parameter	Day of Test 1	2	3	4	5	6	7		COMMENTS
HH Recon	DO (mg//L)	6.7	6.9	7.1	7.2	7.1	7.1	6.9		
	Cond. (µS)	1237	1455	1322	1311	1329	1274	1297		
	pH	8.3	8.4	8.4	8.3	8.3	8.3	8.3		
	Temp. (°C)	24.4	25.4	24.9	24.5	24.8	24.2	24.2		
0	DO (mg//L)	6.8	7.0	7.2	7.2	7.2	6.9	7.0		
	Cond. (µS)	560	641	599	580	591	588	565		
	pH	8.4	8.5	8.6	8.4	8.5	8.5	8.5		
	Temp. (°C)	22.1	24.3	23.9	23.6	24.3	23.9	23.7		
10	DO (mg//L)	6.7	7.0	7.2	7.3	7.1	6.9	6.8		
	Cond. (µS)	648	737	682	670	675	676	657		
	pH	8.4	8.5	8.5	8.5	8.5	8.5	8.5		
	Temp. (°C)	23.0	24.3	23.3	24.7	23.8	24.2	24.2		
20	DO (mg//L)	6.7	7.0	7.2	7.1	7.0	6.8	6.7		
	Cond. (µS)	747	843	806	784	781	779	748		
	pH	8.4	8.5	8.5	8.5	8.5	8.5	8.4		
	Temp. (°C)	24.0	23.9	24.4	24.8	25.0	24.5	23.2		
40	DO (mg//L)	6.7	6.9	7.1	7.1	6.9	6.8	6.7		
	Cond. (µS)	887	1003	927	939	956	914	915		
	pH	8.4	8.4	8.5	8.4	8.5	8.5	8.4		
	Temp. (°C)	23.6	24.4	24.5	24.7	24.4	24.4	23.3		
60	DO (mg//L)	6.7	6.9	7.1	7.0	6.9	6.8	6.7		
	Cond. (µS)	1008	1143	1055	1050	1064	1042	1024		
	pH	8.4	8.4	8.5	8.4	8.5	8.4	8.4		
	Temp. (°C)	23.8	25.0	24.5	24.5	24.7	24.6	24.0		
80	DO (mg//L)	6.7	6.8	7.1	7.1	6.9	6.8	6.7		
	Cond. (µS)	1147	1298	1227	1214	1242	1226	1191		
	pH	8.4	8.4	8.5	8.4	8.4	8.4	8.4		
	Temp. (°C)	23.6	25.1	24.4	24.7	24.3	24.6	24.1		
Incubator Temperature (°C)		24.0	~~27.8~~ 24.5 MW	19.5	24.0	24.0	24.0	24.0		Max: 25.4
Analyst		MW	MW	MW	NL	TE	u	NL		Min: 22.1
Time Analyzed		1125	1040	1210	1310	1220	1150	1135		Range: 3.3
Environmental Chamber		~~RT~~ T	T	T	T	T	T	T		Mean: 23.8 ± 1.7
Meter Number		1	1	1	1	1	1	1		

Data Checked and Approved by Laboratory Manager (Initials): AR

2/2

CHRONIC TOXICITY CHEMISTRY BENCH SHEET

START Date: 12/1/20

FINISH Date: 12/8/20

Dilution Water: Hard Recon

Test Substance: DR-6

Client/Project: Rico/RIC1220-DR-6

Organism: *C. dubia*

Test Conc.	Chemical Parameter	Day of Test								COMMENTS
		1	2	3	4	5	6	7		
100	DO (mg//L)	6.8	6.8	7.1	7.1	6.9	6.8	6.7		
	Cond. (µS)	1320	1428	1420	1374	1402	1392	1294		
	pH	8.4	8.4	8.5	8.4	8.4	8.4	8.4		
	Temp. (°C)	23.1	23.0	24.0	24.7	24.1	24.2	24.1		
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									

Incubator Temperature (°C)	24.0	24.5	19.5	24.0	24.0	24.0	24.0		Max: 25.4
Analyst	jw	jw	jw	NL	TE	u	NL		Min: 22.1
Time Analyzed	1125	1040	1210	1310	1220	1150	1135		Range: 3.3
Environmental Chamber	T	T	T	T	T	T	T		Mean: 23.8 ±1.7
Meter Number	1	1	1	1	1	1	1		

Data Checked and Approved by Laboratory Manager (Initials): AR

CHRONIC TOXICITY CHEMISTRY BENCH SHEET

1/2

START Date: 12/1/20

FINISH Date: 12/8/20

Dilution Water: Hard Recon

Test Substance: DR-7

Client/Project: Rico/RIC1220-DR-7

Organism: *C. dubia*

Test Conc.	Chemical Parameter	Day of Test 1	2	3	4	5	6	7		COMMENTS
HH Recon	DO (mg//L)	7.0	6.9	7.0	6.9	7.0	6.8	7.0		
	Cond. (µS)	1272	1391	1273	1323	~~1298~~ 1295	1345	1296		
	pH	8.3	8.3	8.4	8.3	8.3	8.3	8.3		
	Temp. (°C)	23.4	24.8	24.7	24.7	24.9	24.0	25.0		
0	DO (mg//L)	6.8	6.7	6.9	6.9	6.9	6.9	6.9		
	Cond. (µS)	558	615	569	583	~~569~~ 555	593	559		• 555
	pH	8.4	8.4	8.5	8.4	8.5	8.5	8.5		
	Temp. (°C)	24.4	25.3	25.3	25.0	24.0	24.9	24.9		
10	DO (mg//L)	6.8	6.6	6.9	6.9	7.0	6.9	6.8		
	Cond. (µS)	567	620	561	596	~~582~~ 581	581	575		• 566
	pH	8.4	8.5	8.5	8.5	8.5	8.6	8.5		
	Temp. (°C)	24.1	25.4	25.2	24.9	24.4	25.2	25.0		
20	DO (mg//L)	6.8	6.7	7.0	7.0	7.0	7.1	6.8		
	Cond. (µS)	581	623	567	593	582	597	581		
	pH	8.4	8.5	8.5	8.5	8.5	8.6	8.5		
	Temp. (°C)	24.5	25.5	25.3	25.1	24.4	25.2	25.0		
40	DO (mg//L)	6.8	6.7	7.0	7.0	~~5~~7.0	7.2	6.8		
	Cond. (µS)	596	643	577	606	583	620	599		
	pH	8.5	8.5	8.6	8.5	*	8.7	8.5		* tech error - not recorded
	Temp. (°C)	24.5	25.5	25.4	25.0	24.8	25.4	25.2		
60	DO (mg//L)	6.8	6.6	7.0	7.0	7.0	7.1	6.7		
	Cond. (µS)	614	672	591	621	580	645	629		
	pH	8.5	8.5	8.6	8.5	8.5	8.6	8.6		
	Temp. (°C)	24.4	25.1	25.4	25.1	24.7	24.9	25.0		
80	DO (mg//L)	6.8	6.8	7.0	7.1	7.1	7.3	6.7		
	Cond. (µS)	638	688	600	640	640	642	644		
	pH	8.5	8.5	8.6	8.5	8.5	8.5	8.5		
	Temp. (°C)	24.5	25.5	25.3	24.7	24.6	24.8	25.0		
Incubator Temperature (°C)		24.0	24.5	19.5	24.0	~~24.0~~ 24.0	24.0	24.0		Max: 25.6
Analyst		JM	u	AW	LAG	MV	AW	NL		Min: 23.4
Time Analyzed		1100	1120	1225	1340	1305	1310	1145		Range: 2.2
Environmental Chamber		T	T	T	T	T	T	T		Mean: 24.5 ± 1.1
Meter Number		1	1	1	1	1	1	1		

Data Checked and Approved by Laboratory Manager (Initials): AR

CHRONIC TOXICITY CHEMISTRY BENCH SHEET

START Date: 12/1/20

FINISH Date: 12/8/20

Dilution Water: Hard Recon

Test Substance: DR-7

Client/Project: Rico/RIC1220-DR-7

Organism: *C. dubia*

Test Conc.	Chemical Parameter	Day of Test 1	2	3	4	5	6	7		COMMENTS
100	DO (mg//L)	6.9	6.8	7.0	7.1	7.2	7.2	6.7		
	Cond. (µS)	655	710	666	668	656	684	685		
	pH	8.5	8.6	8.6	8.5	8.3	8.5	8.5		
	Temp. (°C)	24.2	25.6	24.9	24.5	24.4	24.0	24.9		
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
Incubator Temperature (°C)		24.0	24.5	19.5	24.0	24.0	24.0	24.0		Max: 25.6
Analyst		JMJ	u	AW	LAG	MV	AW	NL		Min: 23.4
Time Analyzed		1100	1120	1225	1340	1305	1310	1145		Range: 2.2
Environmental Chamber		T	T	T	T	T	T	T		Mean: 24.5 ± 1.1
Meter Number		1	1	1	1	1	1	1		

Data Checked and Approved by Laboratory Manager (Initials): AR

CHRONIC TOXICITY CHEMISTRY BENCH SHEET

START Date: 12/8/20 FINISH Date: 12/14/20

Dilution Water: EPA Hard Recon Test Substance: AC3EFF

Client/Project: Rico/RIC1220B-AC3EFF Organism *C. dubia*

Test Conc.	Chemical Parameter	Day of Test 1	2	3	4	5	6	7		COMMENTS
HH Recon	DO (mg//L)	6.7	6.7	7.0	7.0	6.8	7.0			
	Cond. (µS)	1290	1287	1307	1408	1340	1328			
	pH	8.2	8.2	8.3	8.3	8.3	8.3	MH		
	Temp. (°C)	23.8	23.4	24.5	24.2	24.3	~~21.8~~	~~24.2~~		24.3
0	DO (mg//L)	6.7	6.7	6.9	7.0	6.7	6.8			
	Cond. (µS)	574	552	578	573	610	607			
	pH	8.4	8.5	8.5	8.6	8.5	8.5	MH		
	Temp. (°C)	23.6	24.7	22.4	24.5	24.2	21.8	~~23.5~~		
10	DO (mg//L)	6.7	6.7	7.0	6.8	6.8	6.9			
	Cond. (µS)	639	635	651	678	670	699			
	pH	8.4	8.4	8.5	8.5	8.5	8.5	MH		
	Temp. (°C)	24.2	24.2	23.0	24.5	24.1	24.1	~~24.3~~		
20	DO (mg//L)	6.7	6.7	7.0	6.8	6.8	6.9			
	Cond. (µS)	715	735	724	782	763	802			
	pH	8.4	8.4	8.5	8.5	8.5	8.4	MH		
	Temp. (°C)	24.2	24.5	24.1	24.3	22.8	23.1	~~23.5~~		
40	DO (mg//L)	6.7	6.8	7.0	6.9	6.8	7.0			
	Cond. (µS)	840	820	834	889	868	889			
	pH	8.4	8.4	8.5	8.5	8.5	8.4	MH		
	Temp. (°C)	24.3	24.3	24.0	24.0	24.0	24.3	~~24.1~~		
60	DO (mg//L)	6.8	6.8	7.1	6.9	6.9	7.1			
	Cond. (µS)	986	955	967	1029	1021	1041			
	pH	8.4	8.4	8.5	8.5	8.5	8.4	MH		
	Temp. (°C)	24.1	24.0	23.6	24.1	24.2	24.1	~~24.0~~		
80	DO (mg//L)	6.8	6.8	7.2	7.0	7.0	7.1			
	Cond. (µS)	1109	1053	1076	1143	1116	1150			
	pH	8.4	8.4	8.4	8.5	8.4	8.4	MH		
	Temp. (°C)	24.0	24.4	23.6	24.2	24.3	24.3	~~24.0~~		
Incubator Temperature (°C)		25.0	25.0	25.0	25.5	23.5	25.0			Max: ~~24.8~~ 24.7
Analyst		JMS	LAG	JMS	TE	MM	TE			Min: ~~22.4~~ 21.3
Time Analyzed		1115	1100	1130	1250	1150	1215			Range: ~~2.4~~ 2.9
Environmental Chamber		W	W	W	W	W	W	~~W~~ MH		Mean: ~~23.5 ± 1.1~~ 23.3 ± 1.5
Meter Number		1	1	1	1	1	1			

Data Checked and Approved by Laboratory Manager (Initials): AR

2/2

CHRONIC TOXICITY CHEMISTRY BENCH SHEET

START Date: 12/8/20

FINISH Date: 12/14/20

Dilution Water: EPA Hard Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC1220B-AC3EFF

Organism *C. dubia*

Test Conc.	Chemical Parameter	Day of Test 1	2	3	4	5	6	7		COMMENTS
100	DO (mg//L)	6.9	6.9	7.2	7.1	7.0	7.2			
	Cond. (µS)	1226	1166	1193	1284	~~[illegible]~~ 1236	1278			
	pH	8.4	8.3	8.4	8.4	8.4	8.4			
	Temp. (°C)	24.2	24.6	23.6	24.1	24.5	24.2	~~24.2~~ mH		
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									
	DO (mg//L)									
	Cond. (µS)									
	pH									
	Temp. (°C)									

	1	2	3	4	5	6	7		
Incubator Temperature (°C)	25.0	25.0	25.0	25.5	25.5	25.0			Max: ~~24.6~~ mH 24.7
Analyst	JMS	LAG	JMS	TE	MW	TE			Min: ~~[illegible]~~ mH 21.8
Time Analyzed	1115	1100	1130	1250	1150	1226			Range: ~~[illegible]~~ mH 2.9
Environmental Chamber	W	W	W	W	W	W	~~W~~ mH		Mean: ~~23.5 ± 1.1~~ mH 23.3 ± 1.5
Meter Number	1	1	1	1	1	1			

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 1/8/21 1245

FINISH Date/Time: 1/10/21 1210

Dilution Water: EPA Hard Recon

Test Substance: DR-2

Client/Project: Rico/RIC121-DR-2

Species: *C. dubia*

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	5	5	3			17/20	
	B	5	5	5				
	C	5	5	5			85%	
	D	5	5	4				
0	A	5	5	5			19/20	
	B	5	5	5				
	C	5	5	4			95%	
	D	5	5	5				
10	A	5	5	5			19/20	
	B	5	5	5				
	C	5	5	5			95%	
	D	5	5	4				
20	A	5	5	5			19/20	
	B	5	4	4				
	C	5	5	5			95%	
	D	5	5	5				
40	A	5	5	5			19/20	
	B	5	5	5				
	C	5	5	5			95%	
	D	5	5	4				
60	A	5	5	5			20/20	
	B	5	5	5				
	C	5	5	5			100%	
	D	5	5	5				
80	A	5	5	5			17/20	
	B	5	5	4				
	C	5	5	5			85%	
	D	5	4	3				
ANALYST		AW	TE	TE				
TIME FED		1245	—	—				
TIME RENEWED		1245	1400	1210				

Template Number 7

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 1/8/21 1245

FINISH Date/Time: 1/10/21 1210

Dilution Water: EPA Hard Recon

Test Substance: DR-2

Client/Project: Rico/RIC121-DR-2

Species: *C. dubia*

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	5	5	5			19/20	
	B	5	5	5				
	C	5	5	4			95%	
	D	5	5	5				
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		AW	TE	TE				
TIME FED		1645	–	–				
TIME RENEWED		1245	1400	1210				

Template Number 7

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 11/6/20 1300

FINISH Date/Time: 11/8/20 1235

Dilution Water: EPA Hard Recon

Test Substance: DR-3

Client/Project: Rico/RIC1120-DR-3

Species: C. dubia

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	5	5	5			19/20 95%	
	B	5	5	4				
	C	5	5	5				
	D	5	5	5				
0	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
10	A	5	5	4			19/20 95%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
20	A	5	3	1			8/20 40%	
	B	5	4	2				
	C	5	3	2				
	D	5	5	3				
40	A	5	5	2			6/20 30%	
	B	5	5	1				
	C	5	4	1				
	D	5	3	2				
60	A	5	3	0			1/20 5%	
	B	5	~~1~~ 0	0				
	C	5	3	1				
	D	5	1	0				
80	A	5	1	0			2/20 10%	
	B	5	1	1				
	C	5	2	1				
	D	5	1	0				
ANALYST		MW	LAG	TE				
TIME FED		835	—	—				
TIME RENEWED		1300	1150	1235				

Template Number 21

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 11/6/20 1306

FINISH Date/Time: 11/8/20 1235

Dilution Water: EPA Hard Recon

Test Substance: DR-3

Client/Project: Rico/RIC1120-DR-3

Species: C. dubia

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	5	1	0			0/20 0%	
	B	5	0	0				
	C	5	0	0				
	D	5	1	0				
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		MW	LAG	TE				
TIME FED		835	—	—				
TIME RENEWED		1300	1150	1235				

Template Number 21

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1200

FINISH Date/Time: 12/3/20 1120

Dilution Water: Hard Recon

Test Substance: DR-6

Client/Project: Rico/RIC1220 -DR-6

Species: C. dubia

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	5	5	5			19/20 95%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	4				
0	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
10	A	5	5	5			19/20 95%	
	B	5	5	5				
	C	5	4	4				
	D	5	5	5				
20	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
40	A	5	5	5			14/15 93.3%	* tech error - 5 missing organisms. one replicate excluded from all statistical analyses
	B	5	0*	0				
	C	5	4	4				
	D	5	5	5				
60	A	5	4	4			19/20 95%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
80	A	5	0*	0			8/10 80%	* tech error - 5 missing organisms. ~~One~~ TWO replicate excluded from all statistical analyses
	B	5	5	4				
	C	5	0*	0				
	D	5	5	4				
ANALYST		W	AW	AW				
TIME FED		910	—	—				
TIME RENEWED		1200	1020	1120				

Template Number 8

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1200

FINISH Date/Time: 12/3/20 1120

Dilution Water: Hard Recon

Test Substance: DR-6

Client/Project: Rico/RIC1220 -DR-6

Species: C. dubia

CONCENTRATION & REPLICATE		Number alive/day of test: Start	24 hr.	48 hr.	72 hr.	96 hr.	#alive/ # exposed (% survival)	COMMENTS
100	A	5	4	4			12/15 80%	* tech error - 4 missing organisms. One replicate excluded from all statistical analyses
	B	5	4	0*				
	C	5	4	4				
	D	5	5	4				
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		u	AW	AW				
TIME FED		910	—	—				
TIME RENEWED		1200	1020	1120				

Template Number 8

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1310

FINISH Date/Time: 12/3/20 1305

Dilution Water: Hard Recon

Test Substance: DR-7

Client/Project: Rico/RIC\220-DR-7

Species: C. dubia

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
0	A	5	5	4			18/20 90%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	4				
10	A	5	5	5			19/20 95%	
	B	5	5	4				
	C	5	5	5				
	D	5	5	5				
20	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
40	A	5	5	4			18/20 90%	
	B	5	5	5				
	C	5	5	4				
	D	5	5	5				
60	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
80	A	5	5	5			18/20 90%	
	B	5	5	4				
	C	5	5	5				
	D	5	4	4				
ANALYST		TE	MW	JMS				
TIME FED		910	-	-				
TIME RENEWED		1310	1150	1305				

Template Number 21

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1310

FINISH Date/Time: 12/3/20 1305

Dilution Water: Hard Recon

Test Substance: DR-7

Client/Project: Rico/RIC\220-DR-7

Species: C. dubia

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	5	5	5			19/20	
	B	5	5	5			95%	
	C	5	5	5				
	D	5	5	4				
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		TE	MW	JMS				
TIME FED		910	–	–				
TIME RENEWED		1310	1150	1305				

Template Number 21

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 11/17/20 1055

FINISH Date/Time: 11/19/20 1045

Dilution Water: EPA Hard Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC1120B-AC3EFF

Species: C. dubia

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	5	5	5			20/20	
	B	5	5	5				
	C	5	5	5			100%	
	D	5	5	5				
0	A	5	5	5			20/20	
	B	5	5	5				
	C	5	5	5			100%	
	D	5	5	5				
10	A	5	5	~~4~~ 5			19/20	
	B	5	5	5				
	C	5	5	4			95%	
	D	5	5	5				
20	A	5	5	5			20/20	
	B	5	5	5				
	C	5	5	5			100%	
	D	5	5	5				
40	A	5	4	4			19/20	
	B	5	5	5			95%	
	C	5	5	5			~~100%~~	
	D	5	5	5				
60	A	5	5	5			20/20	
	B	5	5	5				
	C	5	5	5			100%	
	D	5	5	5				
80	A	5	5	5			20/20	
	B	5	5	5				
	C	5	5	5			100%	
	D	5	5	5				
ANALYST		LC	LG	MN				
TIME FED		815	-	-				
TIME RENEWED		1055	1040	1045				

Template Number 8

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 11/17/20 1055

FINISH Date/Time: 11/19/20 1045

Dilution Water: EPA Hard Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC1120B-AC3EFF

Species: C. dubia

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	5	5	5			20/20 100%	
	B	5	5	5				
	C	5	5	5				
	D	5	5	5				
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		LL	LAG	MN				
TIME FED		815	—	-				
TIME RENEWED		1055	1040	1045				

Template Number 8

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1125

FINISH Date/Time: 12/5/20 1150

Dilution Water: Hard Recon

Test Substance: DR-2

Client/Project: Rico/RIC1220 -DR-2

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
0	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
10	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
20	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
40	A	10	10	10	10	10	35/40 87.5%	
	B	10	10	10	10	8		
	C	10	10	10	10	8		
	D	10	10	10	10	9		
60	A	10	10	10	10	10	37/40 92.5%	
	B	10	10	9	9	9		
	C	10	10	10	10	10		
	D	10	10	9	9	8		
80	A	10	10	10	10	10	39/40 97.5%	
	B	10	10	10	10	9		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
ANALYST		TE	LAG	JMS	LAG	MW		
TIME FED		700	—	535	—	—		
TIME RENEWED		1125	1200	1040	1400	1150		

Template Number 31

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1125

FINISH Date/Time: 12/5/20 1150

Dilution Water: Hard Recon

Test Substance: DR-2

Client/Project: Rico/RIC1220-DR-2

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	10	10	10	10	10	38/40 95%	
	B	10	10	10	10	9		
	C	10	10	10	10	9		
	D	10	10	10	10	10		
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		TE	LAG	JMS	LAG	MW		
TIME FED		700	—	535	—	—		
TIME RENEWED		1125	1200	1040	1400	1150		

Template Number 31

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 11/6/20 1140

FINISH Date/Time: 11/10/20 1105

Dilution Water: EPA Hard Recon

Test Substance: DR-3

Client/Project: Rico/RIC1120-DR-3

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	10	10	10	10	8	37/40	
	B	10	10	10	10	10		
	C	10	10	9	9	9	92.5%	
	D	10	10	10	10	10		
0	A	10	10	10	10	10	39/40	
	B	10	10	10	10	10		
	C	10	10	10	9	9	97.5%	
	D	10	10	10	10	10		
10	A	10	10	10	10	9	37/40	
	B	10	10	9	9	9		
	C	10	9	9	9	9	92.5%	
	D	10	10	10	10	10		
20	A	10	10	10	10	10	39/40	
	B	10	10	10	9	9		
	C	10	10	10	10	10	97.5%	
	D	10	10	10	10	10		
40	A	10	10	10	10	10	37/40	
	B	10	10	9	9	9		
	C	10	10	9	9	9	92.5%	
	D	10	9	9	9	9		
60	A	10	10	10	10	9	38/40	
	B	10	10	10	10	10		
	C	10	10	9	9	9	95%	
	D	10	10	10	10	10		
80	A	10	9	9	9	9	37/40	
	B	10	10	10	10	9		
	C	10	10	10	10	10	92.5%	
	D	10	10	10	10	9		
ANALYST		LAG	LAG	TE	TE	CL		
TIME FED		615	—	625	—	—		
TIME RENEWED		1140	1450	1340	925	1105		

Template Number 8

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 11/6/20 1140

FINISH Date/Time: 11/10/20 1105

Dilution Water: EPA Hard Recon

Test Substance: DR-3

Client/Project: Rico/RIC1120-DR-3

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	10	10	10	10	10	37/40 92.5%	
	B	10	10	9	9	9		
	C	10	10	10	9	9		
	D	10	10	9	9	9		
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		LAG	LAG	TE	TE	U		
TIME FED		615	—	625	—	—		
TIME RENEWED		1140	1450	1340	925	1105		

Template Number 8

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1120

FINISH Date/Time: 12/5/20 1155

Dilution Water: Hard Recon

Test Substance: DR-6

Client/Project: Rico/RIC 1220 -DR-6

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	10	10	10	10	10	38/40 95%	
	B	10	10	10	10	10		
	C	10	10	10	9	9		
	D	10	10	10	10	9		
0	A	10	10	10	10	8	36/40 90%	
	B	10	10	10	10	9		
	C	10	10	10	10	10		
	D	10	10	10	9	9		
10	A	10	10	10	9	9	39/40 97.5%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
20	A	10	10	10	10	8	37/40 92.5%	
	B	10	10	10	9	9		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
40	A	10	10	10	10	10	37/40 92.5%	
	B	10	10	10	8	8		
	C	10	10	9	9	9		
	D	10	10	10	10	10		
60	A	10	10	10	10	10	39/40 97.5%	
	B	10	10	10	9	9		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
80	A	10	10	10	10	10	39/40 97.5%	
	B	10	10	10	10	9		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
ANALYST		cc	LAG	WW	LAG	TE		
TIME FED		700	—	555	—	—		
TIME RENEWED		1120	1100	1120	1300	1155		

Template Number 31

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1120

FINISH Date/Time: 12/5/20 1155

Dilution Water: Hard Recon

Test Substance: DR-6

Client/Project: Rico/RIC1220 -DR-6

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	10	10	10	10	10	39/40 97.5%	
	B	10	10	9	9	9		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		a	LAG	MN	LAG	TE		
TIME FED		700	—	535	—	—		
TIME RENEWED		1120	1100	1120	1300	1155		

Template Number 31

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1205

FINISH Date/Time: 12/5/20 1215

Dilution Water: Hard Recon

Test Substance: DR-7

Client/Project: Rico/RIC1226-DR-7

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
0	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
10	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
20	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
40	A	10	10	10	10	10	39/40 97.5%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	9	9		
60	A	10	10	10	10	10	39/40 97.5%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	9		
80	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
ANALYST		TE	WW	JVS	AW	TE		
TIME FED		700	—	535	—	—		
TIME RENEWED		1205	1245	1215	1350	1215		

Template Number 31

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1205

FINISH Date/Time: 12/5/20 1215

Dilution Water: Hard Recon

Test Substance: DR-7

Client/Project: Rico/RIC 1220-DR-7

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	10	10	10	10	10	40/40	
	B	10	10	10	10	10		
	C	10	10	10	10	10	100%	
	D	10	10	10	10	10		
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		TE	NN	JMS	AW	TE		
TIME FED		700	–	535	–	–		
TIME RENEWED		1205	1245	1215	1350	1215		

Template Number 31

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 11/17/20 1010

FINISH Date/Time: 11/21/20 1035

Dilution Water: EPA Hard Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC1120B-AC3EFF

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
HH Recon	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
0	A	10	10	9	9	9	38/40 95%	
	B	10	10	10	10	9		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
10	A	10	10	10	9	9	39/40 97.5%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
20	A	10	10	10	10	10	38/~~7~~ MW 40 95%	
	B	10	10	10	10	10		
	C	10	9	9	9	8		
	D	10	10	10	10	10		
40	A	10	10	10	10	10	39/40 97.5%	
	B	10	10	10	10	10		
	C	10	10	10	10	9		
	D	10	10	10	10	10		
60	A	10	10	10	10	8	38/40 95%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
80	A	10	10	10	10	10	39/40 97.5%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	9		
ANALYST		u	u	u	AW	MW		
TIME FED		710	—	540	—	—		
TIME RENEWED		1010	905	915	1005	1035		

Template Number 31

Data Checked and Approved by Laboratory Manager (Initials): AR

ACUTE TOXICITY TEST BENCH SHEET

START Date/Time: 11/17/20 1010

FINISH Date/Time: 11/21/20 1035

Dilution Water: EPA Hard Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC1120B- AC3Eff

Species: P. promelas

CONCENTRATION & REPLICATE		Number alive/day of test					#alive/ # exposed (% survival)	COMMENTS
		Start	24 hr.	48 hr.	72 hr.	96 hr.		
100	A	10	10	10	10	10	40/40 100%	
	B	10	10	10	10	10		
	C	10	10	10	10	10		
	D	10	10	10	10	10		
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
	A							
	B							
	C							
	D							
ANALYST		CL	CL	CL	MN	MN		
TIME FED		710	–	540	–	–		
TIME RENEWED		1010	905	915	1005	1035		

Template Number 31

Data Checked and Approved by Laboratory Manager (Initials): AR

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1235

FINISH Date/Time: 12/8/20 1140

Dilution Water: Hard Recon

Test Substance: DR-2

Client/Project: Rico/RIC1220 -DR-2

Begun By: AW

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed	NOTES: + 1		
HH Recon	1	0	—	—	—	—	—	—	—	—	0	7.9	AW	1130			
	2	0	—	—	—	—	—	—	—	—	0	7.4	u	1035			
	3	0	—	—	—	—	—	—	—	—	0	7.85	BK	1220			
	4	5	8	6	7	6	7	6	4	5	6	7.4	TE	1240			
	5	0	13	11	11	15	10	12	12	10	10	8.0	TE	1235			
	6	~~0~~	~~18~~	~~14~~	~~13~~	~~14~~	~~10~~	~~11~~	~~10~~	~~0~~	~~0~~	7.8	BK	1210	Summarized Results:		
	7	13	16	19	13	0	15	0	12	9	18	—	MH	1140			
	8														# live adults	mean reprod, ± S.D.	norm. reprod. ± S.D.
TOTALS		26	38	36	31	35	32	29	28	24	34				10	31.3±4.5	31.3±4.5

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:		
0	1	0	—	—	—	—	—	—	—	—	0	7.8	AW			
	2	0	—	—	—	—	—	—	—	—	0	7.3	u			
	3	0	—	—	—	—	—	—	—	—	0	8.0	BK			
	4	6	7	6	7	5	5	5	6	7	6	7.7	TE			
	5	8	10	14	12	10	12	13	11	10	10	7.6	TE			
	6	0	15	14	12	1	11	7	16	0	0	7.8	BK	Summarized Results:		
	7	17	0	0	0	17	0	0	20	14	16	—	MH			
	8													# live adults	mean reprod, ± S.D.	norm. reprod. ± S.D.
TOTALS		31	32	34	31	33	28	25	33*	31	32			10	31.0±2.7	31.0±2.7

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:	
10	1	0	—	—	—	—	—	—	—	—	0	7.5	AW		
	2	0	—	—	—	—	—	—	—	—	0	7.2	u		
	3	0	—	—	—	—	—	—	—	—	0	8.0	BK		
	4	7	8	7	6	6	5	7	7	5	4	7.6	TE		
	5	13	11	10	11	8	14	14	13	2	1	7.7	TE		
	6	10	9	0	0	0	10	12	10	1	10	7.9	BK	Summarized Results:	
	7	0	0	20	21	18	0	0	0	0d	18	—	MH		
	8									↑				# live adults	normalized reproduction ± S.D.
TOTALS		30	28	37	38	32	29	33	30	8d	33			9	29.8±8.3

Board Used	Cup									
11/24A	4	6	13	14	33	34	42	43	44	46

Date/time adults isolated	11/30/20 1400
Date/time neonates harvested	11/30/20 2140

Template number 7

* fourth brood excluded from total

Data Checked and Approved by Laboratory Manager (Initials): AR

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1235

FINISH Date/Time: 12/8/20 1140

Dilution Water: Hard Recon

Test Substance: DR-2

Client/Project: Rico/RIC1220-DR-2

Begun By: AW

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed	NOTES:
20	1	0	—	—	—	—	—	—	—	—	0	7.6	AW	1130	
	2	0	—	—	—	—	—	—	—	—	0	7.3	"	1035	
	3	0	—	—	—	—	—	—	—	—	0	7.9	BK	1220	
	4	9	5	8	6	6	7	7	5	6	8	7.5	TE	1240	
	5	11	9	15	9	14	11	10	11	14	2	7.7	TE	1235	
	6	9	0	10	0	12	11	1	0	15	1	7.8	BK	1210	Summarized Results:
	7	0	9	0	14	0	0	16	21	0	16	—	MH	1140	# live adults: 10
	8														normalized reproduction ± S.D.: 30.8 ± 4.2
TOTALS		29	23	33	29	32	29	34	37	35	27				

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
40	1	0	—	—	—	—	—	—	—	—	0	7.5	AW	
	2	0	—	—	—	—	—	—	—	—	0	7.4	"	
	3	0	—	—	—	—	—	—	—	—	0	7.9	BK	
	4	7	6	6	4	7	6	6	7	6	7	7.7	TE	
	5	12	10	9	0	11	13	12	13	14	12	7.9	TE	
	6	14	9	0	14	15	8	7	14	11	0	7.8	BK	Summarized Results:
	7	0	0	12	19	0	0	0	17	0	17	—	MH	# live adults: 10
	8													normalized reproduction ± S.D.: 30.8 ± 4.5
TOTALS		33	25	27	37	33	27	25	34*	31	36			

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
60	1	0	—	—	—	—	—	—	—	—	0	7.5	AW	
	2	0	—	—	—	—	—	—	—	—	0	7.5	"	
	3	0	—	—	0	4	0	—	—	—	0	7.9	BK	
	4	5	6	7	6	0	4	6	6	5	4	7.7	TE	
	5	10	12	13	14	9	12	11	11	10	9	8.0	TE	
	6	0	0	16	12	12	15	13	0	0	0	8.0	BK	Summarized Results:
	7	20	18	0	1	24	20	14	16	16	16	—	MH	# live adults: 10
	8													normalized reproduction ± S.D.: 31.9 ± 3.4
TOTALS		35	36	36	33	25*	31*	30*	33	31	29			

Board Used	Cup									
11/24A	4	6	13	14	33	34	42	43	44	46

Date/time adults isolated	11/30/20 1400
Date/time neonates harvested	11/30/20 2140

Template number 7

* fourth brood excluded from total

Data Checked and Approved by Laboratory Manager (Initials): AR

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1235

FINISH Date/Time: 12/8/20 1140

Dilution Water: Hard Recon

Test Substance: DR-2

Client/Project: Rico/RIC1220-DR-2

Begun By: AW

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed
80	1	0	—	—	—	—	—	—	—	—	0	7.5	AW	1130
	2	0	—	—	—	—	—	—	—	—	0	7.7	"	1035
	3	0	—	—	—	—	—	—	—	—	0	7.9	BK	1220
	4	6	5	6	6	6	6	7	7	6	6	7.9	TE	1240
	5	14	11	13	9	14	14	15	15	1	0	8.4	TE	1235
	6	6	8	6	0	16	15	13	10	4Δ	16	8.1	BK	1210
	7	0	1	0	19	0	18	8	0	0	20	—	MH	1140
	8													
TOTALS		26	25	25	34	36	35*	35*	32	~~4~~ 11	42			

NOTES: ΔDead/undeveloped neonates - number not counted.

Summarized Results:	
# live adults	normalized reproduction ± S.D.
10	30.1 ± 8.7 ~~29.9 ± 9.2~~

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
100	1	0	—	—	—	—	—	—	—	—	0	7.8	AW
	2	0	—	—	—	—	—	—	—	—	0	8.5	"
	3	0	—	—	—	—	—	—	—	—	0	7.9	BK
	4	6	6	8	7	5	8	6	6	5	6	9.1	TE
	5	10	10	13	14	15	11	12	10	10	9	9.4	TE
	6	10	9	6	0	9	14	11	13	0	0	8.4	BK
	7	0	0	0	20	2	0	0	1	8	16	—	MH
	8												
TOTALS		26	25	27	41	31	33	29	30	23	31		

NOTES:

Summarized Results:	
# live adults	normalized reproduction ± S.D.
10	29.6 ± 5.1

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
	1												
	2												
	3												
	4												
	5												
	6												
	7												
	8												
TOTALS													

NOTES:

Summarized Results:	
# live adults	normalized reproduction ± S.D.

Board Used	Cup									
11/24A	4	6	13	14	33	34	42	43	44	46

Date/time adults isolated	11/30/20 1400
Date/time neonates harvested	11/30/20 2140

Template number 7

Data Checked and Approved by Laboratory Manager (Initials): AR

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1130

FINISH Date/Time: 12/8/20 1110

Dilution Water: Hard Recon

Test Substance: DR-6

Client/Project: Rico/RIC1220 -DR-6

Begun By: AW

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed
HH Recon	1	0	—	—	—	—	—	—	—	—	0	7.5	MW	1020
	2	0	—	—	—	—	—	—	—	—	0	8.0	MW	1000
	3	0	—	—	—	—	—	—	—	—	0	7.3	MW	1125
	4	7	7	7	8	8	7	8	8	7	7	8.2	NL	1205
	5	13	11	12	13	11	13	10	12	12	0	7.7	TE	1115
	6	0	—	0	18	0	12	0	—	—	0	7.8	~	1100
	7	14	13	15	0	17	0	15	14	18	0	—	MH	1110
	8													
TOTALS		34	31	34	39	36	32	33	34	37	7			

NOTES:

Summarized Results:

# live adults	mean reprod. ± S.D.	norm. reprod. ± S.D.
10	31.7 ± 9.0	31.7 ± 9.0

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
0	1	0	—	—	—	—	—	—	—	—	0	7.6	MW
	2	0	—	—	—	—	—	—	—	—	0	8.0	MW
	3	0	—	—	—	—	—	—	—	—	0	7.6	MW
	4	7	7	7	7	7	8	7	8	6	6	7.5	NL
	5	10	12	12	0	13	10	14	10	9	11	7.5	TE
	6	0	—	0	11	19	19	0	—	—	0	7.8	~
	7	18	19	18	21	0	0	18	20	10	20	—	MH
	8												
TOTALS		35	38	37	39	39	37	39	38	25	37		

NOTES:

Summarized Results:

# live adults	mean reprod. ± S.D.	norm. reprod. ± S.D.
10	36.4 ± 4.2	36.4 ± 4.2

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
10	1	0	—	—	—	—	—	—	—	—	0	7.9	MW
	2	0	—	—	—	—	—	—	—	—	0	7.9	MW
	3	0	—	—	—	—	—	—	—	—	0	7.3	MW
	4	7	7	8	6	5	8	8	8	6	11	7.6	NL
	5	0	10	16	13	0	14	14	11	15	13	7.6	TE
	6	0	0	19	0	8	21	14	0	—	0	7.5	~
	7	17	17	0	17	24	0	0	21	17	19	—	MH
	8												
TOTALS		24	34	43	36	37	43	36	40	38	43		

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
10	37.4 ± 5.7

Board Used	Cup									
11124A	4	6	13	14	33	34	42	43	44	46

Date/time adults isolated	11/30/20 1400
Date/time neonates harvested	11/30/20 2140

Template number 8

Data Checked and Approved by Laboratory Manager (Initials): AR

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1130

FINISH Date/Time: 12/8/20 1110

Dilution Water: Hard Recon

Test Substance: DR-6

Client/Project: Rico/RIC 1220-DR-6

Begun By: AW

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed
20	1	0	—	—	—	—	—	—	—	—	0	8.0	MW	1020
	2	0	—	—	—	—	—	—	—	—	0	7.9	MW	1000
	3	0	—	—	—	—	—	—	—	—	0	7.3	MW	1125
	4	6	0	8	9	7	7	9	7	6	8	7.7	NL	1205
	5	9	7	11	13	13	0	13	13	0	11	7.6	TE	1115
	6	0	12	0	0	18	11	13	14	10	0	7.5	"	1100
	7	19	0	21	17	0	17	0	0	0	20	—	MH	1110
	8													
TOTALS		34	19	40	39	38	35	35	34	16	39			

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
10	32.9 ± 8.4

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
40	1	0	—	—	—	—	—	—	—	—	0	8.1	MW
	2	0	—	—	—	—	—	—	—	—	0	8.0	MW
	3	0	—	—	—	—	—	—	—	—	0	7.2	MW
	4	8	7	7	7	7	7	0	7	7	6	8.0	NL
	5	10	9	8	9	11	14	6	12	9	13	7.9	TE
	6	0	—	—	0	0Δ	0	13	0	—	0	7.6	"
	7	16	18	20	18	0	19	0	19	19	19	—	MH
	8												
TOTALS		34	34	35	34	18	40	19	38	35	38		

NOTES: Δ Dead/Underdeveloped neonates, number not counted

Summarized Results:

# live adults	normalized reproduction ± S.D.
10	32.5 ± 7.7

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
60	1	0	—	—	—	—	—	—	—	—	0	8.2	MW
	2	0	—	—	—	—	—	—	—	—	0	8.3	MW
	3	0	—	—	—	—	—	—	—	—	0	7.3	MW
	4	5	6	7	7	7	8	7	7	8	3	8.2	NL
	5	12	11	11	10	11	13	11	11	10	11	8.0	TE
	6	0	—	—	0	19	16	0	—	—	0	7.7	"
	7	21	19	17	17	0	0	16	16	0Δ	18	—	MH
	8												
TOTALS		38	36	35	34	37	37	34	34	18	32		

NOTES: Δ Dead/underdeveloped neonates, number not counted.

Summarized Results:

# live adults	normalized reproduction ± S.D.
10	33.5 ± 5.7

Board Used	Cup									
11/24A	4	6	13	14	33	34	42	43	44	46

Date/time adults isolated	11/30/20 1400
Date/time neonates harvested	11/30/20 2140

Template number 8

Data Checked and Approved by Laboratory Manager (Initials): AR

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1130

FINISH Date/Time: 12/8/20 1110

Dilution Water: Hard Recon

Test Substance: DR-6

Client/Project: Rico/RIC 1220 -DR-6

Begun By: AW

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed	NOTES:
80	1	0	—	—	—	—	—	—	—	—	0	8.5	MW	1020	Δ Dead/undeveloped neonates, number not counted
	2	0	—	—	—	—	—	—	—	—	0	8.5	MW	1000	
	3	0	—	—	—	—	—	—	—	—	0	7.6	MW	1125	
	4	6	6	7	4	7	7	5	0	4	4	8.2	NL	1205	
	5	12	9	8	7	11	11	6	0	12	14	8.4	TE	1115	
	6	0	—	—	—	0	10Δ	0	—	—	0	7.8	"	1100	Summarized Results:
	7	8Δ	17	12Δ	15	12	0	16	0Δ	13	17	—	MH	1110	
	8														# live adults / normalized reproduction ± S.D.
TOTALS		26	32	27	26	30	28	27	0	29	35				10 / 26.0 ± 9.6

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
100	1	0	—	—	—	—	—	—	—	—	0	8.4	MW	Δ Dead/undeveloped neonates, number not counted.
	2	0	—	—	—	—	—	—	—	—	0	9.0	MW	
	3	0	—	—	—	—	—	—	—	—	0	8.1	MW	
	4	0	6	0	0	4	4	0	0	6	0	9.5	NL	
	5	6	7	0	4	2	1	4	0	3	0	8.9	TE	
	6	0	0	7Δ	0	13	0	—	—	—	0	8.2	"	Summarized Results:
	7	0	13Δ	0	5Δ	0	0Δ	12Δ	12	17	0Δ	—	MH	
	8													# live adults / normalized reproduction ± S.D.
TOTALS		6	26	7	9	19	5	16	12	26	0			10 / 12.6 ± 8.9

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
	1												~~AW~~ MW	
	2												~~MW~~	
	3													
	4													
	5													
	6													Summarized Results:
	7													
	8													# live adults / normalized reproduction ± S.D.
TOTALS														

Board Used	Cup									
11/24A	4	10	13	14	33	34	42	43	44	46

Date/time adults isolated	11/30/20 1400
Date/time neonates harvested	11/30/20 2140

Template number 8

Data Checked and Approved by Laboratory Manager (Initials): AR

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1205

FINISH Date/Time: 12/8/20 1120

Dilution Water: Hard Recon

Test Substance: DR-7

Client/Project: Rico/RIC1220-DR-7

Begun By: LAG

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed
HH Recon	1	0	—	—	—	—	—	—	—	—	0	7.5	JMS	1010
	2	0	—	—	—	—	—	—	—	—	0	7.3	AW	1030
	3	0	—	—	—	—	—	—	—	—	0	8.1	AW	1130
	4	8	7	7	7	7	7	8	8	7	6	7.7	LAG	1225
	5	11	13	12	10	12	12	15	13	13	7	7.9	MV	1135
	6	0	—	0	14	10	0	8	0	9	0	7.8	AW	1205
	7	14	16	0	0	0	14	0	10	0	7	—	BK	1120
	8													
TOTALS		33	36	19	31	29	33	31	31	29	20			

NOTES:

Summarized Results:

# live adults	mean reprod. ± S.D.	norm. reprod. ± S.D.
10	29.2±5.5	29.2±5.5

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
0	1	0	—	—	—	—	—	—	—	—	0	7.4	JMS
	2	0	—	—	—	—	—	—	—	—	0	7.3	AW
	3	0	—	—	—	—	—	—	—	—	0	8.0	AW
	4	8	7	7	8	7	8	8	9	7	6	7.9	LAG
	5	10	14	14	11	12	14	13	12	10	12	7.8	MV
	6	15	14	17	10	18	16	15	17	15	15	7.8	AW
	7	0	—	—	—	—	—	—	—	—	0	—	BK
	8												
TOTALS		33	35	38	29	37	38	36	38	32	33		

NOTES:

Summarized Results:

# live adults	mean reprod. ± S.D.	norm. reprod. ± S.D.
10	34.9±3.1	34.9 ± 3.1

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
10	1	0	—	—	—	—	—	—	—	—	0	7.4	JMS
	2	0	—	—	—	—	—	—	—	—	0	7.3	AW
	3	0	—	—	—	—	—	—	—	—	0	7.8	AW
	4	6	7	3	8	6	8	7	9	6	7	7.8	LAG
	5	11	10	11	15	14	14	13	14	12	13	7.7	MV
	6	15	0	0	16	0	15	16	19	17	20	7.9	AW
	7	0	17	17	0	18	0	14	0	0	0	—	BK
	8												
TOTALS		32	34	31	39	38	29	36*	42	35	40		

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
10	35.6 ± 4.2

Board Used	Cup									
11/24A	3	5	11	16	26	27	32	36	45	47

Date/time adults isolated	11/30/20 1400
Date/time neonates harvested	11/30/20 2140

Template number 7

Data Checked and Approved by Laboratory Manager (Initials): AR

* fourth brood excluded from totals

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1205

FINISH Date/Time: 12/8/20 1120

Dilution Water: Hard Recon

Test Substance: DR-7

Client/Project: Rico/RIC1220-DR-7

Begun By: LAG

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed	NOTES:
20	1	0	—	—	—	—	—	—	—	—	0	7.4	JMS	1010	
	2	0	—	—	—	—	—	—	—	—	0	7.3	AW	1030	
	3	0	—	—	—	—	—	—	—	—	0	7.7	AW	1130	
	4	7	7	6	7	7	7	7	8	7	7	8.0	LAG	1225	
	5	14	9	12	17	14	13	17	14	11	10	7.7	MW	1135	
	6	1	14	17	18	15	16	18	18	14	0	7.9	AW	1205	Summarized Results:
	7	17	0	—	—	—	—	—	—	0	18	—	BK	1120	
	8														# live adults / normalized reproduction ± S.D.
TOTALS		39	30	35	42	36	36	37	40	32	35				10 / 36.2 ± 3.6

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
40	1	0	—	—	—	—	—	—	—	—	0	7.6	JM	
	2	0	—	—	—	—	—	—	—	—	0	7.7	AW	
	3	0	—	—	—	—	—	—	—	—	0	7.7	AW	
	4	9	7	6	6	6	8	8	8	7	7	8.1	LAG	
	5	17	12	15	12	15	13	14	14	13	11	7.8	MW	
	6	3	13	20	15	17	17	23	22	16	17	8.0	AW	Summarized Results:
	7	0	—	—	—	—	—	—	—	—	0	—	BK	
	8													# live adults / normalized reproduction ± S.D.
TOTALS		29	32	41	33	38	38	45	46	36	35			10 / 37.3 ± 5.5

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
60	1	0	—	—	—	—	—	—	—	—	0	7.7	JMS	
	2	0	—	—	—	—	—	—	—	—	0	7.7	AW	
	3	0	—	—	—	—	0	6	0	—	0	7.8	AW	
	4	6	6	7	4	8	7	0	8	6	7	8.0	LAG	
	5	13	12	12	13	13	16	17	14	14	10	7.9	MW	
	6	13	14	18	17	18	16	22	18	19	0	7.9	AW	Summarized Results:
	7	0	—	—	—	—	0	20	0	0	21	—	BK	
	8													# live adults / normalized reproduction ± S.D.
TOTALS		32	32	37	34	39	33	45*	40	39	38			10 / 36.9 ± 4.2

Board Used	Cup									
11124 A	3	5	11	16	26	27	32	36	45	47

Date/time adults isolated	11/30/20 1400
Date/time neonates harvested	11/30/20 2140

Template number 7

Data Checked and Approved by Laboratory Manager (Initials): AR

* Fourth brood excluded from totals

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 12/1/20 1205

FINISH Date/Time: 12/8/20 1120

Dilution Water: Hard Recon

Test Substance: DR-7

Client/Project: Rico/RIC1220-DR-7

Begun By: LAG

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed	NOTES:
80	1	0	—	—	—	—	—	—	—	—	0	7.8	JVS	1010	
	2	0	—	—	—	—	—	—	—	—	0	8.1	AW	1030	
	3	0	—	—	—	—	—	—	—	—	0	7.9	AW	1130	
	4	7	7	7	6	7	6	7	7	8	6	8.1	LAG	1225	
	5	16	15	15	11	14	13	15	13	12	15	8.1	JW	1135	
	6	17	6	18	0	20	21	18	22	19	18	7.9	AW	1205	Summarized Results:
	7	0	0	0	16	0	—	—	—	—	0	—	BK	1120	# live adults / normalized reproduction ± S.D.
	8														
TOTALS		40	28	40	33	41	40	40	42	39	39				10 / 38.2 ± 4.3

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
100	1	0	—	—	—	—	—	—	—	—	0	8.2	JVS	
	2	0	—	—	—	—	—	—	—	—	0	8.8	AW	
	3	0	—	—	—	—	—	—	—	—	0	8.2	AW	
	4	8	6	8	7	7	7	8	0	8	8	9.8	LAG	
	5	16	11	12	14	16	12	0	13	11	12	8.3	JW	
	6	14	19	18	16	19	16	5	22	0	20	7.7	AW	Summarized Results:
	7	0	—	—	—	—	—	—	0	18	0	—	BK	# live adults / normalized reproduction ± S.D.
	8													
TOTALS		38	36	38	37	42	35	13	35	37	40			10 / 35.1 ± 8.1

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
	1													
	2													
	3													
	4													
	5													
	6													Summarized Results:
	7													# live adults / normalized reproduction ± S.D.
	8													
TOTALS														

Board Used	Cup									
11/24A	3	5	11	16	26	27	32	36	45	47

Date/time adults isolated	11/30/20 1400
Date/time neonates harvested	11/30/20 2140

Template number 7

Data Checked and Approved by Laboratory Manager (Initials): AR

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 12/8/20 1200

FINISH Date/Time: 12/14/20 1130

Dilution Water: EPA Hard Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC1220B-AC3EFF

Begun By: AR

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed
HH Recon	1	0									0	7.4	JMS	1025
	2	0									0	7.2	LAG	1005
	3	0	0	0d	0					0	7	7.6	JMS	1005
	4	5	4		6	5	4	6	4	5	0	7.6	TE	1200
	5	9	13		17	11	9	14	15	14	7	7.0	MW	1050
	6	0	0		11	0	17	18	10	17	19	8.2	TE	1130
	7													
	8													
TOTALS		14	17	0d	34	16	30	38	29	36	33			

NOTES:

Summarized Results:

# live adults	mean reprod. ± S.D.	norm. reprod. ± S.D.
9	27.4 ± 9.3	24.7 ± 12.3

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
0	1	0									0	7.5	JMS
	2	0									0	7.2	LAG
	3	0	0	0	6	6	0	7	0	0	8	7.5	JMS
	4	7	6	5	0			0	7	6	0	7.4	TE
	5	14	13	15	16	16	0	16	16	12	15	7.6	MW
	6	0	19	14	0	18	0d	19	6	14	16	7.3	TE
	7												
	8												
TOTALS		21	38	34	22	40	0d	42	29	32	39		

NOTES:

Of confirmed female

Summarized Results:

# live adults	mean reprod. ± S.D.	norm. reprod. ± S.D.
9	33.0 ± 7.7	29.7 ± 12.7

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst
10	1	0									0	7.4	JMS
	2	0									0	7.0	LAG
	3	0								0	3	7.1	JMS
	4	6	7	6	6	6	6	6	4	5	0	7.2	TE
	5	10	17	13	16	15	14	0	8	12	14	7.6	MW
	6	0	19	~~24~~ 21	17	18	0	0	12	20	20	7.6	TE
	7												
	8												
TOTALS		16	43	40	39	39	20	6	24	37	37		

NOTES:

Summarized Results:

# live adults	normalized reproduction ± S.D.
10	30.1 ± 12.6

Board Used	~~12/1/20~~ ~~12/7/20~~ AR					Cup	12/1/20A			~~1/1/20~~ 1/3/20B
~~12/7/20~~ AR	5	6	7	28	32	35	36	37	41	2

Date/time adults isolated	12/7/20 1400
Date/time neonates harvested	12/7/20 2130

Template number 7

Data Checked and Approved by Laboratory Manager (Initials): AR

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 12/5/20 1200

FINISH Date/Time: 12/14/20 1130

Dilution Water: EPA Hard Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC1220B-AC3EFF

Begun By: AR

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed	NOTES:
20	1	0	—	—	—	—	—	—	—	—	0	7.4	JMS	1025	
	2	0	—	—	—	—	—	—	—	—	0	7.1	LAG	1005	
	3	0	0	4	0	0	0	0	od	0	0	7.0	JMS	1005	
	4	6	8	2	8	6	7	7		7	7	7.1	TE	1200	
	5	13	16	16	16	15	17	15		11	15	7.6	MW	1050	
	6	0	15	20	20	17	19	16		15	5	7.6	TE	1130	Summarized Results:
	7														
	8														# live adults / normalized reproduction ± S.D.
TOTALS		19	39	42	44	38	43	38	od	33	27				9 / 32.3 ± 13.8

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
40	1	0	—	—	—	—	—	—	—	—	0	7.4	~~JMS~~ JMS	
	2	0	—	—	—	—	—	—	—	—	0	7.1	LAG	
	3	0	—	—	—	—	—	—	0	4	9	7.0	JMS	
	4	0	8	6	8	5	6	6	7	0	0	7.1	TE	
	5	4	16	15	16	15	0	16	18	15	16	7.1	MW	
	6	1	5	16	18	8	20	18	21	20	20	7.8	TE	Summarized Results:
	7													
	8													# live adults / normalized reproduction ± S.D.
TOTALS		5	29	37	42	28	26	40	46	39	45			10 / 33.7 ± 12.3

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
60	1	0	—	—	—	—	—	—	—	—	0	7.5	JMS	
	2	0	—	—	—	—	—	—	—	—	0	7.0	LAG	
	3	0	0	0	6	6	0	—	—	—	0	7.0	JMS	
	4	7	6	5	0	0	7	6	8	8	8	7.0	TE	
	5	15	12	14	16	15	10	13	14	13	8	7.0	MW	
	6	16	0	18	22	22	21	18	1	17	0	7.8	TE	Summarized Results:
	7													
	8													# live adults / normalized reproduction ± S.D.
TOTALS		38	18	37	44	43	38	37	23	38	16			10 / 33.2 ± 10.2

Board Used	Cup									113520 3
12/1/20A	5	6	7	28	32	35	36	37	41	2

Date/time adults isolated	12/7/20 1400
Date/time neonates harvested	12/7/20 2130

Template number 7

Data Checked and Approved by Laboratory Manager (Initials): AR

CERIODAPHNIA DUBIA 3-BROOD CHRONIC TOXICITY TEST BENCH SHEET

START Date/Time: 12/8/20 1200

FINISH Date/Time: 12/14/20 1130

Dilution Water: EPA Hard Recon

Test Substance: AC3EFF

Client/Project: Rico/RIC1220B-AC3EFF

Begun By: AR

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	Time Renewed and Fed	NOTES:
80	1	0	—	—	—	—	—	—	—	—	0	7.4	JMS	1025	
	2	0	—	—	—	—	—	—	—	—	0	7.0	LAG	1005	
	3	0	0	0	0	7	5	0	0	6	8	7.0	JMS	1005	
	4	7	8	6	6	0	0	8	6	0	0	6.9	TE	1200	
	5	16	15	11	15	16	14	18	14	14	17	7.0	MW	1050	
	6	17	2	14	16	20	23	0	10	17	18	7.8	TE	1130	Summarized Results:
	7														# live adults / normalized reproduction ± S.D.
	8														
TOTALS		40	25	31	37	43	42	26	30	37	43				10 / 35.4 ± 6.9

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
100	1	0	—	—	—	—	—	—	—	—	0	7.3	JMS	
	2	0	—	—	—	—	—	—	—	—	0	6.9	LAG	
	3	0	0	6	6	4	4	0	0	0	0	7.0	JMS	
	4	5	4	0	—	0	0	8	9	5	0	6.9	TE	
	5	15	15	17	14	15	17	16	15	14	4	6.9	MW	
	6	14	18	21	20	19	21	17	23	12	1	7.5	TE	Summarized Results:
	7													# live adults / normalized reproduction ± S.D.
	8													
TOTALS		34	37	44	40	38	42	41	47	31	5			10 / 35.9 ± 11.8

Conc.	Day	Replicate A	B	C	D	E	F	G	H	I	J	D.O. (mg/L)	Analyst	NOTES:
	1													
	2													
	3													
	4													
	5													
	6													Summarized Results:
	7													# live adults / normalized reproduction ± S.D.
	8													
TOTALS														

Board Used	Cup									
12120A	5	6	7	28	32	35	36	37	41	2

Date/time adults isolated	12/7/20 1410
Date/time neonates harvested	12/7/20 2130

Template number 7

Data Checked and Approved by Laboratory Manager (Initials): AR

CETIS Summary Report

Report Date:	27 Jan-21 08:19 (p 1 of 1)
Test Code/ID:	5BCEF2C5 / 15-4028-9221

Ceriodaphnia 48-h Acute Survival Test — **GEI Consultants, Inc**

Batch ID:	13-6363-4924	**Test Type:**	Survival (48h)	**Analyst:**		
Start Date:	06 Nov-20 13:00	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Hard Synthetic Water	
Ending Date:	08 Nov-20 12:35	**Species:**	Ceriodaphnia dubia	**Brine:**		
Test Length:	48h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**

Sample ID:	00-1561-3290	**Code:**	RIC1120-DR-3	**Project:**	Special Studies
Sample Date:	05 Nov-20 09:50	**Material:**	Mining Effluent	**Source:**	Special Studies
Receipt Date:	06 Nov-20 07:30	**CAS (PC):**		**Station:**	DR-3
Sample Age:	27h	**Client:**	Copper Environmental Consulting		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
19-2180-4457	48h Survival Rate	GLM: Log-Normal (Probit)		EC1	4.564	1.577	7.927	21.91	1
				EC5	7.401	3.217	11.52	13.51	
				EC10	9.577	4.691	14.11	10.44	
				EC15	11.4	6.039	16.21	8.775	
				EC20	13.08	7.37	18.12	7.643	
				EC25	14.73	8.73	19.97	6.788	
				EC40	19.86	13.26	25.74	5.035	
				EC50	23.77	16.88	30.28	4.207	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
19-2180-4457	48h Survival Rate	Control Resp	0.95	0.9	>>	Yes	Passes Criteria

48h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
0	L	4	0.9500	0.7909	1.0000	0.8000	1.0000	0.0500	0.1000	10.53%	5.00%
10		4	0.9500	0.7909	1.0000	0.8000	1.0000	0.0500	0.1000	10.53%	5.00%
20		4	0.4000	0.1402	0.6598	0.2000	0.6000	0.0817	0.1633	40.82%	60.00%
40		4	0.3000	0.1163	0.4837	0.2000	0.4000	0.0577	0.1155	38.49%	70.00%
60		4	0.0500	0.0000	0.2091	0.0000	0.2000	0.0500	0.1000	200.00%	95.00%
80		4	0.1000	0.0000	0.2837	0.0000	0.2000	0.0577	0.1155	115.47%	90.00%
100		4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

CETIS Summary Report

Report Date:	27 Jan-21 09:48 (p 1 of 2)
Test Code/ID:	153E831B / 03-5641-8331

Ceriodaphnia 7-d Survival and Reproduction Test — **GEI Consultants, Inc**

Batch ID:	09-1008-2570	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**			
Start Date:	01 Dec-20 12:35	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Hard Synthetic Water		
Ending Date:	08 Dec-20 11:40	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	6d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	

Sample ID:	02-0272-4844	**Code:**	RIC1220-DR2	**Project:**	Special Studies
Sample Date:	30 Nov-20 10:05	**Material:**	Mining Effluent	**Source:**	Special Studies
Receipt Date:	01 Dec-20 08:40	**CAS (PC):**		**Station:**	DR-2
Sample Age:	26h (1.5 °C)	**Client:**	Copper Environmental Consulting		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
11-9803-0210	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test		100	>100	n/a	1	n/a	1
09-4476-2559	Reproduction	Steel Many-One Rank Sum Test		100	>100	n/a	1	19.2%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
08-7702-0924	7d Survival Rate	Linear Interpolation (ICPIN)	✓	EC5	>100	n/a	n/a	<1	1
			✓	EC10	>100	n/a	n/a	<1	
			✓	EC15	>100	n/a	n/a	<1	
			✓	EC20	>100	n/a	n/a	<1	
			✓	EC25	>100	n/a	n/a	<1	
			✓	EC40	>100	n/a	n/a	<1	
			✓	EC50	>100	n/a	n/a	<1	
19-6798-5076	Reproduction	Linear Interpolation (ICPIN)	✓	IC5	>100	n/a	n/a	<1	1
			✓	IC10	>100	n/a	n/a	<1	
			✓	IC15	>100	n/a	n/a	<1	
			✓	IC20	>100	n/a	n/a	<1	
			✓	IC25	>100	n/a	n/a	<1	
			✓	IC40	>100	n/a	n/a	<1	
			✓	IC50	>100	n/a	n/a	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
08-7702-0924	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
11-9803-0210	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
09-4476-2559	Reproduction	Control Resp	31	15	>>	Yes	Passes Criteria
19-6798-5076	Reproduction	Control Resp	31	15	>>	Yes	Passes Criteria
09-4476-2559	Reproduction	PMSD	0.1923	0.13	0.47	Yes	Passes Criteria

CETIS Summary Report

Report Date: 27 Jan-21 09:48 (p 2 of 2)
Test Code/ID: 153E831B / 03-5641-8331

Ceriodaphnia 7-d Survival and Reproduction Test — **GEI Consultants, Inc**

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
0	L	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
10		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
20		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
40		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
60		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
80		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	31	29.09	32.91	25	34	0.8433	2.667	8.60%	0.00%
0	L	10	31.3	28.05	34.55	24	38	1.438	4.547	14.53%	-0.97%
10		10	29.8	23.85	35.75	8	38	2.632	8.324	27.93%	3.87%
20		10	30.8	27.81	33.79	23	37	1.323	4.185	13.59%	0.65%
40		10	30.8	27.59	34.01	25	37	1.42	4.492	14.58%	0.65%
60		10	31.9	29.43	34.37	25	36	1.09	3.446	10.80%	-2.90%
80		10	30.1	23.9	36.3	11	42	2.742	8.672	28.81%	2.90%
100		10	29.6	25.98	33.22	23	41	1.6	5.06	17.09%	4.52%

CETIS Summary Report

Report Date:	21 Dec-20 16:23 (p 1 of 2
Test Code/ID:	25B8ABE1 / 06-3285-9617

Ceriodaphnia 7-d Survival and Reproduction Test — **GEI Consultants, Inc**

Batch ID:	16-4059-7905	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**			
Start Date:	01 Dec-20 11:30	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Hard Synthetic Water		
Ending Date:	08 Dec-20 11:10	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	7d	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	

Sample ID:	17-9397-7796	**Code:**	RIC1220-DR6	**Project:**	Special Studies
Sample Date:	30 Nov-20 11:10	**Material:**	Mining Effluent	**Source:**	Special Studies
Receipt Date:	01 Dec-20 08:40	**CAS (PC):**		**Station:**	DR-6
Sample Age:	24h (1.5 °C)	**Client:**	Copper Environmental Consulting		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
10-6979-2748	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test		100	>100	n/a	1	n/a	1
09-0988-6517	Reproduction	Steel Many-One Rank Sum Test		60	80	69.28	1.667	21.3%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
01-2968-4410	7d Survival Rate	Linear Interpolation (ICPIN)		EC5	>100	n/a	n/a	<1	1
				EC10	>100	n/a	n/a	<1	
				EC15	>100	n/a	n/a	<1	
				EC20	>100	n/a	n/a	<1	
				EC25	>100	n/a	n/a	<1	
				EC40	>100	n/a	n/a	<1	
				EC50	>100	n/a	n/a	<1	
01-0856-0512	Reproduction	Linear Interpolation (ICPIN)	✓	IC5	14.69	6.25	61.2	6.807	1
			✓	IC10	19.38	13.88	64.98	5.16	
			✓	IC15	64.6	17.89	72.43	1.548	
			✓	IC20	69.89	46.45	80.64	1.431	
			✓	IC25	75.19	65.57	82.68	1.33	
			✓	IC40	85.76	75.72	90.92	1.166	
			✓	IC50	91.27	82.59	97.94	1.096	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
01-2968-4410	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
10-6979-2748	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
01-0856-0512	Reproduction	Control Resp	36.4	15	>>	Yes	Passes Criteria
09-0988-6517	Reproduction	Control Resp	36.4	15	>>	Yes	Passes Criteria
09-0988-6517	Reproduction	PMSD	0.2133	0.13	0.47	Yes	Passes Criteria

CETIS Summary Report

Report Date: 21 Dec-20 16:23 (p 2 of 2
Test Code/ID: 25B8ABE1 / 06-3285-9617

Ceriodaphnia 7-d Survival and Reproduction Test — GEI Consultants, Inc

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
0	L	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
10		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
20		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
40		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
60		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
80		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	36.4	33.4	39.4	25	39	1.327	4.195	11.53%	0.00%
0	L	10	31.7	25.27	38.13	7	39	2.844	8.994	28.37%	12.91%
10		10	37.4	33.29	41.51	24	43	1.815	5.739	15.34%	-2.75%
20		10	32.9	26.86	38.94	16	40	2.669	8.439	25.65%	9.62%
40		10	32.5	27.02	37.98	18	40	2.423	7.663	23.58%	10.71%
60		10	33.5	29.39	37.61	18	38	1.815	5.74	17.13%	7.97%
80		10	26	19.16	32.84	0	35	3.026	9.568	36.80%	28.57%
100		10	12.6	6.218	18.98	0	26	2.821	8.922	70.81%	65.38%

Client:	Rico DR-6; RIC1220-DR-6
Test Start Date:	12/1/2020
Test Species:	*C. dubia*

Control mean	M1	36.4	*mean repro or growth*
25% effect level	X	27.3	
Conc. > X	Cj	60	*test concentration*
conc. < X	Cj+1	80	*test concentration*
mean for Cj	Mj	33.5	*mean repro or growth*
mean for Cj+1	Mj+1	26	*mean repro or growth*
IC25		76.5	

From U.S. Environmental Protection Agency (EPA). 2002. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. EPA-821-R-02-013. Office of Water, Washington D.C.

Data Checked and Approved by (Initials): AR

CETIS Summary Report

Report Date:	22 Dec-20 08:15 (p 1 of 2
Test Code/ID:	6BBA3417 / 18-0736-5143

Ceriodaphnia 7-d Survival and Reproduction Test — **GEI Consultants, Inc**

Batch ID:	11-3706-3633	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**			
Start Date:	01 Dec-20 12:05	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Hard Synthetic Water		
Ending Date:	08 Dec-20 11:20	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	6d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	

Sample ID:	15-4336-8830	**Code:**	RIC1220-DR7	**Project:**	Special Studies
Sample Date:	30 Nov-20 12:10	**Material:**	Mining Effluent	**Source:**	Special Studies
Receipt Date:	01 Dec-20 08:40	**CAS (PC):**		**Station:**	DR-7
Sample Age:	24h (1.5 °C)	**Client:**	Copper Environmental Consulting		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
02-1738-3450	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test		100	>100	n/a	1	n/a	1
00-5753-0961	Reproduction	Steel Many-One Rank Sum Test		100	>100	n/a	1	14.8%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
11-0373-5469	7d Survival Rate	Linear Interpolation (ICPIN)	✓	EC5	>100	n/a	n/a	<1	1
			✓	EC10	>100	n/a	n/a	<1	
			✓	EC15	>100	n/a	n/a	<1	
			✓	EC20	>100	n/a	n/a	<1	
			✓	EC25	>100	n/a	n/a	<1	
			✓	EC40	>100	n/a	n/a	<1	
			✓	EC50	>100	n/a	n/a	<1	
17-8487-7586	Reproduction	Linear Interpolation (ICPIN)	✓	IC5	>100	n/a	n/a	<1	1
			✓	IC10	>100	n/a	n/a	<1	
			✓	IC15	>100	n/a	n/a	<1	
			✓	IC20	>100	n/a	n/a	<1	
			✓	IC25	>100	n/a	n/a	<1	
			✓	IC40	>100	n/a	n/a	<1	
			✓	IC50	>100	n/a	n/a	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
02-1738-3450	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
11-0373-5469	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
00-5753-0961	Reproduction	Control Resp	34.9	15	>>	Yes	Passes Criteria
17-8487-7586	Reproduction	Control Resp	34.9	15	>>	Yes	Passes Criteria
00-5753-0961	Reproduction	PMSD	0.1484	0.13	0.47	Yes	Passes Criteria

CETIS Summary Report

Report Date: 22 Dec-20 08:15 (p 2 of 2
Test Code/ID: 6BBA3417 / 18-0736-5143

Ceriodaphnia 7-d Survival and Reproduction Test — **GEI Consultants, Inc**

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
0	L	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
10		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
20		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
40		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
60		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
80		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	34.9	32.7	37.1	29	38	0.9713	3.071	8.80%	0.00%
0	L	10	29.2	25.26	33.14	19	36	1.744	5.514	18.88%	16.33%
10		10	35.6	32.6	38.6	29	42	1.327	4.195	11.78%	-2.01%
20		10	36.2	33.64	38.76	30	42	1.133	3.584	9.90%	-3.72%
40		10	37.3	33.37	41.23	29	46	1.739	5.498	14.74%	-6.88%
60		10	36.9	33.91	39.89	32	45	1.32	4.175	11.32%	-5.73%
80		10	38.2	35.11	41.29	28	42	1.365	4.315	11.30%	-9.46%
100		10	35.1	29.33	40.87	13	42	2.549	8.062	22.97%	-0.57%

CETIS Summary Report

Report Date:	15 Dec-20 11:49 (p 1 of 1)
Test Code/ID:	74004C26 / 19-4617-6550

Ceriodaphnia 7-d Survival and Reproduction Test — **GEI Consultants, Inc**

Batch ID:	04-9863-6664	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**		
Start Date:	08 Dec-20 12:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Hard Synthetic Water	
Ending Date:	14 Dec-20 11:30	**Species:**	Ceriodaphnia dubia	**Brine:**		
Test Length:	5d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**

Sample ID:	09-1615-3905	**Code:**	RIC1220B-AC3EFF	**Project:**	Special Studies
Sample Date:	07 Dec-20 10:35	**Material:**	Mining Effluent	**Source:**	Special Studies
Receipt Date:	08 Dec-20 07:40	**CAS (PC):**		**Station:**	AC3EFF
Sample Age:	25h (2 °C)	**Client:**	Copper Environmental Consulting		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
09-6426-1904	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test		100	>100	n/a	1	n/a	1
01-7893-3932	Reproduction	Steel Many-One Rank Sum Test		100	>100	n/a	1	41.2%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
14-8076-2773	6d Survival Rate	Linear Interpolation (ICPIN)	✓	EC5	>100	n/a	n/a	<1	1
			✓	EC10	>100	n/a	n/a	<1	
			✓	EC15	>100	n/a	n/a	<1	
			✓	EC20	>100	n/a	n/a	<1	
			✓	EC25	>100	n/a	n/a	<1	
			✓	EC40	>100	n/a	n/a	<1	
			✓	EC50	>100	n/a	n/a	<1	
15-3637-8928	Reproduction	Linear Interpolation (ICPIN)	✓	IC5	>100	n/a	n/a	<1	1
			✓	IC10	>100	n/a	n/a	<1	
			✓	IC15	>100	n/a	n/a	<1	
			✓	IC20	>100	n/a	n/a	<1	
			✓	IC25	>100	n/a	n/a	<1	
			✓	IC40	>100	n/a	n/a	<1	
			✓	IC50	>100	n/a	n/a	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
01-7893-3932	Reproduction	Control Resp	29.7	15	>>	Yes	Passes Criteria
15-3637-8928	Reproduction	Control Resp	29.7	15	>>	Yes	Passes Criteria
01-7893-3932	Reproduction	PMSD	0.4118	0.13	0.47	Yes	Passes Criteria

6d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	0.00%
0	L	10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	0.00%
10		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%
20		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	0.00%
40		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%
60		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%
80		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	29.7	20.61	38.79	0	42	4.02	12.71	42.80%	0.00%
0	L	10	24.7	15.89	33.51	0	38	3.896	12.32	49.88%	16.84%
10		10	30.1	21.06	39.14	6	43	3.996	12.64	41.98%	-1.35%
20		10	32.3	22.46	42.14	0	44	4.351	13.76	42.60%	-8.75%
40		10	33.7	24.89	42.51	5	46	3.893	12.31	36.53%	-13.47%
60		10	33.2	25.88	40.52	16	44	3.235	10.23	30.81%	-11.78%
80		10	35.4	30.45	40.35	25	43	2.187	6.915	19.53%	-19.19%
100		10	35.9	27.45	44.35	5	47	3.737	11.82	32.92%	-20.88%

Report of Acute Toxicity Testing using the Rainbow Trout (*Oncorhynchus mykiss*)

Project ID: 14001-475-064
December 2020

Sponsor and Laboratory Information

Sponsor	Copper Environmental Consulting 406 East Park Avenue, Suite 2 Anaconda, MT 59711
Project Officer	Kevin Pfeifer (406) 563-2700, ext. 310
Testing Facility	TRE Environmental Strategies, LLC 100 Racquette Drive, Unit A Fort Collins, CO 80524 Fax: (970) 490-2963 State of Florida NELAP Laboratory ID: E87972
Study Director	Rami B. Naddy, Ph.D. (970) 416-0916 email: naddyrb.tre@gmail.com
Report Author	Whitney Naddy (970) 416-0916 email: naddywm.tre@gmail.com

Test Information

Test	Acute Toxicity under Static-Renewal Conditions
Basis	USEPA (2002), method 2019.0
Test Dates and Time	December 22, 2020 @ 1545 to December 26, 2020 @ 1535
Test Length	96 hours
Species	*Oncorhynchus mykiss*
Test Material	Effluent (Grab) – DR-7
Permit Number	N/A
Dilution Water	Hard Reconstituted Water
Test Concentrations	0 (Control), 25, 50, and 100% effluent

- *Results described in this report apply only to the samples submitted to the laboratory and analyzed, as listed in the report*
- *Test results comply with NELAC standards. Reports are intended to be considered in their entirety; TRE is not responsible for consequences arising from use of a partial report*
- *This report contains 6 pages plus 2 appendices*

Effluent Collection and Receipt

Sample No.	Field No.	Collection Date & Time	TRE No.	Date of Receipt	Temp. at Arrival (°C)	Qual.
1	DR7-20201221	12/21/20 @ 0930 - 1015	34651	12/22/20	4.8	

Note: See Appendix A for chain of custody records

Effluent Characterization

Sample No.	pH	Hard. (mg/L)[HA]	Alk. (mg/L)[HA]	Spec. Cond. (µS/cm)	TRC (mg/L)[G]	NH_3-N (mg/L)
1	7.5	324	162	661	0.02	<1.0

Initial Dilution/Control Water Characterization

Batch No.	pH	Hard. (mg/L)[HA]	Alk. (mg/L)[HA]	Spec. Cond. (µS/cm)	TRC (mg/L)[G]	NH_3-N (mg/L)
14140	8.2	172	111	538	0.03	<1.0

Test Conditions

Type	Static-Renewal Acute
Test Endpoints	Survival
Test Chambers	4L glass aquaria
Test Solution Volume	2L
Replicates per Treatment	2
Organisms per Replicate	10
Test Temperature	12 ± 1°C (≤3°C differential)
Lighting	Fluorescent, 16 hours light:8 hours dark
Chamber Placement	Random according to computer-generated chart
Aeration?	[X] No [ ] Yes
Test Solution Renewal	At 48 Hours

Test Organism

Species	*Oncorhynchus mykiss*
Age	39 days post hatch / 20 days post swim-up
Source	Trout Lodge, Lot No. 20-031
Average wet weight (g)	0.1211
Loading Rate (g/L)	0.606
Ratio (long/short)	1.18
Acclimation	Hard Water
Feeding	Off food for 48h prior to testing; no food during testing
Reference Toxicant Testing	Initiated December 18, 2020 using sodium chloride (NaCl)

TEST RESULTS

Biological Data

Test Concentration (% Effluent)	Percent Survival of *Pimephales promelas*			
	24 hours	48 hours	72 hours	96 hours
0 (Control)	100	100	100	100
25	100	100	100	100
50	100	100	100	100
100	100	100	100	100
Control Performance	Acceptable			

Note: See Appendix B for copies of laboratory data sheets

Data Analysis and Test Endpoints

Biological Endpoint	Statistical Endpoint	Value (% Effluent)
Survival	96-hour LC_{50}	>100

Note: Analyses completed using, where appropriate, CETIS version 1.8.7 (2014)

Physical and Chemical Data

Treatment (% Effluent)	pH		Dissolved Oxygen (mg/L)		Conductivity (µS/cm)		Temperature (°C)		Qual.
	Low	High	Low	High	Low	High	Low	High	
0 (Control)	8.1	8.3	5.8	8.1	538	570	10	13	T1
100	7.4	8.2	7.5	8.8	661	675	10	13	T1
All Treatments	7.4	8.3	≥5.8		NA		10	13	T1, T3
							8	12	T4

Reference Toxicant Test Results for *O. mykiss*

96-Hour LC_{50} (mg Cl^-/L)	TRE Historical 95% Control Limits (mg Cl^-/L)	
	Low	High
10,640	3,644	10,840

References

CETIS. 2014. Comprehensive Environmental Toxicity Information System. User Guide (version 1.8.7). Tidepool Scientific, LLC. McKinleyville, CA.

USEPA. 2002. Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms. Fifth Edition, EPA-821-R-02-012.

Explanation of Qualifiers

Note: study-specific narratives within the body of the report are denoted, if necessary, with the superscript letters **a - d**, and associated footnotes. Other qualifications and definitions are defined below.

S -	Sample temperature upon receipt was outside the range recommended by USEPA (2002), (i.e., 0 to 6ºC or ambient if collected and used on the same day).
I -	Ice was present in the sample upon receipt.
N1 -	Sample was not used for testing.
N2 -	Liquid from container with ice was not used for testing.
F -	Sample was filtered to remove indigenous organisms prior to use.
HT -	Sample hold time (normally 36 hours) was exceeded.
HA -	Hardness and alkalinity concentrations are presented as $CaCO_3$.
G -	TRC = Total Residual Chlorine
T1 -	Temperatures measured in some of the old test solutions were outside the recommended test temperature range but the allowed 3ºC differential was not exceeded.
T2 -	Temperatures measured in some of the old test solutions were outside the recommended test temperature range and the allowed 3ºC differential was exceeded.
T3 -	Temperatures measured in test solutions.
T4 -	Continuous temperatures measured in the environmental chamber or water bath.
X1 -	Mean young per original female. If any 4th or higher broods were produced, they were excluded from calculation of mean young per female and statistical analysis of reproduction.
X2 -	One or more organisms in this treatment were lost or not found in the test chamber and were excluded from analysis, as the loss was attributed to technician error. See laboratory data sheets for additional detail, as appropriate.
X3 -	One or more male *C. dubia* were found in this treatment and were included in analysis of survival but excluded from analysis of reproduction. See laboratory data sheets for additional detail, as appropriate.
X4 -	One or more fish were alive at test termination but were lost during the drying/weighing process. These fish were included in analysis of survival but excluded from analysis of growth. See laboratory data sheets for additional detail, as appropriate.
O1 -	Dissolved oxygen concentrations were ≤ 4.0 mg/L in one or more treatments during the test; aeration was initiated in all test chambers. See laboratory data sheets for additional detail, as appropriate.
O2 -	Dissolved oxygen concentrations ≤ 4.0 mg/L were observed in one or more treatments only at test termination.
O3 -	Dissolved oxygen concentrations were ≤ 4.0 mg/L in one or more treatments during the test but aeration was not possible. See laboratory data sheets for additional detail, as appropriate.
W1 -	Weight per original number of organisms introduced at test initiation.
W2 -	Weight per surviving number of organisms at test termination.
V1 -	Value was statistically (α=0.05 or 0.01, as appropriate) reduced relative to the control, but was considered a Type I error (anomalous false positive), and was disregarded. The NOEC was interpreted accordingly.
V2 -	Value was not statistically (α=0.05 or 0.01, as appropriate) less than the control, but was considered a Type II error (anomalous false negative). The NOEC was interpreted accordingly.
P1 -	PMSD was below the lower bound indicated by USEPA (2002). A statistically significant reduction for a treatment was disregarded if the RPD for that treatment was less than the lower bound.
P2 -	PMSD was above the upper bound indicated by USEPA (2002), and statistically significant reductions in organism performance were detected.
P3 -	PMSD was above the upper bound indicated by USEPA (2002), and no statistically significant reductions in organism performance were detected.
R -	Monthly reference toxicant test endpoint for this species was outside the 95% control limits for the 20 most recent endpoints.

Statement of Quality Assurance

The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with the protocol (if applicable) and standard operating procedures, and that the resulting data and report meet the requirements of the NELAC standards. This report is an accurate reflection of the raw data.

Quality Assurance Unit — Date: January 8, 2021

Data Analyst — Date: 01/11/2021

APPENDIX A

Chain of Custody Records

TRE Environmental Strategies, LLC - Chain of Custody

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

Client/Project Name: Copper Environ. Consulting

Project #: 14001-475(001-063)

Chain of Custody Tape #: 49755 Intact?(circle): Yes No Not Used

Sampler (Print/Affiliation): _____ Signature: _____

Client / Sample ID	Sample Collection Beginning Date	Beginning Time	Ending Date	Ending Time	Sample Type Grab	Comp.	Volume	Preservation (i.e.: 0-6°C)	Matrix (Liq., Soil, Sediment, etc.)	RET						Sample Temp. Upon Arrival (Therm. # IR1) °C	Lab Sample ID
DR-7_20001221	12/21/20	0930	12/21/20	1015			2.5G	0-6°C	L	X						4.8	34651
DR-7_20001221	12/21/20	0930	12/21/20	1015			2.5G	0-6°C	L	X							

Sample Relinquished By: (Print Name/Affiliation) Mackenzie Turrin / CEC
Signature: [signature]
Date: 12/21/20
Time: 1460

Received By: (Print Name/Affiliation)
Signature:
Date:
Time:

Sample Relinquished By: (Print Name/Affiliation)
Signature:
Date:
Time:

Received By: (Print Name/Affiliation)
Signature:
Date:
Time:

Sample Relinquished By: (Print Name/Affiliation)
Signature:
Date:
Time:

Received By: (Print Name/Affiliation) Stephanie Kent / TRE
Signature: Stephanie Kent
Date: 12/22/20
Time: 0900

Laboratory (Destination):

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A
Fort Collins, CO 80524
(970) 416-0916
(970) 490-2963 (FAX)

Sample Shipped Via (circle): FedEx UPS Other Courier

Temp Blank? Yes No

Received on Ice: Yes No

Comments:

Effective Date: 02/13/19

Serial No. 05635

TRE Environmental Strategies, LLC - Chain of Custody

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

Client/Project Name: Copper Environ. Consulting
Project #: 14001-475(061-063)
Chain of Custody Tape #: 49752 Intact?(circle): Yes No Not Used
Sampler (Print/Affiliation): Signature:

Client / Sample ID	Sample Collection Beginning Date	Beginning Time	Ending Date	Ending Time	Sample Type Grab	Comp.	Volume	Preservation (i.e.: 0-6°C)	Matrix (Liq., Soil, Sediment, etc.)	Test Requested: RBT						Sample Temp. Upon Arrival (Therm. # IKL) °C	Lab Sample ID
DR-7_20201221	12/21/20	0930	12/21/20	1013			2.5G	0-6°C	L	x						4.8	34651
							~~2.5G~~	~~0-6°C~~	~~L~~	~~x~~							
								MT 12/21/20									

Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation)	Date:	Laboratory (Destination):
Mackenzie Turrin / CEC	12/21/20			TRE Environmental Strategies, LLC 100 Racquette Drive, Unit A Fort Collins, CO 80524 (970) 416-0916 (970) 490-2963 (FAX)
Signature:	Time: 1400	Signature:	Time:	
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation)	Date:	
Signature:	Time:	Signature:	Time:	
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation) Stephanie Kent / TRE	Date: 12/22/20	Sample Shipped Via (circle): FedEx UPS Other Courier
Signature:	Time:	Signature:	Time: 0900	Temp Blank? Yes No
Comments:				Received on Ice: Yes No

Effective Date: 02/13/19

Serial No. 05638

APPENDIX B

Test Data

QA: AB 1/7/21

TOXICITY DATA PACKAGE COVER SHEET

Test Type: Acute

Project Number: 14001-475-064

Test Substance: Effluent (DR-7)

Species: *Oncorhynchus mykiss*

Dilution Water Type: Hard

Organism Lot or Batch Number: 20-031

Concurrent Control Water Type: N/A

Age: 39 days

Supplier: Trout Lodge

Date and Time Test Began: 12/22/20 @ 1545

Date and Time Test Ended: 12/26/20 @ 1535

Protocol Number: USEPA 2002, method 2019.0

Investigator(s): SK/AT/EN/HR

Background Information

pH control?: Yes **No**

Type of Test: Static-Renewal (at 48 hr)

If yes, give % CO_2: NA

Test Temperature: 12 ± 1 °C

Env. Chmbr/**Bath #**: 1 Test Chmbrs: 4L

Photoperiod: 16 h light : 8 h dark

Light Intensity: 50-100 ft. c.

Test Solution Vol.: 2 L

Number of Replicates per Treatment: 2

Length of Test: 96 h

Number of Organisms per Replicate: 10

Type of Food and Quantity per Chamber: NONE

Feeding Frequency: NA

Test Substance Characterization Parameters and Frequency:

Hardness: Sx Receipt Alkalinity: Sx Receipt NH_3: Sx Receipt TRC: Sx Receipt

pH: Daily Conductivity: Initiation and Renewal

Test Concentrations (Volume:Volume): Hard, 25, 50, 100%

Agency Summary Sheet(s)?: N/A

Reference Toxicant Data:	Test Dates: 12/18/2020 to 12/22/2020		LC_{50}: 10,640
Hist. 95% Control Limits: 3644 to 10840		Method for Determining Ref. Tox. Value: SK	

Special Procedures and Considerations:

D.O. maintained ≥ 4.0 mg/L

* Conductivity measured in all treatments in new test solutions at test initiation and renewal

-Measure Temp in reps Daily -Measure pH and D.O in one rep Daily

Appropriate correction factors have been applied to all temperatures recorded in this data package

Study Director Initials: NRW Date: 12/21/20

QA: AB 1/7/21

TEST SUBSTANCE USAGE LOG

Project Number: 14001-475-064

	Sample 1	Sample 2	Sample 3
Test Substance Number	34651		
Test Substance Collection Date and Time	From: 12/21/20 @ 0930	From: @	From: @
	To: 12/21/20 @ 1015	To: @	To: @
Sample Type (Grab or Comp)			
Date Test Substance Received	12/22/20		
Dilution Water Number RW# or TRE#, circle one	14040/14145*		
Concurrent Control Water RW#	NA		
Date(s) Used	12/22/20		
	12/24/20*		

Preparation of Test Solutions

Test Substance Conc. (% Effluent)	Test Substance Volume (ml)	Control Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)
0%	0	4000	4000						
25%	1000	3000	4000						
50%	2000	2000	4000						
100%	4000	0	4000						
Total	7000	9000	16000						

Initials / Date	SK/ 12/22/20		
Initials / Date	EN 12/24/20 mixedRBT		
Initials / Date			
Initials / Date			
Initials / Date			
Initials / Date			
Initials / Date			
Initials / Date			

QA Form No. 052
Revision 2
Effective 1/96
QA: AB 1/7/21

ACUTE BIOLOGICAL DATA

Project Number: 14001-475-064

Test Species: ***Oncorhynchus mykiss***

Trt.	Test Replicate	Number of Surviving Organisms 0 Hours	24 Hours	48 Hours	72 Hours	96 Hours	Remarks (% Survival)
MH	A	10	10	10	10	10	
	B	10	10	10	10	10	
	C						100
	D						
25%	A	10	10	10	10	10	
	B	10	10	10	10	10	
	C						100
	D						
50%	A	10	10	10	10	10	
	B	10	10	10	10	10	
	C						100
	D						
100%	A	10	10	10	10	10	
	B	10	10	10	10	10	
	C						100
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
Date:		12/22/20	12/23/20	12/24/20	12/25/20	12/26/20	
Time:		1545	1040	1030	1255	1535	
Initials:		SK/B	SK	HR	SK	HR	

QA: AB 1/7/21

Project Number:	14001-475-064
Test Species:	***Oncorhynchus mykiss***

WER CHEMICAL DATA

Conc.	Rep	Dissolved Oxygen (mg/L) Day 0 NEW	Day 1 OLD	Day 2 NEW	Day 2 OLD	Day 3 OLD	Day 4 OLD	Temperature (°C) Day 0 NEW	Day 1 OLD	Day 2 NEW	Day 2 OLD	Day 3 OLD	Day 4 OLD	pH (s.u.) Day 0 NEW	Day 1 OLD	Day 2 NEW	Day 2 OLD	Day 3 OLD	Day 4 OLD	Cond. (uS/cm) Day 0 NEW	Day 2 NEW
MH	A	7.4		5.8	7.8			12		12	11			8.2		8.3	8.1			538	570
	B		8.1			7.8	7.4	12	10Δ	12		12	13		8.3			8.2	8.1		
25%	A	7.8		7.1	7.8			12		*	11			8.0		8.1	8.1			598	611
	B		7.9			7.7	7.4	12	10Δ	*		12	13		8.3			8.2	8.1		
50%	A	8.1		7.7	7.8			12		*	11			7.8		7.7	8.1			624	637
	B		8.0			7.7	7.5	12	10Δ	*		12	13		8.2			8.1	8.1		
100%	A	8.7		8.8	7.8			12		12	11			7.5		7.4	8.2			661	675
	B		8.0			7.8	7.5	12	10Δ	12		12	13		8.0			8.1	8.2		
	A																				
	B																				
	A																				
	B																				
	A																				
	B																				
	A																				
	B																				
Meter#:		17	18	17	17	17	17	L-39	L-36	L-35	L-36	L-36	L-36	FM31	FM30	FM30	FM30	FM31	FM31	15	15
Date:		12/22/20	12/23/20	12/24/20	12/24/20	12/25/20	12/26/20	12/22/20	12/23/20	12/24/20	12/24/20	12/25/20	12/26/20	12/22/20	12/23/20	12/24/20	12/24/20	12/25/20	12/26/20	12/22/20	12/24/20
Time:		1530	1040	1555	1555	1255	1540	1530	1040	1555	1555	1255	1540	1530	1040	1555	1555	1255	1540	1530	1555
Initials:		SK	SK	EN	EN	SK	HR	SK	SK	EN	EN	SK	HR	SK	SK	EN	EN	SK	HR	SK	EN

	Hardness (mg/L as CaCO3)	Alkalinity (mg/L as CaCO3)	TRC (mg/L)	NH3-N (mg/L)	Date	Time	Initials
Value:	324	162	0.02	<1.0	12/22/20	0925	EV
Meter:	titr	titr	22	HA1			

Note: Hardness, alkalinity, TRC, and NH3 data appearing on this page have been transcribed from the wet chemistry log, FCETL QA Form No. 084

*Dilution water and 100% effluent were brought to 12°C prior to making the dilution series. The temperature of the resulting effluent dilutions is ~~also~~ (1) assumed to be also 12°C.

Δ Checked all reps

(1) ASSUMED

DAILY TOXICITY TEST LOG

Project Number:	14001-475-064
Test Species:	***Oncorhynchus mykiss***

General Comments	Random Chart ID : Bubbles	Feeding NONE	Initials/ Date
Test Day 0	Test solution added to test chambers at: 1520 Initials: SK Test Organisms Added at: 1545	None	SK 12/22/20
Test Day 1	Real time temp= 8 °C Range = 8 - 11 °C	None	SK 12/23/20
Test Day 2	Real time temp= ① ~~8~~ 9 °C Range = ① ~~8 - 11~~ 9-★ °C	None	HR 12/24/20
Test Day 3	Real time temp= 9 °C Range = 9 - 11 °C	None	SK 12/25/20
Test Day 4	Real time temp= 10 °C Range = 9-12 °C	NONE	HR 12/26/20

★ meter error

① SK 12/23/20 WP

QA Form No. 094
Revision 2
Effective 10/15
QA: AB 1/8/21

RAINBOW TROUT LENGTHS, WEIGHTS, AND LOADING OF CONTROL ORGANISMS

Project Number: 14001-475-064	Test Substance: Effluent (DR-7)	Comments:
Species: O. mykiss	Analyst: SK	
Date/Time of Measurements: 12/26/20 @ 1600	Balance ID: A+D Oven ID (if used):	
Weight Type (Circle): Wet (Blot Dry) Dry (>100°C) AFDW (>500°C) Other:		Lot Number: 20-031
Measurement Type (Circle): Pre-weight (Post-weight)		Organism age: 43 days

No.	Treatment/ Replicate	Length (mm)	Net Weight (g)	No.	Treatment/ Replicate	Length (mm)	Net Weight (g)	No.	Treatment/ Replicate	Length (mm)	Net Weight (g)
1	Control A	23	0.0922	1	Control B	25	0.1302	1	Control C		
2		25	0.1592	2		25	0.1243	2			
3		25	0.1476	3		23	0.1123	3			
4		23	0.1153	4		26	0.1285	4			
5		22	0.0796	5		23	0.0983	5			
6		25	0.1432	6		24	0.1131	6			
7		25	0.1406	7		24	0.1077	7			
8		25	0.1358	8		23	0.0970	8			
9		25	0.1396	9		25	0.1460	9			
10		22	0.0996	10		24	0.1120	10			

Length Calculations	
Max: 26	Min: 22
Mean: 24.1	
Ratio (long/short): 1.18	

Weight Calculations	
Max: 0.1592	Min: 0.0796
Mean: 0.1211 g	
Test Solution Volume: 2L	Loading Rate (g/L): 0.606

① SK 12/26/20 WP

OAnew 1/8/21

Initial weights for RBT for 475 **DR-7**

Dec 2020

	wt (g)	Length (mm)
1	0.0922	23
2	0.1592	25
3	0.1476	25
4	0.1153	23
5	0.0796	22
6	0.1432	25
7	0.1406	25
8	0.1358	25
9	0.1396	25
10	0.0996	22
11	0.1302	25
12	0.1243	25
13	0.1123	23
14	0.1285	26
15	0.0983	23
16	0.1131	24
17	0.1077	24
18	0.0970	23
19	0.1460	25
20	0.1120	24
sum =	2.4221	482
avg =	0.1211	24.10
Max	0.1592	26
Min	0.0796	22
count	20	20

1.18 Ratio (long / short)

overall avg =	**0.1211**
count per tank	**10**
mass per tank (g)	**1.2111**
Test soln vol (L):	**2**
Loading Rate (g/L)	**0.606**

Report of Acute Toxicity Testing using the Rainbow Trout (*Oncorhynchus mykiss*)

Project ID: 14001-475-065
December 2020

Sponsor and Laboratory Information

Sponsor	Copper Environmental Consulting 406 East Park Avenue, Suite 2 Anaconda, MT 59711
Project Officer	Kevin Pfeifer (406) 563-2700, ext. 310
Testing Facility	TRE Environmental Strategies, LLC 100 Racquette Drive, Unit A Fort Collins, CO 80524 Fax: (970) 490-2963 State of Florida NELAP Laboratory ID: E87972
Study Director	Rami B. Naddy, Ph.D. (970) 416-0916 email: naddyrb.tre@gmail.com
Report Author	Whitney Naddy (970) 416-0916 email: naddywm.tre@gmail.com

Test Information

Test	Acute Toxicity under Static-Renewal Conditions
Basis	USEPA (2002), method 2019.0
Test Dates and Time	December 22, 2020 @ 1600 to December 26, 2020 @ 1600
Test Length	96 hours
Species	*Oncorhynchus mykiss*
Test Material	Effluent (Grab) – DR-6
Permit Number	N/A
Dilution Water	Hard Reconstituted Water
Test Concentrations	High hardness (HH Control), 0 (Control), 25, 50, and 100% effluent

- *Results described in this report apply only to the samples submitted to the laboratory and analyzed, as listed in the report*
- *Test results comply with NELAC standards. Reports are intended to be considered in their entirety; TRE is not responsible for consequences arising from use of a partial report*
- *This report contains 6 pages plus 2 appendices*

Effluent Collection and Receipt

Sample No.	Field No.	Collection Date & Time	TRE No.	Date of Receipt	Temp. at Arrival (°C)	Qual.
1	DR-6-20201221	12/21/20 @ 1030 – 1115	34650	12/22/20	3.9	

Note: See Appendix A for chain of custody records

Effluent Characterization

Sample No.	pH	Hard. (mg/L)[HA]	Alk. (mg/L)[HA]	Spec. Cond. (µS/cm)	TRC (mg/L)[G]	NH_3-N (mg/L)
1	7.3	720	120	1,282	<0.02	<1.0

Initial Dilution/Control Water Characterization

Batch No.	pH	Hard. (mg/L)[HA]	Alk. (mg/L)[HA]	Spec. Cond. (µS/cm)	TRC (mg/L)[G]	NH_3-N (mg/L)
14142[a]	8.1	672	98	1341	0.02	<1.0
14140[b]	8.3	172	111	567	0.03	<1.0

[a] High Hardness (recipe provided by client)
[b] Mod Hard

Test Conditions

Type	Static-Renewal Acute
Test Endpoints	Survival
Test Chambers	4L glass aquaria
Test Solution Volume	2L
Replicates per Treatment	2
Organisms per Replicate	10
Test Temperature	12 ± 1°C (≤3°C differential)
Lighting	Fluorescent, 16 hours light:8 hours dark
Chamber Placement	Random according to computer-generated chart
Aeration?	[X] No [ ] Yes
Test Solution Renewal	At 48 Hours

Test Organism

Species	*Oncorhynchus mykiss*
Age	39 days post hatch / 20 days post swim-up
Source	Trout Lodge, Lot No. 20-031
Average wet weight (g)	0.1188
Loading Rate (g/L)	0.594
Ratio (long/short)	1.14
Acclimation	Hard Water
Feeding	Off food for 48h prior to testing; no food during testing
Reference Toxicant Testing	Initiated December 18, 2020 using sodium chloride (NaCl)

TEST RESULTS

Biological Data

Test Concentration (% Effluent)	Percent Survival of *Pimephales promelas*			
	24 hours	48 hours	72 hours	96 hours
High Hardness (HH Control)	100	100	100	100
0 (Control)	100	100	100	100
25	100	100	100	100
50	100	100	100	100
100	100	100	100	100
Control Performance	Acceptable			

Note: See Appendix B for copies of laboratory data sheets

Data Analysis and Test Endpoints

Biological Endpoint	Statistical Endpoint	Value (% Effluent)
Survival	96-hour LC_{50}	>100

Note: Analyses completed using, where appropriate, CETIS version 1.8.7 (2014)

Physical and Chemical Data

Treatment (% Effluent)	pH		Dissolved Oxygen (mg/L)		Conductivity (µS/cm)		Temperature (°C)		Qual.
	Low	High	Low	High	Low	High	Low	High	
0 (Control)	8.0	8.4	7.3	8.2	567	615	9	13	T2
100	7.3	8.0	7.4	8.7	1,282	1,361	9	12	T1
All Treatments	7.3	8.4	≥7.1		NA		9	13	T2, T3
							8	12	T4

Reference Toxicant Test Results for *O. mykiss*

96-Hour LC_{50} (mg Cl^-/L)	TRE Historical 95% Control Limits (mg Cl^-/L)	
	Low	High
10,640	3,644	10,840

References

CETIS. 2014. Comprehensive Environmental Toxicity Information System. User Guide (version 1.8.7). Tidepool Scientific, LLC. McKinleyville, CA.

USEPA. 2002. Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms. Fifth Edition, EPA-821-R-02-012.

Explanation of Qualifiers

Note: study-specific narratives within the body of the report are denoted, if necessary, with the superscript letters **a - d**, and associated footnotes. Other qualifications and definitions are defined below.

S -	Sample temperature upon receipt was outside the range recommended by USEPA (2002), (i.e., 0 to 6ºC or ambient if collected and used on the same day).
I -	Ice was present in the sample upon receipt.
N1 -	Sample was not used for testing.
N2 -	Liquid from container with ice was not used for testing.
F -	Sample was filtered to remove indigenous organisms prior to use.
HT -	Sample hold time (normally 36 hours) was exceeded.
HA -	Hardness and alkalinity concentrations are presented as $CaCO_3$.
G -	TRC = Total Residual Chlorine
T1 -	Temperatures measured in some of the old test solutions were outside the recommended test temperature range but the allowed 3ºC differential was not exceeded.
T2 -	Temperatures measured in some of the old test solutions were outside the recommended test temperature range and the allowed 3ºC differential was exceeded.
T3 -	Temperatures measured in test solutions.
T4 -	Continuous temperatures measured in the environmental chamber or water bath.
X1 -	Mean young per original female. If any 4th or higher broods were produced, they were excluded from calculation of mean young per female and statistical analysis of reproduction.
X2 -	One or more organisms in this treatment were lost or not found in the test chamber and were excluded from analysis, as the loss was attributed to technician error. See laboratory data sheets for additional detail, as appropriate.
X3 -	One or more male *C. dubia* were found in this treatment and were included in analysis of survival but excluded from analysis of reproduction. See laboratory data sheets for additional detail, as appropriate.
X4 -	One or more fish were alive at test termination but were lost during the drying/weighing process. These fish were included in analysis of survival but excluded from analysis of growth. See laboratory data sheets for additional detail, as appropriate.
O1 -	Dissolved oxygen concentrations were ≤ 4.0 mg/L in one or more treatments during the test; aeration was initiated in all test chambers. See laboratory data sheets for additional detail, as appropriate.
O2 -	Dissolved oxygen concentrations ≤ 4.0 mg/L were observed in one or more treatments only at test termination.
O3 -	Dissolved oxygen concentrations were ≤ 4.0 mg/L in one or more treatments during the test but aeration was not possible. See laboratory data sheets for additional detail, as appropriate.
W1 -	Weight per original number of organisms introduced at test initiation.
W2 -	Weight per surviving number of organisms at test termination.
V1 -	Value was statistically (α=0.05 or 0.01, as appropriate) reduced relative to the control, but was considered a Type I error (anomalous false positive), and was disregarded. The NOEC was interpreted accordingly.
V2 -	Value was not statistically (α=0.05 or 0.01, as appropriate) less than the control, but was considered a Type II error (anomalous false negative). The NOEC was interpreted accordingly.
P1 -	PMSD was below the lower bound indicated by USEPA (2002). A statistically significant reduction for a treatment was disregarded if the RPD for that treatment was less than the lower bound.
P2 -	PMSD was above the upper bound indicated by USEPA (2002), and statistically significant reductions in organism performance were detected.
P3 -	PMSD was above the upper bound indicated by USEPA (2002), and no statistically significant reductions in organism performance were detected.
R -	Monthly reference toxicant test endpoint for this species was outside the 95% control limits for the 20 most recent endpoints.

Statement of Quality Assurance

The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with the protocol (if applicable) and standard operating procedures, and that the resulting data and report meet the requirements of the NELAC standards. This report is an accurate reflection of the raw data.

Quality Assurance Unit — Date: January 8, 2021

Data Analyst — Date: 01/11/2021

APPENDIX A

Chain of Custody Records

TRE Environmental Strategies, LLC - Chain of Custody

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

Client/Project Name: Copper Environ. Consulting

Project #: 14001-475 (001 - 003)

Chain of Custody Tape #: 49757 Intact?(circle): Yes No Not Used

Sampler (Print/Affiliation): _____ Signature: _____

Client / Sample ID	Sample Collection Beginning Date	Beginning Time	Ending Date	Ending Time	Sample Type Grab	Comp.	Volume	Preservation (i.e.: 0-6°C)	Matrix (Liq., Soil, Sediment, etc.)	RBT						Sample Temp. Upon Arrival (Therm. # IR1) °C	Lab Sample ID
DR-6_20201221	12/21/20	1030	12/21/20	1115			2.5G	0-6°C	L	X						3.9	34650
~~DR-2_20201221~~	12/21/20	1130	12/21/20	1210			2.5G	0-6°C	L	X						3.9	34649
DR-2_20201221																	

MT 12/21/20

Sample Relinquished By: (Print Name/Affiliation)	Date	Received By: (Print Name/Affiliation)	Date
Mackenzie Turner / CEC	12/21/20		
Signature:	Time: 1400	Signature:	Time:
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation)	Date:
Signature:	Time:	Signature:	Time:
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation) Erin Nace / TRE	Date: 12/22/20
Signature:	Time:	Signature:	Time: 0845

Laboratory (Destination):

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A
Fort Collins, CO 80524
(970) 416-0916
(970) 490-2963 (FAX)

Sample Shipped Via (circle): FedEx UPS Other Courier

Temp Blank? Yes No

Received on Ice: Yes No

Comments:

Effective Date: 02/13/19

Serial No. 05631

TRE Environmental Strategies, LLC - Chain of Custody

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

Client/Project Name: Copper Environ. Consulting | Project #: A001-475(001-003)

Chain of Custody Tape #: 49753 Intact?(circle): Yes No Not Used

Sampler (Print/Affiliation): _____ Signature: _____

Client / Sample ID	Sample Collection Beginning Date	Beginning Time	Ending Date	Ending Time	Sample Type Grab	Comp.	Volume	Preservation (i.e.: 0-6°C)	Matrix (Liq., Soil, Sediment, etc.)	Test Requested: RBT							Sample Temp. Upon Arrival (Therm. # 1B) °C	Lab Sample ID
DR-6-20201221	12/21/20	10:30	12/21/20	1115			2.5G	0-6°C	L	X							3.9	34650
DR-6-20201221	12/21/20	10:30	12/21/20	1115			2.5G	0-6°C	L	X								

Sample Relinquished By: (Print Name/Affiliation)	Date	Received By: (Print Name/Affiliation)	Date
Mackenzie Turnin / CEC	12/21/20		
Signature:	Time: 1400	Signature:	Time:
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation)	Date:
Signature:	Time:	Signature:	Time:
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation) Stephanie Kent / TRE	Date: 12/22/20
Signature:	Time:	Signature:	Time: 0900

Laboratory (Destination):

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A
Fort Collins, CO 80524
(970) 416-0916
(970) 490-2963 (FAX)

Sample Shipped Via (circle): FedEx UPS Other Courier

Temp Blank? Yes No

Received on Ice: Yes No

Comments:

Effective Date: 02/13/19

Serial No. 05630

APPENDIX B

Test Data

QA:MB 1/8/21

TOXICITY DATA PACKAGE COVER SHEET

Test Type: Acute

Project Number: 14001-475-065

Test Substance: Effluent (DR-6)

Species: *Oncorhynchus mykiss*

Dilution Water Type: Hard

Organism Lot or Batch Number: 20-031

Concurrent Control Water Type: Mock

Age: 39 day Supplier: Trout Lodge

Date and Time Test Began: 12/22/20 @ 1600

Date and Time Test Ended: 12/26/20 @ 1400

Protocol Number: USEPA 2002, method 2019.0

Investigator(s): EN/AB/SK/HR

Background Information

pH control?: Yes **No**

Type of Test: Static-Renewal (at 48 hr)

If yes, give % CO_2: NA

Test Temperature: 12 ± 1 °C

Env. Chmbr/**Bath** #: 1 Test Chmbrs: 4 L

Photoperiod: 16 h light : 8 h dark

Light Intensity: 50-100 ft. c.

Test Solution Vol.: 2 L

Number of Replicates per Treatment: 2

Length of Test: 96 h

Number of Organisms per Replicate: 10

Type of Food and Quantity per Chamber: NONE

Feeding Frequency: NA

Test Substance Characterization Parameters and Frequency:

Hardness: Sx Receipt Alkalinity: Sx Receipt NH_3: Sx Receipt TRC: Sx Receipt

pH: Daily Conductivity: Initiation and Renewal

Test Concentrations (Volume:Volume): Mock, Hard, 25, 50, 100%

Agency Summary Sheet(s)?: N/A

Reference Toxicant Data: Test Dates: 12/18/2020 to 12/22/2020 LC_{50}: 10,640

Hist. 95% Control Limits: 3644 to 10840 Method for Determining Ref. Tox. Value: S-K

Special Procedures and Considerations:

D.O. maintained ≥ 4.0 mg/L

* Conductivity measured in all treatments in new test solutions at test initiation and renewal

-Measure Temp in reps Daily -Measure pH and D.O in one rep Daily

Appropriate correction factors have been applied to all temperatures recorded in this data package

Study Director Initials: KSW Date: 12/21/20

QA: AB 1/8/21

TEST SUBSTANCE USAGE LOG

Project Number: 14001-475-065

	Sample 1	Sample 2	Sample 3
Test Substance Number	34650		
Test Substance Collection Date and Time	From: 12/21/20 @ 1030	From: @	From: @
	To: 12/21/20 @ 1115	To: @	To: @
Sample Type (Grab or Comp)			
Date Test Substance Received	12/22/20		
Dilution Water Number RW# or TRE#, circle one	14140/14145*		
Concurrent Control Water RW#	14142		
Date(s) Used	12/22/20		
	12/24/20*		

Preparation of Test Solutions

Test Substance Conc. (% Effluent)	Test Substance Volume (ml)	Control Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)
Mock	0	0	4000						
0%	0	4000	4000						
25%	1000	3000	4000						
50%	2000	2000	4000						
100%	4000	0	4000						
Total	7000	9000	20000						

Initials / Date	EN 12/22/20 mixed PBT		
Initials / Date	HR 12/24/20 " "		
Initials / Date			
Initials / Date			
Initials / Date			
Initials / Date			
Initials / Date			

QA Form No. 052
Revision 2
Effective 1/96
QA: AB 1/5/21

ACUTE BIOLOGICAL DATA

Project Number: 14001-475-065

Test Species: ***Oncorhynchus mykiss***

Trt.	Test Replicate	Number of Surviving Organisms 0 Hours	24 Hours	48 Hours	72 Hours	96 Hours	Remarks
Mock	A	10	10	10	10	10	% survival 100
	B	10	10	10	10	10	
	C						
	D						
0%	A	10	10	10	10	10	100
	B	10	10	10	10	10	
	C						
	D						
25%	A	10	10	10	10	10	100
	B	10	10	10	10	10	
	C						
	D						
50%	A	10	10	10	10	10	100
	B	10	10	10	10	10	
	C						
	D						
100%	A	10	10	10	10	10	100
	B	10	10	10	10	10	
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
Date:		12/22/20	12/23/20	12/24/20	12/25/20	12/26/20	
Time:		1600	1030	1555	1255	1400	
Initials:		EN/MB	SK	HR	SK	HR	

Project Number:	14001-475-065
Test Species:	***Oncorhynchus mykiss***

WER CHEMICAL DATA

Conc.	Rep	Dissolved Oxygen (mg/L) Day 0 NEW	Day 1 OLD	Day 2 NEW	Day 2 OLD	Day 3 OLD	Day 4 OLD	Temperature (°C) Day 0 NEW	Day 1 OLD	Day 2 NEW	Day 2 OLD	Day 3 OLD	Day 4 OLD	pH (s.u.) Day 0 NEW	Day 1 OLD	Day 2 NEW	Day 2 OLD	Day 3 OLD	Day 4 OLD	Cond. (uS/cm) Day 0 NEW	Day 2 NEW
Mock	A	7.4 ~~7~~		7.7	7.3			12		12	13			8.1		8.4	8.0			1341	1350
	B		7.4			7.2	7.1		9△			12	13		8.0			8.3	7.8		
0%	A	7.4		8.2	7.5			12		12	12			8.3		8.4	8.0			567	615
	B		7.6			7.4	7.3		9△			12	13		8.0			8.2	8.0		
25%	A	7.7		8.4	7.5			*		*	12			7.9		8.2	8.2			785	794
	B		7.9			7.5	7.3		9△			12	13		8.2			8.2	8.0		
50%	A	8.1		8.5	7.6			*		*	12			7.7		7.8	7.9			981	998
	B		7.9			7.6	7.4		9△			12	12		7.9			8.1	8.0		
100%	A	8.6		8.7	7.7			12		12	12			7.3		7.5	8.0			1282	1361
	B		8.0			7.1	7.4		9△			12	12		8.0			8.0	8.0		
	A																				
	B																				
	A																				
	B																				
	A																				
	B																				
														FM31 ①							
Meter#:		17	18	17	17	17	17	L-35	L-35	L-37	L-37	L-36	L-38	~~12/22/20~~	FM30	FM31	FM31	FM31	FM31	15	15
Date:		12/22/20	12/23/20	12/24/20	12/24/20	12/25/20	12/26/20	12/22/20	12/23/20	12/24/20	12/24/20	12/24/20	12/26/20	12/22/20	12/23/20	12/24/20	12/24/20 ③	12/25/20	12/26/20	12/22/20	12/24/20
Time:		1535	1030	1535	1550	1255	1005	1535	1030	1535	1550	1255	1005	1535	1030	1535	~~1255~~ ②	~~1005~~ ③ 1205	1005	1535	1535
Initials:		EN	SK	HR	HR	SK	HR	EN	SK	HR	HR	SK	HR	EN	SK	HR	~~SK~~ HR ②	~~HR~~ SK ③	HR	EN	HR

	Hardness (mg/L as CaCO3)	Alkalinity (mg/L as CaCO3)	TRC (mg/L)	NH3-N (mg/L)	Date	Time	Initials
Value:	720	120	<0.02	<1.0	12/22/20	0925	EN for GP
Meter:	titr	titr	22	MA1			

Note: Hardness, alkalinity, TRC, and NH3 data appearing on this page have been transcribed from the wet chemistry log, FCETL QA Form No. 084

*Dilution/control water and effluent brought to 12°C prior to making the dilution series. The temperature of resulting effluent dilution is assumed to also be 12°C

△ Checked all reps

① EN 12/22/20 ; E

② HR 12/24/20 ; E (1550)

③ HR 12/24/20 ; E (1255)

QA: AB 1/8/21

DAILY TOXICITY TEST LOG

Project Number:	14001-475-065
Test Species:	***Oncorhynchus mykiss***

General Comments	Random Chart ID : Bubbles	Feeding NONE	Initials/ Date
Test Day 0	Test solution added to test chambers at: 1550 Initials: EN Test Organisms Added at: 1600	None	EN 12/22/20
Test Day 1	Real time temp= 8 °C Range = 8 - 11 °C	None	SK 12/23/20
Test Day 2	Real time temp= 9 °C Range = 9 - ★ °C	NONE	HR 12/24/20
Test Day 3	Real time temp= ①~~25~~ 9 °C Range = 9 - 11 °C	None	SK 12/25/20
Test Day 4	Real time temp= 10 °C Range = 9-12 °C	NONE	HR 12/26/20

①SK 12/25/20 E

★ = Meter error

QA Form No. 094
Revision 2
Effective 10/15

QA: AB 1/8/21

RAINBOW TROUT LENGTHS, WEIGHTS, AND LOADING OF CONTROL ORGANISMS

Project Number: 14001-475-065	Test Substance: Effluent (DR-6)	Comments:
Species: O. mykiss	Analyst: SKI	
Date/Time of Measurements: 12/26/20 @ 1630	Balance ID: A + D Oven ID (if used):	
Weight Type (Circle): Wet (Blot Dry) Dry (>100°C) AFDW (>500°C) Other:		Lot Number: 20-031
Measurement Type (Circle): Pre-weight (Post-weight)		Organism age: 43 days

No.	Treatment/ Replicate	Length (mm)	Net Weight (g)	No.	Treatment/ Replicate	Length (mm)	Net Weight (g)	No.	Treatment/ Replicate	Length (mm)	Net Weight (g)
1	Control A	25	0.1612	1	Control B	24	0.1198	1	Control C		
2		23	0.1008	2		24	0.1012	2			
3		23	0.1072	3		25	0.1392	3			
4		23	0.0987	4		25	0.1447	4			
5		24	0.1047	5		25	0.1341	5			
6		22	0.1073	6		24	0.1164	6			
7		22	0.0885	7		23	0.0973	7			
8		24	0.1314	8		22	0.0797	8			
9		25	0.1507	9		24	0.1172	9			
10		24	0.1392	10		25	0.1360	10			

Length Calculations	
Max: 25	Min: 22
Mean: 23.8	
Ratio (long/short): 1.14	

Weight Calculations	
Max: 0.1612	Min: 0.0797
Mean: 0.1188	
Test Solution Volume: 2 L	Loading Rate (g/L): 0.594

QA: AB 1/8/21

Initial weights for RBT for 475 **DR-6**

Dec 2020

	wt (g)	Length (mm)
1	0.1612	25
2	0.1008	23
3	0.1072	23
4	0.0987	23
5	0.1047	24
6	0.1073	22
7	0.0885	22
8	0.1314	24
9	0.1507	25
10	0.1392	24
11	0.1198	24
12	0.1012	24
13	0.1392	25
14	0.1447	25
15	0.1341	25
16	0.1164	24
17	0.0973	23
18	0.0797	22
19	0.1172	24
20	0.1360	25
sum =	2.3753	476
avg =	0.1188	23.80
Max	0.1612	25
Min	0.0797	22
count	20	20

1.14 Ratio (long / short)

overall avg =	**0.1188**
count per tank	**10**
mass per tank (g)	**1.1877**
Test soln vol (L):	**2**
Loading Rate (g/L)	**0.594**

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A, fort Collins, Colorado 80524
T 970.416.0916 F 970.490.2963

TRE Environmental Strategies

January 7, 2021

Mr. Kevin Pfeifer
Copper Environmental Consulting
406 East Park Avenue, Suite 2
Anaconda, MT 59711

Subject: Results of RBT test(s) – December 2020

Dear Mr. Pfeifer:

Attached is a copy of the acute toxicity test report(s) using *Oncorhynchus mykiss* with a sample received on December 18, 2020.

We appreciate the opportunity to complete this study for Copper Environmental Consulting. Please do not hesitate to contact us if you have any questions.

Sincerely,

Whitney Naddy
Report Author
naddywm.tre@gmail.com

Rami B. Naddy, Ph.D.
Manager / Study Director
naddyrb.tre@gmail.com

Attachment:

14001-475-061

TRE Environmental Strategies

Report of Acute Toxicity Testing using the Rainbow Trout (*Oncorhynchus mykiss*)

Project ID: 14001-475-061
December 2020

Sponsor and Laboratory Information

Sponsor	Copper Environmental Consulting 406 East Park Avenue, Suite 2 Anaconda, MT 59711
Project Officer	Kevin Pfeifer (406) 563-2700, ext. 310
Testing Facility	TRE Environmental Strategies, LLC 100 Racquette Drive, Unit A Fort Collins, CO 80524 Fax: (970) 490-2963 State of Florida NELAP Laboratory ID: E87972
Study Director	Rami B. Naddy, Ph.D. (970) 416-0916 email: naddyrb.tre@gmail.com
Report Author	Amanda Bidlack (970) 416-0916 email: bidlackac.tre@gmail.com

Test Information

Test	Acute Toxicity under Static-Renewal Conditions
Basis	USEPA (2002), method 2019.0
Test Dates and Time	December 18, 2020 @ 1010 to December 22, 2020 @ 1000
Test Length	96 hours
Species	*Oncorhynchus mykiss*
Test Material	Effluent (Grab) – DR-3A
Permit Number	N/A
Dilution Water	Hard Reconstituted Water
Test Concentrations	0 (Control), 25, 50, and 100% effluent

- *Results described in this report apply only to the samples submitted to the laboratory and analyzed, as listed in the report*
- *Test results comply with NELAC standards. Reports are intended to be considered in their entirety; TRE is not responsible for consequences arising from use of a partial report*
- *This report contains 6 pages plus 2 appendices*

Effluent Collection and Receipt

Sample No.	Field No.	Collection Date & Time	TRE No.	Date of Receipt	Temp. at Arrival (°C)	Qual.
1	DR3A-20201217	12/17/20 @ 0910 - 1010	34646	12/18/20	2.1	

Note: See Appendix A for chain of custody records

Effluent Characterization

Sample No.	pH	Hard. (mg/L)[HA]	Alk. (mg/L)[HA]	Spec. Cond. (µS/cm)	TRC (mg/L)[G]	NH_3-N (mg/L)
1	7.2	720	95	1,227	<0.02	<1.0

Initial Dilution/Control Water Characterization

Batch No.	pH	Hard. (mg/L)[HA]	Alk. (mg/L)[HA]	Spec. Cond. (µS/cm)	TRC (mg/L)[G]	NH_3-N (mg/L)
14137	7.9	168	104	556	0.03	<1.0

Test Conditions

Type	Static-Renewal Acute
Test Endpoints	Survival
Test Chambers	4L glass aquaria
Test Solution Volume	2L
Replicates per Treatment	2
Organisms per Replicate	10
Test Temperature	12 ± 1°C (≤3°C differential)
Lighting	Fluorescent, 16 hours light:8 hours dark
Chamber Placement	Random according to computer-generated chart
Aeration?	[X] No [ ] Yes
Test Solution Renewal	At 48 Hours

Test Organism

Species	*Oncorhynchus mykiss*
Age	35 days post hatch / 16 days post swim-up
Source	Trout Lodge, Lot No. 22-031
Average wet weight (g)	0.1031
Loading Rate (g/L)	0.515
Ratio (long/short)	1.27
Acclimation	Hard Water
Feeding	Off food for 48h prior to testing; no food during testing
Reference Toxicant Testing	Initiated December 18, 2020 using sodium chloride (NaCl)

TEST RESULTS

Biological Data

Test Concentration (% Effluent)	Percent Survival of *Pimephales promelas*			
	24 hours	48 hours	72 hours	96 hours
0 (Control)	100	100	100	100
25	100	100	100	100
50	100	100	100	100
100	80	70	70	70
Control Performance	Acceptable			

Note: See Appendix B for copies of laboratory data sheets

Data Analysis and Test Endpoints

Biological Endpoint	Statistical Endpoint	Value (% Effluent)
Survival	96-hour LC_{50}	>100

Note: Analyses completed using, where appropriate, CETIS version 1.8.7 (2014)

Physical and Chemical Data

Treatment (% Effluent)	pH		Dissolved Oxygen (mg/L)		Conductivity (µS/cm)		Temperature (°C)		Qual.
	Low	High	Low	High	Low	High	Low	High	
0 (Control)	7.8	8.3	7.0	7.9	556	570	11	12	
100	7.2	8.0	7.2	8.2	1,227	1,266	11	12	
All Treatments	7.2	8.3	≥7.0		NA		11	12	T3
							9	11	T4

Reference Toxicant Test Results for *O. mykiss*

96-Hour LC_{50} (mg Cl^-/L)	TRE Historical 95% Control Limits (mg Cl^-/L)	
	Low	High
10,640	3,644	10,840

References

CETIS. 2014. Comprehensive Environmental Toxicity Information System. User Guide (version 1.8.7). Tidepool Scientific, LLC. McKinleyville, CA.

USEPA. 2002. Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms. Fifth Edition, EPA-821-R-02-012.

Explanation of Qualifiers

Note: study-specific narratives within the body of the report are denoted, if necessary, with the superscript letters **a - d**, and associated footnotes. Other qualifications and definitions are defined below.

S -	Sample temperature upon receipt was outside the range recommended by USEPA (2002), (i.e., 0 to 6ºC or ambient if collected and used on the same day).
I -	Ice was present in the sample upon receipt.
N1 -	Sample was not used for testing.
N2 -	Liquid from container with ice was not used for testing.
F -	Sample was filtered to remove indigenous organisms prior to use.
HT -	Sample hold time (normally 36 hours) was exceeded.
HA -	Hardness and alkalinity concentrations are presented as $CaCO_3$.
G -	TRC = Total Residual Chlorine
T1 -	Temperatures measured in some of the old test solutions were outside the recommended test temperature range but the allowed 3ºC differential was not exceeded.
T2 -	Temperatures measured in some of the old test solutions were outside the recommended test temperature range and the allowed 3ºC differential was exceeded.
T3 -	Temperatures measured in test solutions.
T4 -	Continuous temperatures measured in the environmental chamber or water bath.
X1 -	Mean young per original female. If any 4th or higher broods were produced, they were excluded from calculation of mean young per female and statistical analysis of reproduction.
X2 -	One or more organisms in this treatment were lost or not found in the test chamber and were excluded from analysis, as the loss was attributed to technician error. See laboratory data sheets for additional detail, as appropriate.
X3 -	One or more male *C. dubia* were found in this treatment and were included in analysis of survival but excluded from analysis of reproduction. See laboratory data sheets for additional detail, as appropriate.
X4 -	One or more fish were alive at test termination but were lost during the drying/weighing process. These fish were included in analysis of survival but excluded from analysis of growth. See laboratory data sheets for additional detail, as appropriate.
O1 -	Dissolved oxygen concentrations were ≤ 4.0 mg/L in one or more treatments during the test; aeration was initiated in all test chambers. See laboratory data sheets for additional detail, as appropriate.
O2 -	Dissolved oxygen concentrations ≤ 4.0 mg/L were observed in one or more treatments only at test termination.
O3 -	Dissolved oxygen concentrations were ≤ 4.0 mg/L in one or more treatments during the test but aeration was not possible. See laboratory data sheets for additional detail, as appropriate.
W1 -	Weight per original number of organisms introduced at test initiation.
W2 -	Weight per surviving number of organisms at test termination.
V1 -	Value was statistically (α=0.05 or 0.01, as appropriate) reduced relative to the control, but was considered a Type I error (anomalous false positive), and was disregarded. The NOEC was interpreted accordingly.
V2 -	Value was not statistically (α=0.05 or 0.01, as appropriate) less than the control, but was considered a Type II error (anomalous false negative). The NOEC was interpreted accordingly.
P1 -	PMSD was below the lower bound indicated by USEPA (2002). A statistically significant reduction for a treatment was disregarded if the RPD for that treatment was less than the lower bound.
P2 -	PMSD was above the upper bound indicated by USEPA (2002), and statistically significant reductions in organism performance were detected.
P3 -	PMSD was above the upper bound indicated by USEPA (2002), and no statistically significant reductions in organism performance were detected.
R -	Monthly reference toxicant test endpoint for this species was outside the 95% control limits for the 20 most recent endpoints.

Statement of Quality Assurance

The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with the protocol (if applicable) and standard operating procedures, and that the resulting data and report meet the requirements of the NELAC standards. This report is an accurate reflection of the raw data.

Quality Assurance Unit — Date: January 6, 2021

Data Analyst — Date: 01/07/2021

APPENDIX A

Chain of Custody Records

TRE Environmental Strategies, LLC - Chain of Custody

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

Client/Project Name: Copper Environ. Consulting

Project #: 14001-475(061-063)

Chain of Custody Tape #: 49760 Intact?(circle): Yes No Not Used

Sampler (Print/Affiliation): _____ Signature: _____

Client / Sample ID	Sample Collection Beginning Date	Beginning Time	Ending Date	Ending Time	Sample Type Grab	Comp.	Volume	Preservation (i.e.: 0-6°C)	Matrix (Liq., Soil, Sediment, etc.)	Test Requested: RBT						Sample Temp. Upon Arrival (Therm. # IR1) °C	Lab Sample ID
RR 12/17/20 ~~AC3EP~~ DR-3A_20201217	12/17/20	0910	12/17/20	1010	X		2.5G	0-6°C	L	X						~~3~~72.1	3464916 ①
DR-3A_20201217	12/17/20	0910	12/17/20	1010	X		2.5G	0-6°C	L	X							

Sample Relinquished By: (Print Name/Affiliation)	Date	Received By: (Print Name/Affiliation)	Date	Laboratory (Destination):
Bob Rader	12/17/20			TRE Environmental Strategies, LLC 100 Racquette Drive, Unit A Fort Collins, CO 80524 (970) 416-0916 (970) 490-2963 (FAX)
Signature: Robert M. Rader	Time: 1400	Signature:	Time:	
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation)	Date:	
Signature:	Time:	Signature:	Time:	
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation) Emma M. Campbell / TRE	Date: 12/18/20	Sample Shipped Via (circle): FedEx Other UPS Courier
Signature:	Time:	Signature: Emma M. Campbell	Time: 0800	Temp Blank? Yes No

Comments:

Received on Ice: Yes No

① EC 12/18/20 E

Effective Date: 02/13/19

Serial No. 05633

TRE Environmental Strategies, LLC - Chain of Custody

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

Client/Project Name: Copper Environ. Consulting Project #: 14001-475(001-003)

Chain of Custody Tape #: 49760 Intact?(circle): Yes No Not Used

Sampler (Print/Affiliation): _____ Signature: _____

Client / Sample ID	Sample Collection Beginning Date	Beginning Time	Ending Date	Ending Time	Sample Type Grab	Comp.	Volume	Preservation (i.e.: 0-6°C)	Matrix (Liq., Soil, Sediment, etc.)	Test Requested: RBT							Sample Temp. Upon Arrival (Therm. # 121) °C	Lab Sample ID
RR 12/17/20 ~~AC3EP~~ DR-3A_20201217	12/17/20	0910	12/17/20	1010	X		2.5G	0-6°C	L	X							21	346446
DR-3A_20201217	12/17/20	0910	12/17/20	1010	X		2.5G	0-6°C	L	X								

Sample Relinquished By: (Print Name/Affiliation)	Date	Received By: (Print Name/Affiliation)	Date
Bob Rader	12/17/20		
Signature: Robert M. Rader	Time: 1400	Signature:	Time:
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation)	Date:
Signature:	Time:	Signature:	Time:
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation) Emma M. Campbell / TRE	Date: 12/18/20
Signature:	Time:	Signature: Emma M Campbell	Time: 0800

Laboratory (Destination):

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A
Fort Collins, CO 80524
(970) 416-0916
(970) 490-2963 (FAX)

Sample Shipped Via (circle): FedEx Other UPS Courier

Temp Blank? Yes No

Received on Ice: Yes No

Comments:

Effective Date: 02/13/19

Serial No. 05633

APPENDIX B

Test Data

TOXICITY DATA PACKAGE COVER SHEET

QA NW 1/5/21

Test Type: Acute

Project Number: 14001-475-061

Test Substance: Effluent (DR-3A)

Species: *Oncorhynchus mykiss*

Dilution Water Type: Hard

Organism Lot or Batch Number: 22-031

Concurrent Control Water Type: N/A

Age: 35d

Supplier: Trout Lodge

Date and Time Test Began: 12/15/20 @ 1010

Date and Time Test Ended: 12/22/20 @ 1000

Protocol Number: USEPA 2002, method 2019.0

Investigator(s): AB/HR/CP/SK

Background Information

Type of Test: Static-Renewal (at 48 hr)

pH control?: Yes **No**

If yes, give % CO_2: NA

Test Temperature: 12 ± 1 °C

Env. Chmbr/**Bath #**: 1 Test Chmbrs: 4 L

Photoperiod: 16 h light : 8 h dark

Light Intensity: 50-100 ft. c.

Test Solution Vol.: 2 L

Number of Replicates per Treatment: 2

Length of Test: 96 h

Number of Organisms per Replicate: 10

Type of Food and Quantity per Chamber: NONE

Feeding Frequency: NA

Test Substance Characterization Parameters and Frequency:

Hardness: Sx Receipt Alkalinity: Sx Receipt NH_3: Sx Receipt TRC: Sx Receipt

pH: Daily Conductivity: Initiation and Renewal

Test Concentrations (Volume:Volume): Hard, 25, 50, 100%

Agency Summary Sheet(s)?: N/A

Reference Toxicant Data: Test Dates: 12/18/20 to 12/22/20 LC_{50}: 10640

Hist. 95% Control Limits: 3644 to 10840 Method for Determining Ref. Tox. Value: S-K

Special Procedures and Considerations:

D.O. maintained ≥ 4.0 mg/L

* Conductivity measured in all treatments in new test solutions at test initiation and renewal

-Measure Temp in reps Daily -Measure pH and D.O in one rep Daily

Appropriate correction factors have been applied to all temperatures recorded in this data package

Study Director Initials: USW Date: 12/17/20

QA NSN 1/5/21

TEST SUBSTANCE USAGE LOG

Project Number: 14001-475-061

	Sample 1	Sample 2	Sample 3
Test Substance Number	34696		
Test Substance Collection Date and Time	From: 12/17/20 @ 0910 To: 12/17/20 @ 1010	From: @ To: @	From: @ To: @
Sample Type (Grab or Comp)			
Date Test Substance Received	12/18/20		
Dilution Water Number RW# or TRE#, circle one	14137/14140*		
Concurrent Control Water RW#	NA		
Date(s) Used	12/18/20 12/20/20*		

Preparation of Test Solutions

Test Substance Conc. (% Effluent)	Test Substance Volume (ml)	Control Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)
0%	0	4000	4000						
25%	1000	3000	4000						
50%	2000	2000	4000						
100%	4000	0	4000						
Total	7000	9000	16000						

Initials / Date	AB 12/18/20		
Initials / Date	HR 12/20/20		
Initials / Date			
Initials / Date			
Initials / Date			
Initials / Date			
Initials / Date			
Initials / Date			

QA NW 1/5/21

ACUTE BIOLOGICAL DATA

Project Number: 14001-475-061

Test Species: ***Oncorhynchus mykiss***

Trt.	Test Replicate	Number of Surviving Organisms 0 Hours	24 Hours	48 Hours	72 Hours	96 Hours	Remarks % survival
MH	A	10	10	10	10	10	100
	B	10	10	10	10	10	
	C						
	D						
25%	A	10	10	10	10	10	100
	B	10	10	10	10	10	
	C						
	D						
50%	A	10	10	10	10	10	100
	B	10	10	10	10	10	
	C						
	D						
100%	A	10	9	8	8	8	70
	B	10	7	4	6	6	
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
Date:		12/18/20	12/19/20	12/20/20	12/21/20	12/22/20	
Time:		1010	1300	1220	0915	1000	
Initials:		AB/HR	CP	HR	SK	EN	

QA NSW 1/5/21

Project Number:	14001-475-061
Test Species:	***Oncorhynchus mykiss***

WER CHEMICAL DATA

Conc.	Rep	Dissolved Oxygen (mg/L) Day 0 NEW	Day 1 OLD	Day 2 NEW	Day 2 OLD	Day 3 OLD	Day 4 OLD	Temperature (°C) Day 0 NEW	Day 1 OLD	Day 2 NEW	Day 2 OLD	Day 3 OLD	Day 4 OLD	pH (s.u.) Day 0 NEW	Day 1 OLD	Day 2 NEW	Day 2 OLD	Day 3 OLD	Day 4 OLD	Cond. (uS/cm) Day 0 NEW	Day 2 NEW
MH	A	7.9	7.7	7.0	7.2		7.86 ②	12	11	12	12		11	8.1	8.0	8.3	8.1		7.8	556	570
	B					7.7		12		12		12						7.9			
25%	A	7.9	7.7	7.6	7.6		7.915 ②	12	11	12	12		12	7.8	7.9	8.1	8.0		7.89 ②	① 644 740	770
	B					7.9		12		12		12						7.8			
50%	A	7.9	7.8	7.9	7.6		8.0	12	11	12	12		12	7.6	7.8	7.8	8.0		7.9	914	938
	B					7.9		12		12		12						7.7			
100%	A	7.2	7.9	8.2	7.8		8.1	12	11	12	12		11	7.2	7.7	7.5	8.0		7.9	1227	1266
	B					8.1		12		12		12						7.7			
	A																				
	B																				
	A																				
	B																				
	A																				
	B																				
	A																				
	B																				
Meter#:		17	17	17	17	18	17	L-42	L-39	L-39	L-36	L-36	L-36	FM31	FM31	FM31	FM31	FM31	FM30	15	15
Date:		12/18/20	12/19/20	12/20/20	12/20/20	12/21/20	12/22/20	12/18/20	12/19/20	12/20/20	12/20/20	12/21/20	12/22/20	12/18/20	12/19/20	12/20/20	12/20/20	12/21/20	12/22/20	12/18/20	12/20/20
Time:		0955	1300	1200	1210	0940	1005	0955	1300	1200	1210	0915	1000	0955	1300	1200	1210	0940	1005	0955	1200
Initials:		AM	CP	HR	HR	SK	EN	AM	CP	HR	HR	SK	EN	AM	CP	HR	HR	SK	EN	AM	HR

	Hardness (mg/L as CaCO3)	Alkalinity (mg/L as CaCO3)	TRC (mg/L)	NH3-N (mg/L)	Date	Time	Initials
Value:	720	95	20.02	21.0	12/18/20	1530	AS for VS
Meter:	Titr	Titr	22	HA1			

Note: Hardness, alkalinity, TRC, and NH3 data appearing on this page have been transcribed from the wet chemistry log, FCETL QA Form No. 084

① AS 12/18/20 E

② EN 12/22/20; WD

DAILY TOXICITY TEST LOG

QA NSW 1/5/21

Project Number:	14001-475-061
Test Species:	***Oncorhynchus mykiss***

General Comments	Random Chart ID : Bubbles	Feeding NONE	Initials/ Date
Test Day 0	Test solution added to test chambers at: 950 Initials: AS Test Organisms Added at: 1010	NA	AS/ HR 12/18/20
Test Day 1	Real time temp= 11 °C Range = 11 - 11 °C	NONE	CP 12/19/20
Test Day 2	Real time temp= 10 °C Range = 9-11 °C	NONE	HR 12/20/20
Test Day 3	Real time temp= 11 °C Range = 9 - 11 °C	NONE	SK 12/21/20
Test Day 4	Real time temp= 11 °C Range = 11 - 11 °C	None	EN 12/22/20

QA NW 1/5/21

RAINBOW TROUT LENGTHS, WEIGHTS, AND LOADING OF CONTROL ORGANISMS

Project Number: 14001-475	Test Substance: DR-3A	Comments:
Species: O. mykiss	Analyst: AB/EN	
Date/Time of Measurements: 12/22/20 @ 1035	Balance ID: AND2 Oven ID (if used):	
Weight Type (Circle): Wet (Blot Dry) Dry (>100°C) AFDW (>500°C) Other:		Lot Number: 22-031
Measurement Type (Circle): Pre-weight (Post-weight)		Organism age: 16d post swim-up

No.	Treatment/ Replicate	Length (mm)	Net Weight (g)	No.	Treatment/ Replicate	Length (mm)	Net Weight (g)	No.	Treatment/ Replicate	Length (mm)	Net Weight (g)
1	Control A	24	0.0901	1	Control B	24	0.1105	1	Control C		
2		22	0.0943	2		23	0.0925	2			
3		28	0.1371	3		23	0.0965	3			
4		24	0.1074	4		22	0.1028	4			
5		23	0.0948	5		23	0.1086	5			
6		27	0.1246	6		23	0.0947	6			
7		24	0.1031	7		22	0.0930	7			
8		22	0.1024	8		25	0.1127	8			
9		23	0.0740	9		23	0.0921	9			
10		25	0.1059	10		24	0.1250	10			

Length Calculations	
Max: 28	Min: 22
Mean: 23.7	
Ratio (long/short): 1.27	

Weight Calculations	
Max: 0.1371	Min: 0.0740
Mean: 0.1031	
Test Solution Volume: 2L	Loading Rate (g/L): 0.515

GA [illegible] 1/5/21

Initial weights for RBT for 475 **DR-3A**
Dec 2020

	wt (g)	Length (mm)
1	0.0901	24
2	0.0943	22
3	0.1371	28
4	0.1074	24
5	0.0948	23
6	0.1246	27
7	0.1031	24
8	0.1026	22
9	0.0740	23
10	0.1054	25
11	0.1105	24
12	0.0925	23
13	0.0965	23
14	0.1028	22
15	0.1086	23
16	0.0947	23
17	0.0930	22
18	0.1127	25
19	0.0921	23
20	0.1250	24
sum =	2.0618	474
avg =	0.1031	23.70
Max	0.1371	28
Min	0.0740	22
count	20	20

1.27 Ratio (long / short)

overall avg =	**0.1031**
count per tank	**10**
mass per tank (g)	**1.0309**
Test soln vol (L):	**2**
Loading Rate (g/L)	**0.515**

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A, fort Collins, Colorado 80524
T 970.416.0916 F 970.490.2963

TRE Environmental Strategies

January 8, 2021

Mr. Kevin Pfeifer
Copper Environmental Consulting
406 East Park Avenue, Suite 2
Anaconda, MT 59711

Subject: Results of RBT test(s) – December 2020

Dear Mr. Pfeifer:

Attached is a copy of the acute toxicity test report(s) using *Oncorhynchus mykiss* with a sample received on December 18, 2020.

We appreciate the opportunity to complete this study for Copper Environmental Consulting. Please do not hesitate to contact us if you have any questions.

Sincerely,

Whitney Naddy
Report Author
naddywm.tre@gmail.com

Rami B. Naddy, Ph.D.
Manager / Study Director
naddyrb.tre@gmail.com

Attachment:

14001-475-062

Report of Acute Toxicity Testing using the Rainbow Trout (*Oncorhynchus mykiss*)

Project ID: 14001-475-062
December 2020

Sponsor and Laboratory Information

Sponsor	Copper Environmental Consulting 406 East Park Avenue, Suite 2 Anaconda, MT 59711
Project Officer	Kevin Pfeifer (406) 563-2700, ext. 310
Testing Facility	TRE Environmental Strategies, LLC 100 Racquette Drive, Unit A Fort Collins, CO 80524 Fax: (970) 490-2963 State of Florida NELAP Laboratory ID: E87972
Study Director	Rami B. Naddy, Ph.D. (970) 416-0916 email: naddyrb.tre@gmail.com
Report Author	Amanda Bidlack (970) 416-0916 email: bidlackac.tre@gmail.com

Test Information

Test	Acute Toxicity under Static-Renewal Conditions
Basis	USEPA (2002), method 2019.0
Test Dates and Time	December 18, 2020 @ 1115 to December 22, 2020 @ 1130
Test Length	96 hours
Species	*Oncorhynchus mykiss*
Test Material	Effluent (Grab) – AC3EFF
Permit Number	N/A
Dilution Water	Hard Reconstituted Water
Test Concentrations	0 (Control), 25, 50, and 100% effluent

- *Results described in this report apply only to the samples submitted to the laboratory and analyzed, as listed in the report*
- *Test results comply with NELAC standards. Reports are intended to be considered in their entirety; TRE is not responsible for consequences arising from use of a partial report*
- *This report contains 6 pages plus 2 appendices*

Effluent Collection and Receipt

Sample No.	Field No.	Collection Date & Time	TRE No.	Date of Receipt	Temp. at Arrival (°C)	Qual.
1	AC3EFF12 1720	12/17/20 @ 1030 – 1130	34645	12/18/20	1.9	

Note: See Appendix A for chain of custody records

Effluent Characterization

Sample No.	pH	Hard. (mg/L)[HA]	Alk. (mg/L)[HA]	Spec. Cond. (µS/cm)	TRC (mg/L)[G]	NH_3-N (mg/L)
1	7.5	660	82	1,197	<0.02	<1.0

Initial Dilution/Control Water Characterization

Batch No.	pH	Hard. (mg/L)[HA]	Alk. (mg/L)[HA]	Spec. Cond. (µS/cm)	TRC (mg/L)[G]	NH_3-N (mg/L)
14137	8.1	168	104	528	0.03	<1.0

Test Conditions

Type	Static-Renewal Acute
Test Endpoints	Survival
Test Chambers	4L glass aquaria
Test Solution Volume	2L
Replicates per Treatment	2
Organisms per Replicate	10
Test Temperature	12 ± 1°C (≤ 3°C differential)
Lighting	Fluorescent, 16 hours light:8 hours dark
Chamber Placement	Random according to computer-generated chart
Aeration?	[X] No [ ] Yes
Test Solution Renewal	At 48 Hours

Test Organism

Species	*Oncorhynchus mykiss*
Age	35 days post hatch / 16 days post swim-up
Source	Trout Lodge, Lot No. 20-031
Average wet weight (g)	0.0972
Loading Rate (g/L)	0.486
Ratio (long/short)	1.25
Acclimation	Hard Water
Feeding	Off food for 48h prior to testing; no food during testing
Reference Toxicant Testing	Initiated December 18, 2020 using sodium chloride (NaCl)

TEST RESULTS

Biological Data

Test Concentration (% Effluent)	Percent Survival of *Pimephales promelas*			
	24 hours	48 hours	72 hours	96 hours
0 (Control)	100	100	100	100
25	100	100	100	100
50	100	100	100	100
100	100	100	100	100
Control Performance	Acceptable			

Note: See Appendix B for copies of laboratory data sheets

Data Analysis and Test Endpoints

Biological Endpoint	Statistical Endpoint	Value (% Effluent)
Survival	96-hour LC_{50}	>100

Note: Analyses completed using, where appropriate, CETIS version 1.8.7 (2014)

Physical and Chemical Data

Treatment (% Effluent)	pH		Dissolved Oxygen (mg/L)		Conductivity (µS/cm)		Temperature (°C)		Qual.
	Low	High	Low	High	Low	High	Low	High	
0 (Control)	7.8	8.2	6.9	7.9	492	528	11	12	
100	7.5	8.1	7.7	8.3	1,197	1,255	11	12	
All Treatments	7.5	8.2	≥6.9		NA		11	12	T3
							9	11	T4

Reference Toxicant Test Results for *O. mykiss*

96-Hour LC_{50} (mg Cl^-/L)	TRE Historical 95% Control Limits (mg Cl^-/L)	
	Low	High
10,640	3,644	10,840

References

CETIS. 2014. Comprehensive Environmental Toxicity Information System. User Guide (version 1.8.7). Tidepool Scientific, LLC. McKinleyville, CA.

USEPA. 2002. Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms. Fifth Edition, EPA-821-R-02-012.

Explanation of Qualifiers

Note: study-specific narratives within the body of the report are denoted, if necessary, with the superscript letters **a - d**, and associated footnotes. Other qualifications and definitions are defined below.

S -	Sample temperature upon receipt was outside the range recommended by USEPA (2002), (i.e., 0 to 6ºC or ambient if collected and used on the same day).
I -	Ice was present in the sample upon receipt.
N1 -	Sample was not used for testing.
N2 -	Liquid from container with ice was not used for testing.
F -	Sample was filtered to remove indigenous organisms prior to use.
HT -	Sample hold time (normally 36 hours) was exceeded.
HA -	Hardness and alkalinity concentrations are presented as $CaCO_3$.
G -	TRC = Total Residual Chlorine
T1 -	Temperatures measured in some of the old test solutions were outside the recommended test temperature range but the allowed 3ºC differential was not exceeded.
T2 -	Temperatures measured in some of the old test solutions were outside the recommended test temperature range and the allowed 3ºC differential was exceeded.
T3 -	Temperatures measured in test solutions.
T4 -	Continuous temperatures measured in the environmental chamber or water bath.
X1 -	Mean young per original female. If any 4th or higher broods were produced, they were excluded from calculation of mean young per female and statistical analysis of reproduction.
X2 -	One or more organisms in this treatment were lost or not found in the test chamber and were excluded from analysis, as the loss was attributed to technician error. See laboratory data sheets for additional detail, as appropriate.
X3 -	One or more male *C. dubia* were found in this treatment and were included in analysis of survival but excluded from analysis of reproduction. See laboratory data sheets for additional detail, as appropriate.
X4 -	One or more fish were alive at test termination but were lost during the drying/weighing process. These fish were included in analysis of survival but excluded from analysis of growth. See laboratory data sheets for additional detail, as appropriate.
O1 -	Dissolved oxygen concentrations were ≤ 4.0 mg/L in one or more treatments during the test; aeration was initiated in all test chambers. See laboratory data sheets for additional detail, as appropriate.
O2 -	Dissolved oxygen concentrations ≤ 4.0 mg/L were observed in one or more treatments only at test termination.
O3 -	Dissolved oxygen concentrations were ≤ 4.0 mg/L in one or more treatments during the test but aeration was not possible. See laboratory data sheets for additional detail, as appropriate.
W1 -	Weight per original number of organisms introduced at test initiation.
W2 -	Weight per surviving number of organisms at test termination.
V1 -	Value was statistically (α=0.05 or 0.01, as appropriate) reduced relative to the control, but was considered a Type I error (anomalous false positive), and was disregarded. The NOEC was interpreted accordingly.
V2 -	Value was not statistically (α=0.05 or 0.01, as appropriate) less than the control, but was considered a Type II error (anomalous false negative). The NOEC was interpreted accordingly.
P1 -	PMSD was below the lower bound indicated by USEPA (2002). A statistically significant reduction for a treatment was disregarded if the RPD for that treatment was less than the lower bound.
P2 -	PMSD was above the upper bound indicated by USEPA (2002), and statistically significant reductions in organism performance were detected.
P3 -	PMSD was above the upper bound indicated by USEPA (2002), and no statistically significant reductions in organism performance were detected.
R -	Monthly reference toxicant test endpoint for this species was outside the 95% control limits for the 20 most recent endpoints.

Statement of Quality Assurance

The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with the protocol (if applicable) and standard operating procedures, and that the resulting data and report meet the requirements of the NELAC standards. This report is an accurate reflection of the raw data.

Quality Assurance Unit — Date: January 7, 2021

Data Analyst — Date: 01/08/2021

APPENDIX A

Chain of Custody Records

TRE Environmental Strategies, LLC - Chain of Custody

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

Client/Project Name: Copper Environ. Consulting | Project #: 14001-475(061-063)

Chain of Custody Tape #: 49750 Intact?(circle): Yes No Not Used

Sampler (Print/Affiliation): _____ Signature: _____

Client / Sample ID	Sample Collection Beginning Date	Beginning Time	Ending Date	Ending Time	Sample Type Grab	Comp.	Volume	Preservation (i.e.: 0-6°C)	Matrix (Liq., Soil, Sediment, etc.)	Test Requested: RBT							Sample Temp. Upon Arrival (Therm. # 1RL) °C	Lab Sample ID
AC3EFF121720	12/17/20	1030	12/17/20	1130	X		2.5G	0-6°C	L	X							0.2 / 1.9	3464885
AC3EFF121720	12/17/20	1030	12/17/20	1130	X		2.5G	0-6°C	L	X								

Sample Relinquished By: (Print Name/Affiliation)	Date	Received By: (Print Name/Affiliation)	Date
Bob Rader / CEC	12/17/20		
Signature: Ruth M. Rader	Time: 1400	Signature:	Time:
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation)	Date:
Signature:	Time:	Signature:	Time:
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation) Emma M. Campbell / TRE	Date: 12/18/20
Signature:	Time:	Signature: Emma M. Campbell	Time: 0800

Laboratory (Destination):

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A
Fort Collins, CO 80524
(970) 416-0916
(970) 490-2963 (FAX)

Sample Shipped Via (circle): FedEx Other UPS Courier

Temp Blank? Yes No

Received on Ice: Yes No

Comments:

Effective Date: 02/13/19

DQ 12/18/20 E

Serial No. 05637

TRE Environmental Strategies, LLC - Chain of Custody

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

Client/Project Name: Copper Environ. Consulting

Project #: 14001-475(061-063)

Chain of Custody Tape #: 49750 Intact?(circle): Yes No Not Used

Sampler (Print/Affiliation): _____ Signature: _____

Client / Sample ID	Sample Collection Beginning Date	Beginning Time	Ending Date	Ending Time	Sample Type Grab	Comp.	Volume	Preservation (i.e.: 0-6°C)	Matrix (Liq., Soil, Sediment, etc.)	Test Requested: RBT						Sample Temp. Upon Arrival (Therm. # 12L) °C	Lab Sample ID
AC3EFFI21720	12/17/20	1030	12/17/20	1130	X		2.5G	0-6°C	L	X						1.9	34645
AC3EFFI21720	12/17/20	1030	12/17/20	1130	X		2.5G	0-6°C	L	X							

Sample Relinquished By: (Print Name/Affiliation)	Date	Received By: (Print Name/Affiliation)	Date
Bob Rader / CEC	12/17/20		
Signature: Robert M. Rader	Time: 1400	Signature:	Time:
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation)	Date:
Signature:	Time:	Signature:	Time:
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation) Emma M Campbell/TRE	Date: 12/18/20
Signature:	Time:	Signature: Emma M Campbell	Time: 0800

Laboratory (Destination):

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A
Fort Collins, CO 80524
(970) 416-0916
(970) 490-2963 (FAX)

Sample Shipped Via (circle): **FedEx** **Other** **UPS** **Courier**

Temp Blank? Yes No

Received on Ice: Yes No

Comments:

Effective Date: 02/13/19

Serial No. 05637

APPENDIX B

Test Data

QA Form No. 051
Revision 4
Effective 1/96

QA NSW 1/7/21

TOXICITY DATA PACKAGE COVER SHEET

Test Type: Acute

Project Number: 14001-475-062

Test Substance: Effluent (AC3EFF)

Species: *Oncorhynchus mykiss*

Dilution Water Type: Hard

Organism Lot or Batch Number: 20-031

Concurrent Control Water Type: N/A

Age: 35 d

Supplier: Trout Lodge

Date and Time Test Began: 12/14/20 @ 1115

Date and Time Test Ended: 12/22/20 @ 1130

Protocol Number: USEPA 2002, method 2019.0

Investigator(s): MS/EE/CP/SK

Background Information

pH control?: Yes **No**

Type of Test: Static-Renewal (at 48 hr)

If yes, give % CO_2: NA

Test Temperature: 12 ± 1 °C

Env. Chmbr/**Bath #**: 1 Test Chmbrs: 4L

Photoperiod: 16 h light : 8 h dark

Light Intensity: 50-100 ft. c.

Test Solution Vol.: 2 L

Number of Replicates per Treatment: 2

Length of Test: 96 h

Number of Organisms per Replicate: 10

Type of Food and Quantity per Chamber: NONE

Feeding Frequency: NA

Test Substance Characterization Parameters and Frequency:

Hardness: Sx Receipt Alkalinity: Sx Receipt NH_3: Sx Receipt TRC: Sx Receipt

pH: Daily Conductivity: Initiation and Renewal

Test Concentrations (Volume:Volume): Hard, 25, 50, 100%

Agency Summary Sheet(s)?: N/A

Reference Toxicant Data: Test Dates: 12/18/20 to 12/22/20 LC_{50}: 10640

Hist. 95% Control Limits: 3644 to 10840 Method for Determining Ref. Tox. Value: SK

Special Procedures and Considerations:

D.O. maintained ≥ 4.0 mg/L

* Conductivity measured in all treatments in new test solutions at test initiation and renewal

-Measure Temp in reps Daily -Measure pH and D.O in one rep Daily

Appropriate correction factors have been applied to all temperatures recorded in this data package

Study Director Initials: NZW Date: 12/17/20

QA MW 1/7/21

TEST SUBSTANCE USAGE LOG

Project Number: 14001-475-062

	Sample 1	Sample 2	Sample 3
Test Substance Number	34645		
Test Substance Collection Date and Time	From: 12/17/20 @ 1030	From: @	From: @
	To: 12/17/20 @ 1130	To: @	To: @
Sample Type (Grab or Comp)			
Date Test Substance Received	12/18/20		
Dilution Water Number RW# or TRE#, circle one	14137/14140*		
Concurrent Control Water RW#	NA		
Date(s) Used	12/18/20		
	12/20/20*		

Preparation of Test Solutions

Test Substance Conc. (% Effluent)	Test Substance Volume (ml)	Control Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)
0%	0	4000	4000						
25%	1000	3000	4000						
50%	2000	2000	4000						
100%	4000	0	4000						
Total	7000	9000	16000						

Initials / Date	AB 12/18/20		
Initials / Date	SK 12/20/20		
Initials / Date			
Initials / Date			
Initials / Date			
Initials / Date			
Initials / Date			
Initials / Date			

QA 1/7/21

ACUTE BIOLOGICAL DATA

Project Number: 14001-475-062

Test Species: ***Oncorhynchus mykiss***

Trt.	Test Replicate	Number of Surviving Organisms 0 Hours	24 Hours	48 Hours	72 Hours	96 Hours	Remarks % Survival
~~MH~~ 0 (1)	A	10	10	10	10	10	100
	B	10	10	10	10	10	
	C						
	D						
25%	A	10	10	10	10	10	100
	B	10	10	10	10	10	
	C						
	D						
50%	A	10	10	10	10	10	100
	B	10	10	10	10	10	
	C						
	D						
100%	A	10	10	10	10	10	100
	B	10	10	10	10	10	
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
Date:		12/18/20	12/19/20	12/20/20	12/21/20	12/22/20	
Time:		1115	1305	1230	0930	1130	
Initials:		MJ/EL	CP	SK	SK	SK	

(1) 1/7/21 E

EA [illegible] 1/7/21

Project Number:	14001-475-062
Test Species:	***Oncorhynchus mykiss***

WER CHEMICAL DATA

Conc.	Rep	Dissolved Oxygen (mg/L) Day 0 NEW	Day 1 OLD	Day 2 NEW	Day 2 OLD	Day 3 OLD	Day 4 OLD	Temperature (°C) Day 0 NEW	Day 1 OLD	Day 2 NEW	Day 2 OLD	Day 3 OLD	Day 4 OLD	pH (s.u.) Day 0 NEW	Day 1 OLD	Day 2 NEW	Day 2 OLD	Day 3 OLD	Day 4 OLD	Cond. (uS/cm) Day 0 NEW	Day 2 NEW
① MM control	A	6.9	7.9	7.8	7.4 ~~8.1~~			12	11	12	12			8.1	8.0	8.2	8.1			528	492
	B					7.7	7.6	12		12		12	12					7.8	7.8		
25%	A	7.8	8.0	8.1	7.5			12	11	12	12			8.0	8.0	8.2	8.1			738	753
	B					7.5	7.8	12		12		12	12					8.2	7.8		
50%	A	7.9	8.0	8.2	7.6			12	11	12	12			7.8	7.9	8.1	8.1			893	915
	B					7.7	8.0	12		12		12	12					8.1	7.9		
100%	A	7.7	7.9	8.3	7.8			12	11	12	12			7.5	7.8	7.8	8.1			1197	1255
	B					7.7	8.1	12		12		12	12					7.8	7.8		
	A																				
	B																				
	A																				
	B																				
	A																				
	B																				
	A																				
	B																				
Meter#:		17	17	17	17	18	17	L42	L-39	L-43	L-36	L-36	L-36	FM31	FM31	FM30	FM30	FM30	FM31	15	15
Date:		12/18/20	12/19/20	12/20/20	12/20/20	12/21/20	12/22/20	12/18/20	12/19/20	12/20/20	12/20/20	12/21/20	12/22/20	12/18/20	12/19/20	12/20/20	12/20/20	12/21/20	12/22/20	12/18/20	12/20/20
Time:		1105	1305	1130	1150	0950	1130	1105	1305	1130	1150	0930	1130	1105	1305	1130	1150	0950	1130	1105	1130
Initials:		AM	CP	SK	SK	SK	SK	AM	CP	SK	SK	SK	SK	AM	CP	SK	SK	SK	SK	AM	SK

	Hardness (mg/L as CaCO3)	Alkalinity (mg/L as CaCO3)	TRC (mg/L)	NH3-N (mg/L)	Date	Time	Initials
Value:	660	82	<0.02	<1.0	12/18/20	1530	AS for VS
Meter:			22	HA3			

Note: Hardness, alkalinity, TRC, and NH3 data appearing on this page have been transcribed from the wet chemistry log, FCETL QA Form No. 084

① SK 12/20/20 WP (7.4)

QA rev 1/7/21

DAILY TOXICITY TEST LOG

Project Number:	14001-475-062
Test Species:	***Oncorhynchus mykiss***

General Comments	Random Chart ID : Bubbles	Feeding NONE	Initials/ Date
Test Day 0	Test solution added to test chambers at: 1115 Initials: M Test Organisms Added at: 1100	None	AS/EE 12/18/20
Test Day 1	Real time temp= 11 °C Range = 11 - 11 °C	NONE	CP 12/19/20
Test Day 2	Real time temp= 10 °C Range = 9 - 11 °C	None	SK 12/20/20
Test Day 3	Real time temp= 11 °C Range = 9-11 °C	None	SK 12/21/20
Test Day 4	Real time temp= 11 °C Range = 11-11 °C	None	SK 12/22/20

RAINBOW TROUT LENGTHS, WEIGHTS, AND LOADING OF CONTROL ORGANISMS

QA [illegible] 1/4/20

Project Number: 14001-475-062	Test Substance: Effluent (AC3EFF)	Comments:
Species: O. mykiss	Analyst: SK/M	
Date/Time of Measurements: 12/22/20 @ 1145	Balance ID: A+D #2 Oven ID (if used):	
Weight Type (Circle): Wet (Blot Dry) Dry (>100°C) AFDW (>500°C) Other:		Lot Number: 20-031
Measurement Type (Circle): Pre-weight (Post-weight)		Organism age: ~~39~~ 35 days post hatch 16d post swimup

No.	Treatment/ Replicate	Length (mm)	Net Weight (g)	No.	Treatment/ Replicate	Length (mm)	Net Weight (g)	No.	Treatment/ Replicate	Length (mm)	Net Weight (g)
1	Control A	24	0.0961	1	Control B	25	0.1022	1	Control C		
2		23	0.0958	2		23	0.0934	2			
3		22	0.0697	3		23	0.0989	3			
4		23	0.1026	4		23	0.0925	4			
5		25	0.1282	5		24	0.0985	5			
6		24	0.1268	6		24	0.0974	6			
7		23	0.1019	7		22	0.0888	7			
8		22	0.0908	8		23	0.0917	8			
9		20	0.0688	9		22	0.0803	9			
10		24	0.1113	10		24	0.1086	10			

Length Calculations	
Max: 25	Min: 20
Mean: 23.2	
Ratio (long/short): 1.25	

Weight Calculations	
Max: 0.1282	Min: 0.0688
Mean: 0.0972	
Test Solution Volume: 2L	Loading Rate (g/L): 0.486

GA 12/7/20

Initial weights for RBT for 475 **AC3EFF**
Dec 2020

	wt (g)	Length (mm)
1	0.0961	24
2	0.0958	23
3	0.0697	22
4	0.1026	23
5	0.1282	25
6	0.1268	24
7	0.1019	23
8	0.0908	22
9	0.0688	20
10	0.1113	24
11	0.1022	25
12	0.0934	23
13	0.0989	23
14	0.0925	23
15	0.0985	24
16	0.0974	24
17	0.0888	22
18	0.0917	23
19	0.0803	22
20	0.1086	24
sum =	1.9443	463
avg =	0.0972	23.15
Max	0.1282	25
Min	0.0688	20
count	20	20

1.25 Ratio (long / short)

overall avg =	**0.0972**
count per tank	**10**
mass per tank (g)	**0.9722**
Test soln vol (L):	**2**
Loading Rate (g/L)	**0.486**

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A, fort Collins, Colorado 80524
T 970.416.0916 F 970.490.2963

TRE Environmental Strategies

January 11, 2021

Mr. Kevin Pfeifer
Copper Environmental Consulting
406 East Park Avenue, Suite 2
Anaconda, MT 59711

Subject: Results of RBT test(s) – December 2020

Dear Mr. Pfeifer:

Attached are copies of the acute toxicity test reports using *Oncorhynchus mykiss* with samples received on December 22, 2020.

We appreciate the opportunity to complete these studies for Copper Environmental Consulting. Please do not hesitate to contact us if you have any questions.

Sincerely,

Whitney Naddy
Report Author
naddywm.tre@gmail.com

Rami B. Naddy, Ph.D.
Manager / Study Director
naddyrb.tre@gmail.com

Attachment:

14001-475-063
14001-475-064
14001-475-065

Report of Acute Toxicity Testing using the Rainbow Trout (*Oncorhynchus mykiss*)

Project ID: 14001-475-063
December 2020

Sponsor and Laboratory Information

Sponsor	Copper Environmental Consulting 406 East Park Avenue, Suite 2 Anaconda, MT 59711
Project Officer	Kevin Pfeifer (406) 563-2700, ext. 310
Testing Facility	TRE Environmental Strategies, LLC 100 Racquette Drive, Unit A Fort Collins, CO 80524 Fax: (970) 490-2963 State of Florida NELAP Laboratory ID: E87972
Study Director	Rami B. Naddy, Ph.D. (970) 416-0916 email: naddyrb.tre@gmail.com
Report Author	Amanda Bidlack (970) 416-0916 email: bidlackac.tre@gmail.com

Test Information

Test	Acute Toxicity under Static-Renewal Conditions
Basis	USEPA (2002), method 2019.0
Test Dates and Time	December 22, 2020 @ 1545 to December 26, 2020 @ 1455
Test Length	96 hours
Species	*Oncorhynchus mykiss*
Test Material	Effluent (Grab) – DR-2
Permit Number	N/A
Dilution Water	Hard Reconstituted Water
Test Concentrations	0 (Control), 25, 50, and 100% effluent

- *Results described in this report apply only to the samples submitted to the laboratory and analyzed, as listed in the report*
- *Test results comply with NELAC standards. Reports are intended to be considered in their entirety; TRE is not responsible for consequences arising from use of a partial report*
- *This report contains 6 pages plus 2 appendices*

Effluent Collection and Receipt

Sample No.	Field No.	Collection Date & Time	TRE No.	Date of Receipt	Temp. at Arrival (°C)	Qual.
1	DR-2-20201221	12/21/20 @ 1130 – 1210	34649	12/22/20	3.9	

Note: See Appendix A for chain of custody records

Effluent Characterization

Sample No.	pH	Hard. (mg/L)[HA]	Alk. (mg/L)[HA]	Spec. Cond. (µS/cm)	TRC (mg/L)[G]	NH_3-N (mg/L)
1	8.0	208	112	428	<0.02	<1.0

Initial Dilution/Control Water Characterization

Batch No.	pH	Hard. (mg/L)[HA]	Alk. (mg/L)[HA]	Spec. Cond. (µS/cm)	TRC (mg/L)[G]	NH_3-N (mg/L)
14140	8.1	172	111	278	0.03	<1.0

Test Conditions

Type	Static-Renewal Acute
Test Endpoints	Survival
Test Chambers	4L glass aquaria
Test Solution Volume	2L
Replicates per Treatment	2
Organisms per Replicate	10
Test Temperature	12 ± 1°C (≤3°C differential)
Lighting	Fluorescent, 16 hours light:8 hours dark
Chamber Placement	Random according to computer-generated chart
Aeration?	[X] No [ ] Yes
Test Solution Renewal	At 48 Hours

Test Organism

Species	*Oncorhynchus mykiss*
Age	39 days post hatch/ 20 days post swim-up
Source	Trout Lodge, Lot No. 20-031
Average wet weight (g)	0.1237
Loading Rate (g/L)	0.619
Ratio (long/short)	1.29
Acclimation	Hard Water
Feeding	Off food for 48h prior to testing; no food during testing
Reference Toxicant Testing	Initiated December 18, 2020 using sodium chloride (NaCl)

TEST RESULTS

Biological Data

Test Concentration (% Effluent)	Percent Survival of *Pimephales promelas*			
	24 hours	48 hours	72 hours	96 hours
0 (Control)	100	100	100	100
25	100	100	100	100
50	100	100	100	100
100	100	100	100	100
Control Performance	Acceptable			

Note: See Appendix B for copies of laboratory data sheets

Data Analysis and Test Endpoints

Biological Endpoint	Statistical Endpoint	Value (% Effluent)
Survival	96-hour LC_{50}	>100

Note: Analyses completed using, where appropriate, CETIS version 1.8.7 (2014)

Physical and Chemical Data

Treatment (% Effluent)	pH		Dissolved Oxygen (mg/L)		Conductivity (µS/cm)		Temperature (°C)		Qual.
	Low	High	Low	High	Low	High	Low	High	
0 (Control)	8.1	8.4	7.4	8.2	548	574	10	13	T1
100	8.0	8.3	7.4	9.0	428	435	9	12	T1
All Treatments	8.0	8.4	≥7.4		NA		9	13	T2, T3
							8	12	T4

Reference Toxicant Test Results for *O. mykiss*

96-Hour LC_{50} (mg Cl^-/L)	TRE Historical 95% Control Limits (mg Cl^-/L)	
	Low	High
10,640	3,644	10,840

References

CETIS. 2014. Comprehensive Environmental Toxicity Information System. User Guide (version 1.8.7). Tidepool Scientific, LLC. McKinleyville, CA.

USEPA. 2002. Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms. Fifth Edition, EPA-821-R-02-012.

Explanation of Qualifiers

Note: study-specific narratives within the body of the report are denoted, if necessary, with the superscript letters **a - d**, and associated footnotes. Other qualifications and definitions are defined below.

S -	Sample temperature upon receipt was outside the range recommended by USEPA (2002), (i.e., 0 to 6ºC or ambient if collected and used on the same day).
I -	Ice was present in the sample upon receipt.
N1 -	Sample was not used for testing.
N2 -	Liquid from container with ice was not used for testing.
F -	Sample was filtered to remove indigenous organisms prior to use.
HT -	Sample hold time (normally 36 hours) was exceeded.
HA -	Hardness and alkalinity concentrations are presented as $CaCO_3$.
G -	TRC = Total Residual Chlorine
T1 -	Temperatures measured in some of the old test solutions were outside the recommended test temperature range but the allowed 3ºC differential was not exceeded.
T2 -	Temperatures measured in some of the old test solutions were outside the recommended test temperature range and the allowed 3ºC differential was exceeded.
T3 -	Temperatures measured in test solutions.
T4 -	Continuous temperatures measured in the environmental chamber or water bath.
X1 -	Mean young per original female. If any 4th or higher broods were produced, they were excluded from calculation of mean young per female and statistical analysis of reproduction.
X2 -	One or more organisms in this treatment were lost or not found in the test chamber and were excluded from analysis, as the loss was attributed to technician error. See laboratory data sheets for additional detail, as appropriate.
X3 -	One or more male *C. dubia* were found in this treatment and were included in analysis of survival but excluded from analysis of reproduction. See laboratory data sheets for additional detail, as appropriate.
X4 -	One or more fish were alive at test termination but were lost during the drying/weighing process. These fish were included in analysis of survival but excluded from analysis of growth. See laboratory data sheets for additional detail, as appropriate.
O1 -	Dissolved oxygen concentrations were ≤ 4.0 mg/L in one or more treatments during the test; aeration was initiated in all test chambers. See laboratory data sheets for additional detail, as appropriate.
O2 -	Dissolved oxygen concentrations ≤ 4.0 mg/L were observed in one or more treatments only at test termination.
O3 -	Dissolved oxygen concentrations were ≤ 4.0 mg/L in one or more treatments during the test but aeration was not possible. See laboratory data sheets for additional detail, as appropriate.
W1 -	Weight per original number of organisms introduced at test initiation.
W2 -	Weight per surviving number of organisms at test termination.
V1 -	Value was statistically (α=0.05 or 0.01, as appropriate) reduced relative to the control, but was considered a Type I error (anomalous false positive), and was disregarded. The NOEC was interpreted accordingly.
V2 -	Value was not statistically (α=0.05 or 0.01, as appropriate) less than the control, but was considered a Type II error (anomalous false negative). The NOEC was interpreted accordingly.
P1 -	PMSD was below the lower bound indicated by USEPA (2002). A statistically significant reduction for a treatment was disregarded if the RPD for that treatment was less than the lower bound.
P2 -	PMSD was above the upper bound indicated by USEPA (2002), and statistically significant reductions in organism performance were detected.
P3 -	PMSD was above the upper bound indicated by USEPA (2002), and no statistically significant reductions in organism performance were detected.
R -	Monthly reference toxicant test endpoint for this species was outside the 95% control limits for the 20 most recent endpoints.

Statement of Quality Assurance

The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with the protocol (if applicable) and standard operating procedures, and that the resulting data and report meet the requirements of the NELAC standards. This report is an accurate reflection of the raw data.

Quality Assurance Unit — Date: January 8, 2021

Data Analyst — Date: January 11, 2021

APPENDIX A

Chain of Custody Records

TRE Environmental Strategies, LLC - Chain of Custody

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

Client/Project Name: Copper Environ. Consulting

Project #: 14001-475 (061-063)

Chain of Custody Tape #: 497763 Intact? (circle): Yes No Not Used

Sampler (Print/Affiliation): _____ Signature: _____

Client / Sample ID	Sample Collection Beginning Date	Beginning Time	Ending Date	Ending Time	Sample Type Grab	Comp.	Volume	Preservation (i.e.: 0-6°C)	Matrix (Liq., Soil, Sediment, etc.)	Test Requested: RDT						Sample Temp. Upon Arrival (Therm. #2) °C	Lab Sample ID
DR-2-20001221	12/21/20	1130	12/21/20	1210			2.5G	0-6°C	L	X						3.9	34649
DR-2-20001221	12/21/20	1130	12/21/20	1210			2.5G	0-6°C	L	X							

Sample Relinquished By: (Print Name/Affiliation)	Date	Received By: (Print Name/Affiliation)	Date
Mackenzie Turton / CEC	12/21/20		
Signature:	Time: 1400	Signature:	Time:
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation)	Date:
Signature:	Time:	Signature:	Time:
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation) Stephanie Kent / TRE	Date: 12/22/20
Signature:	Time:	Signature:	Time: 0900

Laboratory (Destination):

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A
Fort Collins, CO 80524
(970) 416-0916
(970) 490-2963 (FAX)

Sample Shipped Via (circle): **FedEx** **Other** **UPS** **Courier**

Temp Blank? Yes No

Received on Ice: Yes No

Comments:

Effective Date: 02/13/19

Serial No. 05629

TRE Environmental Strategies, LLC - Chain of Custody

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

Client/Project Name: Copper Environ. Consulting

Project #: 14001-475 (001 - 003)

Chain of Custody Tape #: 49757 Intact?(circle): Yes No Not Used

Sampler (Print/Affiliation): _____ Signature: _____

Client / Sample ID	Sample Collection Beginning Date	Beginning Time	Ending Date	Ending Time	Sample Type Grab	Comp.	Volume	Preservation (i.e.: 0-6°C)	Matrix (Liq., Soil, Sediment, etc.)	RBT						Sample Temp. Upon Arrival (Therm. # 121) °C	Lab Sample ID
DR-6_20201221	12/21/20	1035	12/21/20	1115			2.5G	0-6°C	L	X						3.9	34650
~~DR-2_20201221~~	12/21/20	1130	12/21/20	1210			2.5G	0-6°C	L	X						3.9	34649
DR-2_20201221																	

MT 12/21/20

Sample Relinquished By: (Print Name/Affiliation)	Date	Received By: (Print Name/Affiliation)	Date
Mackenzie Turner / CEC	12/21/20		
Signature:	Time: 1400	Signature:	Time:
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation)	Date:
Signature:	Time:	Signature:	Time:
Sample Relinquished By: (Print Name/Affiliation)	Date:	Received By: (Print Name/Affiliation) Erin Nace / TRE	Date: 12/22/20
Signature:	Time:	Signature:	Time: 0845

Laboratory (Destination):

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A
Fort Collins, CO 80524
(970) 416-0916
(970) 490-2963 (FAX)

Sample Shipped Via (circle): FedEx Other UPS Courier

Temp Blank? Yes No

Received on Ice: Yes No

Comments:

Effective Date: 02/13/19

Serial No. 05631

APPENDIX B

Test Data

QA NZW 1/8/21

TOXICITY DATA PACKAGE COVER SHEET

Test Type: Acute

Project Number: 14001-475-063

Test Substance: Effluent (DR-2)

Species: *Oncorhynchus mykiss*

Dilution Water Type: Hard

Organism Lot or Batch Number: 20-031

Concurrent Control Water Type: N/A

Age: 39 d

Supplier: Trout Lodge

Date and Time Test Began: 12/22/20 @ 1545

Date and Time Test Ended: 12/24/20 @ 1455

Protocol Number: USEPA 2002, method 2019.0

Investigator(s): CP/AM/SK/EN

Background Information

pH control?: Yes **No**

Type of Test: Static-Renewal (at 48 hr)

If yes, give % CO_2: NA

Test Temperature: 12 ± 1 °C

Env. Chmbr/**Bath #**: 1 Test Chmbrs: 4 L

Photoperiod: 16 h light : 8 h dark

Light Intensity: 50-100 ft. c.

Test Solution Vol.: 2 L

Number of Replicates per Treatment: 2

Length of Test: 96 h

Number of Organisms per Replicate: 10

Type of Food and Quantity per Chamber: NONE

Feeding Frequency: NA

Test Substance Characterization Parameters and Frequency:

Hardness: Sx Receipt Alkalinity: Sx Receipt NH_3: Sx Receipt TRC: Sx Receipt

pH: Daily Conductivity: Initiation and Renewal

Test Concentrations (Volume:Volume): Hard, 25, 50, 100%

Agency Summary Sheet(s)?: N/A

Reference Toxicant Data:	Test Dates: 12/18/20 to 12/22/20		LC_{50}: 10,640
Hist. 95% Control Limits: 3644	to 10 840	Method for Determining Ref. Tox. Value:	SK

Special Procedures and Considerations:

D.O. maintained ≥ 4.0 mg/L

* Conductivity measured in all treatments in new test solutions at test initiation and renewal

-Measure Temp in reps Daily -Measure pH and D.O in one rep Daily

Appropriate correction factors have been applied to all temperatures recorded in this data package

Study Director Initials: NZW Date: 12/21/20

TEST SUBSTANCE USAGE LOG

QA 1/8/21

Project Number: 14001-475-063

	Sample 1	Sample 2	Sample 3
Test Substance Number	34649		
Test Substance Collection Date and Time	From: 12/21/20 @ 1130	From: @	From: @
	To: 12/21/20 @ 1210	To: @	To: @
Sample Type (Grab or Comp)			
Date Test Substance Received	12/22/20		
Dilution Water Number RW# or TRE#, circle one	14140		
Concurrent Control Water RW#	NA		
Date(s) Used	12/22/20		
	12/24/20		

Preparation of Test Solutions

Test Substance Conc. (% Effluent)	Test Substance Volume (ml)	Control Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)
0%	0	4000	4000						
25%	1000	3000	4000						
50%	2000	2000	4000						
100%	4000	0	4000						
Total	7000	9000	16000						

Initials / Date	CP 12/22/20 Mixed RBT		
Initials / Date	EN 12/24/20 " "		
Initials / Date			
Initials / Date			
Initials / Date			
Initials / Date			
Initials / Date			
Initials / Date			

QA Form No. 052
Revision 2
Effective 1/96

QA 1SW 1/8/21

ACUTE BIOLOGICAL DATA

Project Number: 14001-475-063

Test Species: ***Oncorhynchus mykiss***

% survival

Trt.	Test Replicate	Number of Surviving Organisms 0 Hours	24 Hours	48 Hours	72 Hours	96 Hours	Remarks
MH	A	10	10	10	10	10	100
	B	10	10	10	10	10	
	C						
	D						
25%	A	10	10	10	10	10	100
	B	10	10	10	10	10	
	C						
	D						
50%	A	10	10	10	10	10	100
	B	10	10	10	10	10	
	C						
	D						
100%	A	10	10	10	10	10	100
	B	10	10	10	10	10	
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
Date:		12/22/20	12/23/20	10/24/20	12/25/20	12/26/20	
Time:		1545	1045	1530	1300	1455	
Initials:		CP/RB	SK	EN	SK	SK	

QA NBN 1/8/21

Project Number:	14001-475-063
Test Species:	***Oncorhynchus mykiss***

WER CHEMICAL DATA

Conc.	Rep	Dissolved Oxygen (mg/L) Day 0 NEW	Day 1 OLD	Day 2 NEW	Day 2 OLD	Day 3 OLD	Day 4 OLD	Temperature (°C) Day 0 NEW	Day 1 OLD	Day 2 NEW	Day 2 OLD	Day 3 OLD	Day 4 OLD	pH (s.u.) Day 0 NEW	Day 1 OLD	Day 2 NEW	Day 2 OLD	Day 3 OLD	Day 4 OLD	Cond. (uS/cm) Day 0 NEW	Day 2 NEW
MH	A	7.4		7.9	7.9			12		12	11			8.3		8.4	8.1		8.3	548	574
	B		8.2			7.9	7.5	12	10 △			12	13		8.3			8.2			
25%	A	7.7		8.1	7.6			12		*	11			8.2		8.4	8.2			535	545
	B		8.0			7.9	7.4	12	9 △			12	12		8.3			8.1	8.2		
50%	A	8.0		8.5	7.7			12		*	11			8.1		8.3	8.2		②2	504	513
	B		8.1			7.9	7.5	12	9 △			12	12		8.1			8.2	~~8.2~~		
100%	A	8.6		9.0	7.7			12		12	11			8.0		8.3	8.2			428	435
	B		8.1			7.8	7.4	12	9 △			12	12		8.3			8.1	8.2		
	A																				
	B																				
	A																				
	B																				
	A																				
	B																				
	A																				
	B																				
Meter#:		17	18	17	17	17	17	L-39	L-36	L35	L-35	L-36	L-36	FM31	FM30	FM31	FM31	FM31	FM31	15	15
Date:		12/22/20	12/23/20	12/24/20	12/24/20	12/25/20	12/26/20	12/22/20	12/23/20	12/24/20	12/24/20	12/25/20	12/26/20	12/22/20	12/23/20	12/24/20	12/24/20	12/25/20	12/26/20	12/22/20	12/24/20
Time:		1530	1045	1500	1500	1300	1500	1530	1045	1500	1500	1300	1500	1530	1045	1500	1500	1300	1500	1530	1500
Initials:		CP	~~CP~~ ①SK	EN	EN	SK	SK	CP	SK	EN	EN	SK	SK	CP	SK	EN	EN	SK	SK	CP	EN

	Hardness (mg/L as CaCO3)	Alkalinity (mg/L as CaCO3)	TRC (mg/L)	NH3-N (mg/L)	Date	Time	Initials
Value:	208	112	<0.02	<1.0	12/22/20	0925	EN for CP
Meter:	titr	titr	22	HA1			

Note: Hardness, alkalinity, TRC, and NH3 data appearing on this page have been transcribed from the wet chemistry log, FCETL QA Form No. 084

① CP 12/22/20, WP

② SK 12/26/20; E (8.2)

△ Checked all reps

QA NSW 1/8/21

DAILY TOXICITY TEST LOG

Project Number:	14001-475-063
Test Species:	***Oncorhynchus mykiss***

General Comments	Random Chart ID : Bubbles	Feeding NONE	Initials/ Date
Test Day 0	Test solution added to test chambers at: 1530 Initials: CP Test Organisms Added at: 1545	NONE	CP/JS 12/22/20
Test Day 1	Real time temp= 8 °C Range = 8-11 °C	None	SK 12/23/20
Test Day 2	Real time temp= 9 °C Range = 9-★ °C	None	EN 12/24/20
Test Day 3	Real time temp= 9 °C Range = 9-11 °C	None	SK 12/25/20
Test Day 4	Real time temp= 10 °C Range = 9-12 °C	None	JK 12/26/20

★ meter error

RAINBOW TROUT LENGTHS, WEIGHTS, AND LOADING OF CONTROL ORGANISMS

QA rev 1/8/21

Project Number: 14001-475-063	Test Substance: Effluent (DR-2)	Comments:
Species: O. mykiss	Analyst: SKI	
Date/Time of Measurements: 12/26/20 @1520	Balance ID: A+D Oven ID (if used):	
Weight Type (Circle): Wet Blot Dry Dry (>100°C) AFDW (>500°C) Other:		Lot Number: 20-031
Measurement Type (Circle): Pre-weight Post-weight		Organism age: ① ~~39~~ ~~43~~ 43 days post hatch ② ~~24~~ 24 days post swimup

No.	Treatment/ Replicate	Length (mm)	Net Weight (g)	No.	Treatment/ Replicate	Length (mm)	Net Weight (g)	No.	Treatment/ Replicate	Length (mm)	Net Weight (g)
1	Control A	26	0.1453	1	Control B	24	0.1435	1	Control C		
2		25	0.1474	2		21	0.0777	2			
3		25	0.1395	3		24	0.1259	3			
4		24	0.1108	4		25	0.1388	4			
5		25	0.1122	5		22	0.1112	5			
6		27	0.1647	6		25	0.1352	6			
7		23	0.1089	7		25	0.1316	7			
8		24	0.1432	8		23	0.0985	8			
9		25	0.1204	9		23	0.1078	9			
10		23	0.1086	10		24	0.1031	10			

Length Calculations	
Max: 27	Min: 21
Mean: 24.15	
Ratio (long/short): 1.29	

Weight Calculations	
Max: 0.1647	Min: 0.0777
Mean: 0.1237	
Test Solution Volume: 2L	Loading Rate (g/L): 0.619

Draw 1/8/21 CF: at test end orgs were 43 days post hatch & 24 d post swimup

DR KRW 1/8/21

Initial weights for RBT for 475 **DR-2**
Dec 2020

	wt (g)	Length (mm)
1	0.1453	26
2	0.1474	25
3	0.1395	25
4	0.1108	24
5	0.1122	25
6	0.1647	27
7	0.1089	23
8	0.1432	24
9	0.1204	25
10	0.1086	23
11	0.1435	24
12	0.0777	21
13	0.1259	24
14	0.1388	25
15	0.1112	22
16	0.1352	25
17	0.1316	25
18	0.0985	23
19	0.1078	23
20	0.1031	24
sum =	2.4743	483
avg =	0.1237	24.15
Max	0.1647	27
Min	0.0777	21
count	20	20

1.29 Ratio (long / short)

overall avg =	**0.1237**
count per tank	**10**
mass per tank (g)	**1.2372**
Test soln vol (L):	**2**
Loading Rate (g/L)	**0.619**

APPENDIX B: TECHNICAL MEMORANDUM: WHOLE EFFLUENT TOXICITY (WET) TESTING RICO-ARGENTINE MINE SITE

Copper Environmental Consulting
A PRISM SPECTRUM COMPANY

406 E. Park Avenue, Suite 2
Anaconda, Montana 59711
(406) 563-2700
Fax: (406) 563-2701

TECHNICAL MEMORANDUM

To: Steve Ferry, Atlantic Richfield
Sandy Riese, EnSci
Irene Montero, Atlantic Richfield
Terry Moore, EnSci

Project: 70817

From: Brandt Wright, CEC
Barry Fulton, Benchmark Environmental

cc: Kevin Pfeifer, CEC
Brian Park, CEC
Alex Wing, CEC

Tel: (406) 563-2700

Date: July 22, 2020

Subject: Whole Effluent Toxicity (WET) Testing
Rico-Argentine Mine Site
Rico, Colorado

BACKGROUND

Copper Environmental Consulting (CEC), with assistance from Benchmark Environmental, has prepared this technical memorandum to provide a procedure and describe the analytical methods for whole effluent toxicity (WET) testing of the Enhanced Wetland Demonstration (EWD), Dolores River and the St. Louis Ponds System at the Rico-Argentine Mine Site (site).

WET testing has never been performed on the EWD treatment system effluent. This WET testing is anticipated to support future full-scale treatment system design at the SLT, development of performance criteria and full-scale treatment system performance evaluation. WET testing will be performed twice during the 2020 field season. The first round of samples will be collected during the summer of 2020 and represent higher river flow, lower hardness conditions. The second round of samples will be collected during the late fall of 2020 and represent lower river flow, higher hardness conditions. Additional WET testing may be performed in 2021 if either round of sampling is not completed in ideal conditions, if additional data is needed based on the data collected in the first two rounds, and/or if there is a freshet in 2021 and it is determined that testing during a freshet will provide additional data of value. Acute and chronic WET testing will be performed on samples from the following locations (see Attachment A):

- AC3EFF (EWD discharge to Pond 12);
- DR-2 (Dolores River directly upstream of the St. Louis Pond System discharge); and
- DR-6 (St. Louis Ponds System discharge to Dolores River).

The second round of testing will be modified as needed based upon the results of the first round of testing. Modifications may include; but are not limited to addition/removal of select sampling

locations and additional analytical testing. Results will be used to help facilitate future treatment system design and provide a baseline for future comparison for water treatment system performance evaluation. Results will be summarized in a technical memorandum.

This memo includes discussion of the following items:

- Scope of Work – a detailed description of the scope of work;
- Health and Safety – health and safety considerations for the work; and
- Schedule – the anticipated schedule for the WET testing activities.

SCOPE OF WORK

The following presents a detailed scope of work description.

Task 1 – Water Quality Sample Collection and Analyses

Water quality samples will be collected from AC3EFF, DR-2, and DR-6 according to *SOP – Wetlands Sampling* and the *Quality Assurance Project Plan* (QAPP). The sample locations are shown in Attachment A. The water quality samples will be collected concurrently and at the same location with the WET test samples. The field parameters outlined in Table 1 will be collected during sampling. Laboratory analyses will be conducted for the analytes in Table 1 by Pace Analytical Services in Lenexa, Kansas.

Table 1: Field Parameters and Analytes

Field Parameter/Analyte	Method
Temperature	Field
pH	Field
Dissolved Oxygen	Field
Specific Conductance	Field
Oxidation-Reduction Potential	Field
Turbidity	Field
Total and Dissolved Metals	
Aluminum	EPA 200.8
Arsenic	EPA 200.8
Boron	EPA 200.7
Cadmium	EPA 200.8
Calcium	EPA 200.7
Chromium	EPA 200.8
Copper	EPA 200.8
Iron	EPA 200.8
Lead	EPA 200.8
Magnesium	EPA 200.7
Manganese	EPA 200.8
Mercury	EPA 245.1
Molybdenum	EPA 200.8

Field Parameter/Analyte	Method
Nickel	EPA 200.8
Potassium	EPA 200.7
Selenium	EPA 200.8
Silicon	EPA 200.7
Silver	EPA 200.8
Sodium	EPA 200.7
Zinc	EPA 200.8
Alkalinity (Total as $CaCO_3$)	SM 2320B
Biochemical Oxygen Demand (BOD), 5 Day	SM 5210B
Chloride	EPA 300.0
Cyanide	SM 4500-CN-E
Dissolved Organic Carbon (Field Filtered)	SM 5310C
Nitrogen, Ammonia	EPA 350.1
Nitrogen, Nitrate plus Nitrite	EPA 353.2
Phosphorous	EPA 365.4
Sulfate	EPA 300.0
Total Dissolved Solids	SM 2540C
Total Hardness	SM 2340B
Total Organic Carbon	SM 5310C
Total Sulfide	SM 4500-S2-D
Total Suspended Solids	SM 2540D

Task 2 - WET Test Sample Collection

The following procedure will be utilized to collect samples for the WET testing:

- Collect non-preserved grab samples from AC3EFF, DR-2, and DR-6 according to *SOP – Wetlands Sampling*, the *Sampling and Analysis Plan* (SAP), the QAPP, and GEI Consultant's *Sampling Requirements Letter* (Attachment B). The samples will be collected in multiple cubitainers and labeled with the location, sample date, and sample time. Ensure that the samples collected have zero headspace and are placed on ice.
    - 2.5-gallon samples are required for acute WET tests.
    - 1-gallon samples are required for chronic WET tests.
- Prepare a Chain of Custody form and ship the samples via UPS Next Day Air to:

    GEI Consultants, Inc./Ecological Division.
    4601 DTC Boulevard
    Suite L100
    Denver, CO 80237
    (303) 662-0100

Task 3 – WET Testing

WET testing will be performed by GEI Consultants. The WET testing will consist of both acute and chronic WET tests. Test details are provided in Table 2 and Table 3 below.

Table 2: Acute WET Test Details

Testing Protocol	*Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms, Fifth Edition, October 2002 (EPA-821-R-02-012)*
Duration	48-hour static renewal for Invertebrates, 96-hour static renewal for Fish
Dilutions	100%, 80%, 60%, 40%, 20%, and 10%
Controls	One lab-dilution water control (0% effluent) and one high hardness lab control (0% effluent) at DR-6 hardness (approx. 750 mg/L based on mid-June 2020 sampling event). The ionic composition of the high hardness control will be similar to historical analytical data from DR-6.
Dilution Water	Synthetic water prepared by the lab according to EPA (2002). Synthetic water will have similar hardness to upstream Dolores River (DR-2) hardness during high-flow/freshet conditions (approx. 95 mg/L based on mid-June 2020 sampling event).
Temperature	25°C
Sample Volume Required	2.5-gallon grab sample collected once per sampling location
Invertebrate Species	Water Flea (*Ceriodaphnia Dubia*)
Fish Species	Fathead Minnow (*Pimephales promelas)*
Cost per Test (Invertebrates and Fish)	$769 (*C. dubia*) /$830 (*P. promelas*)

Table 3: Chronic WET Test Details

Testing Protocol	*Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, Fourth Edition, October 2002 (EPA-821-R-02-013)*
Duration	7-day static renewal
Dilutions	100%, 80%, 60%, 40%, 20% and 10%
Controls	One lab-dilution water control (0% effluent) and one high hardness lab control (0% effluent) at DR-6 hardness (approx. 750 mg/L based on mid-June 2020 sampling event). The ionic composition of the high hardness control will be similar to historical analytical data from DR-6.
Dilution Water	Synthetic water prepared by the lab according to EPA (2002). Synthetic water will have similar hardness to upstream Dolores River (DR-2) hardness during high-flow/ freshet conditions (approx. 95 mg/L based on mid-June 2020 sampling event).
Temperature	25°C
Sample Volume Required	1-gallon grab sample delivered to GEI on Tuesday, Thursday, and Saturday for a total of 3-gallons per sampling location
Invertebrate Species	Water Flea (*Ceriodaphnia dubia*)
Cost per Test (Invertebrates only)	$1,287

HEALTH AND SAFETY

Sample collection will be conducted in accordance with the Task Risk Assessment (*TRA_Rico_03*) that accompanies *SOP – Wetlands Sampling*, CEC's TSHASP, and the Rico HSSE Program Plan.

SCHEDULE

WET testing is anticipated to be split into multiple weeks to accommodate the laboratory analytical schedule. The AC3EFF and DR-6 sampling/testing are expected to occur the same week. DR-2 sampling/testing is anticipated to occur either the week before or the week after depending on lab availability. Laboratory availability is provided in Table 4.

Table 4: Laboratory Availability

Week of	Laboratory Availability
7/27/2020	1 Location
8/3/2020	1 Location (Possibly No Availability)
8/10/2020	2 Locations (Possibly 1 Location)
8/17/2020	2 Locations
8/24/2020	3 Locations

ATTACHMENTS

Attachment A – Sampling Locations Map
Attachment B – GEI Sampling Requirements Letter
Attachment C – GEI Chain of Custody

SCALE IN FEET
0 125 250

LEGEND:

● SAMPLING LOCATION

NO.	DATE	CADD	CHECK	APP'D	ISSUE/REVISION DESCRIPTION
1	6/19/20	KP	AW	KP	WET TESTING MEMO

Copper Environmental Consulting
A PRISM SPECTRUM COMPANY

406 East Park Ave. Suite 2
Anaconda, MT 59711
(406) 563-2700

ATLANTIC RICHFIELD CO.
RICO-ARGENTINE MINE SITE

SAMPLING LOCATIONS

ATTACHMENT
A

170524_RICO_UPPER_PONDS_MAP.dwg
3/19/2007

Consulting
Engineers and
Scientists

June 18, 2020

Kevin Pfeifer
Copper Environmental

Dear Mr. Pfeifer:

The acute and chronic *Ceriodaphnia dubia* and *Pimephales promelas* tests that you have requested will be run according to appropriate State or Federal biomonitoring regulations. Rinse the cubitainers with the test water several times before filling them with the sample. It is important to minimize the amount of air in the cubitainers and to keep the samples on ice at approximately 4°C to prevent volatile compounds from escaping during shipment. If your effluent has been chlorinated, total residual chlorine must be measured and reported on the chain-of-custody immediately following collection.

Samples need to be delivered or shipped so that they arrive at our lab by 10:30 am, as tests must be initiated within 36 hours of the sample time. Please be sure to fill out proper areas of the included chain-of-custody. GEI Consultants, Inc. requires the use of custody seals to detect unauthorized tampering of the samples during shipping. Fill out the seals with the sampler's signature and date. Attach the seal over the seam of the cooler before the sample leaves your possession. A broken custody seal upon receipt in the GEI lab indicates sample tampering and will require client authorization for use of the sample.

If you have any questions, please give us a call.

Sincerely,

GEI Consultants, Inc./Ecology Division

Natalie Love
Laboratory Director

www.geiconsultants.com

GEI Consultants, Inc./Ecological Division
4601 DTC Boulevard, Suite 900, Denver CO 80237
303.662.0100 fax: 303.662.8757

GEI Consultants, Inc./Ecological Division
4601 DTC BLVD., SUITE L100
DENVER, CO 80237
Main: (303) 662-0100 Lab: (303) 264-1120

BIOASSAY LABORATORY CHAIN-OF-CUSTODY

(GEI Use) Log Number _____

CLIENT/PROJECT_____

ADDRESS_____

CITY_____ STATE_____ZIP _____

PHONE #_____

PROJ. MANAGER_____ SAMPLER_____

					TESTS REQUIRED								CHLORINE		
					ACUTE				CHRONIC				Measured by: Client ☐ Lab ☐		
SAMPLE TYPE/SITE	Composite	Grab	Date Collected	Time Collected	CERIO	FATHEAD	DAPHNIA	TROUT	CERIO	FATHEAD	ALGAE	DAPHNIA	TRC (mg/L)	Date/Time Measured	COMMENTS:

PROJECT INFORMATION	LABORATORY RECEIVING INFORMATION	CLIENT
CLIENT DROP OFF: ☐ COURIER: UPS ☐ FEDEX ☐ OTHER ☐	CONDITION OF SAMPLE ON RECEIPT: CUSTODY SEAL INTACT?: YES ☐ NO ☐ N/A ☐	RELINQUISHED BY:_____ DATE/TIME: _____
TOTAL NUMBER OF CONTAINERS:	TEMPERATURE (°C): TEMPERATURE IN RANGE (0-6°C): YES ☐ NO ☐ IF NOT IN RANGE, SAMPLED SAME DAY, TEMP OK?: YES ☐ NO ☐	**LABORATORY** RECEIVED BY: _____ DATE/TIME: _____
COMMENTS:		

Updated 2019