

**WET TEST REPORT FORM – CHRONIC
pH ADJUSTED (~8.5) TEST**

Permittee: Elk Ridge Mining and Reclamation **Outfall:** 013

Permit No.: CO0000213

Test Type: Routine ☐ TIE ☒

Test Species: *Ceriodaphnia dubia*

IWC: 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1400	03-15-2018	1340	03-22-2018

Test Results	Lethality	Reproduction
IC ₂₅	>100%	53.7%

Dilution(s) - % Effluent

Measurements	Control (0%)	50%	60%	70%	100%	Method Control
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	100	100	100	100
% Survival for day 3	100	100	100	100	100	100
% Survival for day 4	100	100	80	100	80	100
% Survival for day 5	100	100	80	100	80	100
% Survival for day 6	100	100	80	100	80	80
% Survival for day 7	100	100	80	100	80	80
Mean 3 Brood Total	27.4	21.8	18.4	18.2	13.2	27.2

Recon Water: 87

Recon Water: 60

pH (initial/final) – Control: 8.1/8.0 100%: 8.4/8.0

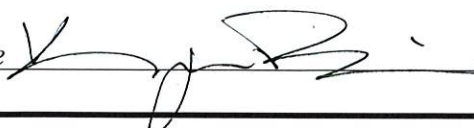
Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

If **NO**, list deviations from test specifications:

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Tessa Hunt-Woodland, Madison Reese, Dan Hillenburg, and Nicole Denkinger

Signature  Date 05/02/2018



The SeaCrest Group

Ceriodaphnia Chronic TIE pH Adjusted (~8.5) Benchsheet

Form #: 1131

Louisville, CO

Permittee:

Cik Ridge

Lab #:

418 208

Site:

013

Effective: January 2006

IWC %:

100

Template #:

5

Dilution Water:

MFT 18-005

Sample Date:

0307

Age & Source:

cerio 405 021518

Test Start:

031518 1400

Test End:

032218-1340

Test Conditions: pH adjusted to ~8.5

	0	1	2	3	4	5	6	7	8	Total
(C) 0	0	0	0	7	11	11	12	15		29
	0	0	0	5	10	13	18	13		28
	0	0	0	6	9	9	14	14		24
	0	0	0	7	6	0	13	13		30
	0	0	0	6	9	0	11	12		26
DO	10.9	10.8	10.0	7.1	7.1	7.0	7.0	6.7		
Temp	24.2	24.3	24.1	24.1	25.0	24.2	24.2	24.3		27.4
pH	8.1	7.9	7.7	8.0	7.9	8.0	7.9	8.0		
Cond	243	321	304	314	300	318	320	318		
(1) 50	0	0	0	7	10	7	4	9		24
	0	0	0	5	10	10	4	10		26
	0	0	0	3	0	4	6	0		15
	0	0	0	5	9	9	9	15		23
	0	0	0	5	7	10	8	8		21
DO	10.9	10.7	10.4	7.2	7.1	7.0	7.0	6.8		
Temp	24.2	24.3	24.1	24.4	24.8	25.0	24.2	24.3		27.4
pH	8.1	7.9	7.7	8.1	7.9	8.0	7.9	8.0		
Cond	243	321	304	314	300	318	320	318		
(2) 60	0	0	0	6	10	9	10	9		26
	0	0	0	2	5	7	5	11		19
	0	0	0	2	3	10	10	10		25
	0	0	0	5	9	10	10	10		25
	0	0	0	6	8	10	8	5		17
DO	10.9	10.7	10.3	7.3	7.2	7.0	7.2	7.0		
Temp	24.2	24.3	24.1	24.5	24.8	25.0	24.5	24.2		27.4
pH	8.1	7.9	7.7	8.1	7.9	8.0	7.9	8.0		
Cond	243	321	304	314	300	318	320	318		
(3) 70	0	0	0	6	6	7	0	11		19
	0	0	0	4	5	7	1	9		20
	0	0	0	4	12	6	5	5		17
	0	0	0	4	8	10	6	9		19
	0	0	0	3	8	10	5	6		16
DO	10.9	10.8	10.1	7.4	7.2	7.0	7.3	7.1		
Temp	24.2	24.3	24.1	24.8	24.8	25.0	24.4	24.2		27.4
pH	8.1	7.9	7.7	8.1	7.9	8.0	7.9	8.0		
Cond	243	321	304	314	300	318	320	318		
(4) 100	0	0	0	2	5	4	6	7		20
	0	0	0	2	5	0	7	0		13
	0	0	0	2	1	10	10	10		23
	0	0	0	3	6	0	8	6		17
	0	0	0	4	5	3	6	7		12
DO	10.9	10.8	10.1	7.4	7.2	7.0	7.4	7.1		
Temp	24.2	24.3	24.1	24.8	24.8	25.0	24.4	24.2		27.4
pH	8.1	7.9	7.7	8.1	7.9	8.0	7.9	8.0		
Cond	243	321	304	314	300	318	320	318		
dilution	0	0	0	6	13	10	10	14		30
water	0	0	0	6	11	11	4	12		29
blank	0	0	0	4	9	8	4	14		21
	0	0	0	7	8	0	12	14		27
	0	0	0	7	12	0	11	16		30
DO	10.9	10.8	10.1	7.4	7.1	7.2	7.8	7.8		
Temp	24.2	24.3	24.1	24.2	24.8	25.0	24.3	24.3		27.2
pH	8.5	7.9	7.9	8.3	7.9	8.1	7.9	8.0		
Cond	310	325	318	311	313	310	334	327		
Initials	1501	1501	1501	1501	1501	1501	1501	1501		
CO ₂	1501	1501	1501	1501	1501	1501	1501	1501		
Algae	1501	1501	1501	1501	1501	1501	1501	1501		
YCT	1501	1501	1501	1501	1501	1501	1501	1501		
H ₂ O	1501	1501	1501	1501	1501	1501	1501	1501		
Eff #1	Eff #2	Eff #3	Recon #1	Recon #2	Recon #3					
Hardness			87							
Alkalinity			60							
Chlorine			20.01							
Ammonia			20.03							

- Exposure Chamber
Total Capacity: 30 ml
Test Solution Surface Area: cm²
Test Solution Volume: 10 ml
Water Depth (constant): cm
(cyclic): to cm
- Feeding Schedule
Not fed: _____
Fed Irregularly: _____
Fed Daily: X
Food Used: YCT, algae
- Aeration
#1 None: _____
#2 None: _____
#3 None: _____
Before Use: _____
(minutes @ ~100 bubbles/min)
Before Use: _____
(minutes @ ~100 bubbles/min)
- Screened Animal Enclosures
Not Used: X
Used: _____
- Condition/appearance of surviving organisms at end of test (i.e., alive but immobile; loss of orientation; erratic movement; etc.):

6. Comments:

1	2	3	4	5
A1	A2	A3	A4	A5

x,y,z = board #.row.column

HCl/NaOH:

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 3/15/2018	Test ID: 208plpH8.5	Sample ID: EFFFIN-Effluent Final
End Date: 3/22/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF2-Industrial
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000
60	1.0000	1.0000	0.0000	1.0000	1.0000
70	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	0.0000	1.0000	1.0000
DWB	1.0000	1.0000	0.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
50	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
60	0.8000	0.8000	0.9425	0.5236	1.0472	24.845	5	0.9000	0.9000
70	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	0.9000	0.9000
100	0.8000	0.8000	0.9425	0.5236	1.0472	24.845	5	0.8000	0.8000
DWB	0.8000	0.8000	0.9425	0.5236	1.0472	24.845	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.59678	0.927	-2.2346	4.3922
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	55.000			
IC10	70.000			
IC15	85.000			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/15/2018	Test ID: 208pH8.5	Sample ID: EFFFIN-Effluent Final
End Date: 3/22/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF2-Industrial
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	29.000	28.000	24.000	30.000	26.000
50	24.000	26.000	15.000	23.000	21.000
60	26.000	19.000	5.000	25.000	17.000
70	19.000	20.000	17.000	19.000	16.000
100	20.000	13.000	4.000	17.000	12.000
DWB	30.000	28.000	21.000	27.000	30.000

Conc-%	Mean	N-Mean	Transform: Untransformed					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	27.400	1.0000	27.400	24.000	30.000	8.789	5	27.400	1.0000
50	21.800	0.7956	21.800	15.000	26.000	19.299	5	21.800	0.7956
60	18.400	0.6715	18.400	5.000	26.000	45.730	5	18.400	0.6715
70	18.200	0.6642	18.200	16.000	20.000	9.028	5	18.200	0.6642
100	13.200	0.4818	13.200	4.000	20.000	45.894	5	13.200	0.4818
DWB	27.200	0.9927	27.200	21.000	30.000	13.608	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.05$)	0.92482	0.927	-1.0242	1.92674
Bartlett's Test indicates equal variances ($p = 0.05$)	11.3145	15.0863		

Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)	Skew	
IC05*	12.232	7.510	5.369	44.694	2.2697
IC10*	24.464	10.615	10.739	65.146	0.8747
IC15*	36.696	10.586	16.108	72.999	0.1101
IC20*	48.929	8.881	21.477	71.854	-0.4120
IC25	53.676	7.332	30.588	73.382	-0.4797
IC40	80.560				
IC50	97.000				

* indicates IC estimate less than the lowest concentration

WET TEST REPORT FORM – CHRONIC
Na₂S₂O₃ A TEST

Permittee: Elk Ridge Mining and Reclamation **Outfall:** 013

Permit No.: CO0000213

Test Type: Routine ☐ TIE ☒

Test Species: *Ceriodaphnia dubia*

IWC: 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1200	03-15-2018	1215	03-22-2018

Test Results	Lethality	Reproduction
IC ₂₅	>100%	72.0%

Dilution(s) - % Effluent

Measurements	Control (0%)	50%	60%	70%	100%	Method Control
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	100	100	100	100
% Survival for day 3	100	100	100	100	100	100
% Survival for day 4	100	100	100	100	100	100
% Survival for day 5	100	100	100	100	100	100
% Survival for day 6	100	100	100	100	100	100
% Survival for day 7	100	100	100	80	100	100
Mean 3 Brood Total	27.0	24.0	24.2	20.6	15.4	27.4

Recon Water: 87

Recon Water: 60

pH (initial/final) – Control: 8.1/7.7 100%: 7.0/7.8

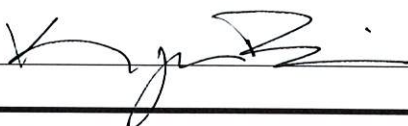
Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

If **NO**, list deviations from test specifications:

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Madison Reese, Dan Hillenburg, and Nicole Denking

Signature 

Date 05/02/2018

Permittee: EIK Base Lab #: 418 208 Site: 013
IWC %: 100 Template #: 5 Dilution Water: MAT 18-005 Sample Date: 0307
Age & Source: cerio 2005 031518 Test Start: 031518 1200 Test End: 032218 1215
Test Conditions: 0.40ml of 2500mg/L $\text{Na}_2\text{S}_2\text{O}_3$ added to each 100 ml dilution set resulting in 10 mg/L

	0	1	2	3	4	5	6	7	8	Total
(C) 0	0	0	0	6	9	0	5	10		30
	0	0	0	4	8	0	12	14		34
	0	0	0	3	10	8	0	12		33
	0	0	0	6	10	15	0	11		31
	0	0	0	6	10	21	0	11		39
DO	11.9	10.9	6.9	7.2	7.0	7.6	7.4	7.5	10.7	10.3
Temp	24.2	25.2	24.1	24.2	24.1	25.1	24.1	24.1	24.1	24.0
pH	8.1	7.8	7.8	7.9	8.0	8.0	8.1	8.0	7.9	7.7
Cond	747	718	307	327	305	309	319	318		27.0
(1) 60	0	0	0	6	10	0	12	9		28
	0	0	0	6	9	0	8	11		23
	0	0	0	6	9	0	12	11		27
	0	0	0	5	8	9	0	13		22
	0	0	0	8	12	10	0	9		20
DO	7.0	11.9	7.0	7.2	7.1	7.8	7.5	11.8	11.4	
Temp	24.8	25.2	24.1	24.2	24.1	25.1	24.2	24.1	24.8	24.0
pH	7.2	7.8	7.8	7.1	7.9	7.9	7.3	8.1	7.9	7.7
Cond	1111	1859			1818					
(2) 60	0	0	0	6	9	0	8	9		23
	0	0	0	5	9+1	0	8	9		24
	0	0	0	5	10	11	0	12		26
	0	0	0	3	8	7	0	8		18
	0	0	0	7	12	11	0	12		30
DO	7.1	11.9	7.0	7.2	7.2	7.9	7.5	7.5	11.9	11.5
Temp	24.8	25.2	24.1	24.1	24.1	25.1	24.2	24.1	24.1	24.8
pH	7.1	7.8	7.8	7.0	7.9	7.9	7.3	8.1	7.9	7.8
Cond	1118	1859	2210		2150					
(3) 70	0	0	0	0	0	7	11+1	0		15
	0	0	0	1	0	5	12+1	0		13
	0	0	0	6	9	12+3	0	0		30
	0	0	0	1	5	7	0	9		22
	0	0	0	6	9	8	0	10		23
DO	7.2	11.9	7.1	7.2	7.2	8.0	7.5	7.6	11.0	11.0
Temp	25.0	25.2	24.2	24.1	24.1	25.1	24.2	24.1	24.1	24.8
pH	7.0	7.8	7.8	7.0	7.9	7.9	7.2	8.1	7.8	7.8
Cond	2270	2470			2450					
(4) 100	0	0	0	0	7	0	3	5		15
	0	0	0	0	0	3	5+3	0		11
	0	0	0	0	6	0	4	7		17
	0	0	0	5	5	0	1	10		17
	0	0	0	4	8	0	5	7		17
DO	7.4	11.9	7.2	7.2	7.3	8.2	7.6	7.0	11.7	11.7
Temp	25.4	25.2	24.2	24.1	24.1	25.1	24.2	24.1	24.1	24.8
pH	7.6	7.8	7.9	6.9	7.8	7.8	7.2	8.2	7.8	7.8
Cond	3180	3270	3210		3220	3230	3050	3120	3110	
dilution water	0	0	0	6	10	0	7	13		23
blank	0	0	0	6	12	0	9	12		27
	0	0	0	6	11+1	0	11	14		29
	0	0	0	5	9	13	0	14		27
	0	0	0	6	11	14	0	15		31
DO	7.5	7.1	7.0	7.2	7.5	7.9	7.9	7.9	11.0	11.0
Temp	24.3	25.2	24.1	24.2	24.1	25.1	24.2	24.1	24.1	24.8
pH	8.0	7.8	7.7	7.9	8.0	7.8	7.9	8.2	8.0	7.9
Cond	314	320	312		331	318	323	352	358	
Algae	ARO/ABS	ARO/ABS	ARO/ABS	ARO/ABS	ARO/ABS	ARO/ABS	ARO/ABS	ARO/ABS	ARO/ABS	
YCT	1801	1801	1801	1801	1801	1801	1801	1801	1801	
H ₂ O										
Initials	ME	ME		DH	ND	ND	DH	ME	ME	
Eff #1		Eff #2		Eff #3		Recon #1		Recon #2		Recon #3
Hardness						87				
Alkalinity						60				
Chlorine						20.01				
Ammonia						20.03				

1. Exposure Chamber
Total Capacity: 30 ml
Test Solution Surface Area: 24 cm²
Test Solution Volume: 10 ml
Water Depth (constant): 10 cm
(cyclic): to cm

2. Feeding Schedule
Not fed:
Fed Irregularly:
Fed Daily:
Food Used: YCT, algae

3. Aeration
#1 None:
#2 None:
#3 None:

Before Use:
(minutes @ ~100 bubbles/min)
Before Use:
(minutes @ ~100 bubbles/min)
Before Use:
(minutes @ ~100 bubbles/min)

4. Screened Animal Enclosures
Not Used: X
Used:

5. Condition/appearance of surviving organisms at end of test (i.e., alive but immobile; loss of orientation; erratic movement; etc.):
round, healthy
in efficient
dilution
blank: round,
healthy

6. Comments:

1	2	3	4	5
19	B3	B4	B10	B8

x.y.z = board #.row.column

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 3/15/2018	Test ID: 208pINaA	Sample ID: EFFFIN-Effluent Final
End Date: 3/22/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF2-Industrial
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000
60	1.0000	1.0000	1.0000	1.0000	1.0000
70	0.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000
DWB	1.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
50	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
60	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
70	0.8000	0.8000	0.9425	0.5236	1.0472	24.845	5	0.9000	0.9000
100	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	0.9000	0.9000
DWB	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.41613	0.927	-3.8705	19.8512
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	65.000			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/15/2018	Test ID: 208pINaA	Sample ID: EFFFIN-Effluent Final
End Date: 3/22/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF2-Industrial
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	30.000	24.000	23.000	31.000	27.000
50	28.000	23.000	27.000	22.000	20.000
60	23.000	24.000	26.000	18.000	30.000
70	15.000	13.000	30.000	22.000	23.000
100	15.000	11.000	17.000	17.000	17.000
DWB	23.000	27.000	29.000	27.000	31.000

Conc-%	Mean	N-Mean	Transform: Untransformed					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	27.000	1.0000	27.000	23.000	31.000	13.095	5	27.000	1.0000
50	24.000	0.8889	24.000	20.000	28.000	14.130	5	24.100	0.8926
60	24.200	0.8963	24.200	18.000	30.000	18.107	5	24.100	0.8926
70	20.600	0.7630	20.600	13.000	30.000	33.031	5	20.600	0.7630
100	15.400	0.5704	15.400	11.000	17.000	16.933	5	15.400	0.5704
DWB	27.400	1.0148	27.400	23.000	31.000	10.827	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.97873	0.927	0.06956	0.09699
Bartlett's Test indicates equal variances ($p = 0.44$)	4.84538	15.0863		

Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)	Skew	
IC05*	23.276	18.044	7.523	84.818	0.5140
IC10*	46.552	14.426	15.046	86.530	-0.2893
IC15	63.286	10.394	25.840	84.978	-0.7194
IC20	67.143	7.779	44.765	89.845	-0.0771
IC25	72.019	7.832	55.052	94.201	0.2600
IC40	95.385				
IC50	>100				

* indicates IC estimate less than the lowest concentration

WET TEST REPORT FORM – CHRONIC
Na₂S₂O₃ B TEST

Permittee: Elk Ridge Mining and Reclamation **Outfall:** 013

Permit No.: CO0000213

Test Type: Routine ☐ TIE ☒

Test Species: *Ceriodaphnia dubia* **IWC:** 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1230	03-15-2018	1225	03-22-2018

Test Results	Lethality	Reproduction
IC ₂₅	66.3%	41.1%

Dilution(s) - % Effluent

Measurements	Control (0%)	50%	60%	70%	100%	Method Control
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	100	100	80	100
% Survival for day 3	100	100	100	80	60	100
% Survival for day 4	100	100	100	80	60	100
% Survival for day 5	100	100	100	80	60	100
% Survival for day 6	100	100	100	80	60	100
% Survival for day 7	100	100	100	80	60	100
Mean 3 Brood Total	27.6	18.8	19.6	16.2	9.8	27.2

Recon Water: 87

Recon Water: 60

pH (initial/final) – Control: 8.1/7.8 100%: 6.8/7.8

Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

If **NO**, list deviations from test specifications:

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Madison Reese, Dan Hillenburg, and Nicole Denkinger

Signature

Date

The SeaCrest Group

Ceriodaphnia Chronic TIE Na₂S₂O₃ b Benchsheet

Form: 113i

Effective: June 2013

Louisville, CO

Permittee:

IWC %:

Age & Source:

Test Conditions:

EIK Ridge

Template #:

Lab #:

Site:

Dilution Water:

Sample Date:

Test Start:

Test End:

1.00ml of 2500mg/L Na₂S₂O₃ added to each 100 ml dilution set resulting in 25 mg/L

	0	1	2	3	4	5	6	7	8	Total
(C) 0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
DO	7.9	7.7	7.2	7.3	7.0	7.7	7.4	7.0	7.1	7.1
Temp	24.1	24.1	24.2	24.1	24.1	25.1	24.2	24.1	24.1	24.1
pH	8.1	7.9	7.9	8.0	8.1	7.9	8.1	8.2	7.9	7.8
Cond	193	192	310	329	383	316	314	310	310	310
(1) 50	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
DO	7.1	7.7	7.0	7.2	7.2	7.5	7.4	7.0	7.1	7.1
Temp	24.1	24.1	24.1	24.1	24.1	25.1	24.2	24.1	24.1	24.1
pH	8.1	7.9	7.9	8.0	8.1	7.9	8.1	8.2	7.9	7.8
Cond	193	192	1838	1838	1838	1838	1838	1838	1838	1838
(2) 60	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
DO	7.1	7.7	6.7	7.2	7.2	7.5	7.4	7.0	7.1	7.1
Temp	24.1	24.1	24.1	24.2	24.1	25.1	24.2	24.1	24.1	24.1
pH	8.1	7.9	8.0	7.1	7.9	7.7	7.3	8.1	7.9	7.8
Cond	193	192	2210	2210	2210	2210	2210	2210	2210	2210
(3) 70	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
DO	7.1	7.7	6.5	7.2	7.2	7.5	7.4	7.0	7.1	7.1
Temp	24.1	24.1	24.1	24.2	24.1	25.1	24.2	24.1	24.1	24.1
pH	8.1	7.9	8.0	7.0	7.9	7.7	7.3	8.1	7.9	7.8
Cond	193	192	2480	2480	2480	2480	2480	2480	2480	2480
(4) 80	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
DO	7.1	7.7	6.3	7.2	7.2	7.5	7.4	7.0	7.1	7.1
Temp	24.1	24.1	24.1	24.2	24.1	25.1	24.2	24.1	24.1	24.1
pH	8.1	7.9	8.0	7.0	7.9	7.7	7.3	8.1	7.9	7.8
Cond	193	192	3230	3230	3230	3230	3230	3230	3230	3230
dilution water	0	0	0	0	0	0	0	0	0	0
blank	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
DO	7.1	7.0	7.0	7.1	7.1	7.4	7.6	7.4	7.4	7.4
Temp	24.1	24.1	24.1	24.2	24.1	25.1	24.2	24.1	24.1	24.1
pH	7.9	7.8	7.6	7.9	8.1	7.6	7.9	7.8	7.7	7.7
Cond	325	355	339	339	347	343	343	338	355	348
Algae	AR/ABS	AR/ABS	AR/ABS	AR/ABS	AR/ABS	AR/ABS	AR/ABS	AR/ABS	AR/ABS	AR/ABS
YCT	1801	1801	1801	1801	1801	1801	1801	1801	1801	1801
H ₂ O	1801	1801	1801	1801	1801	1801	1801	1801	1801	1801
Initials	MR	MR	MR	MR	MR	MR	MR	MR	MR	MR
Eff #1										
Eff #2										
Eff #3										
Recon #1										
Recon #2										
Recon #3										
Hardness										
Alkalinity										
Chlorine										
Ammonia										

1. Exposure Chamber
Total Capacity: 30 ml
Test Solution Surface Area: cm²
Test Solution Volume: 10 ml
Water Depth (constant): cm
(cyclic): to cm

2. Feeding Schedule
Not fed: _____
Fed Irregularly: _____
Fed Daily: ☒ X
Food Used: YCT, algae

3. Aeration
#1 None: _____
#2 None: _____
#3 None: _____

Before Use: _____
(minutes @ ~100 bubbles/min)

Before Use: _____
(minutes @ ~100 bubbles/min)

4. Screened Animal Enclosures
Not Used: ☒ X
Used: _____

5. Condition/appearance of surviving organisms at end of test (i.e., alive but immobile; loss of orientation; erratic movement; etc.):
some pale and slow moving
adults in 70%
and 100%
plank: round and healthy, mobile

6. Comments:

*7.7-D.O. Day 4 Initial

1	2	3	4	5
A9	B3	B4	B10	B3

x,y,z = board #: row, column

ll

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 3/15/2018 Test ID: 208plNaB Sample ID: EFFFIN-Effluent Final
 End Date: 3/22/2018 Lab ID: SCG-Seacrest Group Sample Type: EFF2-Industrial
 Sample Date: Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia
 Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000
60	1.0000	1.0000	1.0000	1.0000	1.0000
70	0.0000	0.0000	1.0000	1.0000	1.0000
100	0.0000	1.0000	0.0000	1.0000	1.0000
DWB	1.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
50	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
60	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
70	0.6000	0.6000	0.8378	0.5236	1.0472	34.233	5	0.6000	0.6000
100	0.6000	0.6000	0.8378	0.5236	1.0472	34.233	5	0.6000	0.6000
DWB	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.05$)	0.72963	0.927	-0.7449	0.82474
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	61.250			
IC10	62.500			
IC15	63.750			
IC20	65.000			
IC25	66.250			
IC40	>100			
IC50	>100			

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/15/2018	Test ID: 208plNaB	Sample ID: EFFFIN-Effluent Final
End Date: 3/22/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF2-Industrial
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	30.000	28.000	27.000	24.000	29.000
50	15.000	19.000	15.000	20.000	25.000
60	23.000	18.000	18.000	19.000	20.000
70	22.000	0.000	19.000	19.000	21.000
100	0.000	18.000	3.000	14.000	14.000
DWB	27.000	29.000	26.000	25.000	29.000

Conc-%	Mean	N-Mean	Transform: Untransformed					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	27.600	1.0000	27.600	24.000	30.000	8.341	5	27.600	1.0000
50	18.800	0.6812	18.800	15.000	25.000	22.060	5	19.200	0.6957
60	19.600	0.7101	19.600	18.000	23.000	10.580	5	19.200	0.6957
70	16.200	0.5870	16.200	0.000	22.000	56.474	5	16.200	0.5870
100	9.800	0.3551	9.800	0.000	18.000	79.827	5	9.800	0.3551
DWB	27.200	0.9855	27.200	25.000	29.000	6.577	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.05$)	0.91589	0.927	-1.3494	3.18337
Bartlett's Test indicates unequal variances ($p = 5.28E-03$)	16.62	15.0863		

Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)	Skew	
IC05*	8.214	1.874	6.014	17.648	2.6949
IC10*	16.429	3.747	12.028	35.296	2.6949
IC15*	24.643	5.415	18.042	52.945	2.4254
IC20*	32.857	6.469	24.057	63.151	2.0476
IC25*	41.071	8.215	30.071	84.651	1.7323
IC40	68.800				
IC50	81.250				

* indicates IC estimate less than the lowest concentration

**WET TEST REPORT FORM – CHRONIC
EDTA A TEST**

Permittee: Elk Ridge Mining and Reclamation

Outfall: 013

Permit No.: CO0000213

Test Type: Routine ☐ TIE ☒

Test Species: *Ceriodaphnia dubia*

IWC: 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1320	03-15-2018	1250	06-05-2012

Test Results	Lethality	Reproduction
IC ₂₅	77.5%	41.5%

Dilution(s) - % Effluent

Measurements	Control (0%)	50%	60%	70%	100%	Method Control
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	100	100	100	100
% Survival for day 3	100	100	100	100	100	100
% Survival for day 4	100	100	100	100	100	100
% Survival for day 5	100	100	100	100	80	100
% Survival for day 6	100	80	100	80	60	100
% Survival for day 7	100	80	100	80	60	100
Mean 3 Brood Total	33.2	23.2	22.4	20.2	15.0	27.4

Recon Water: 87

Recon Water: 60

pH (initial/final) – Control: 8.1/7.9 100%: 7.1/7.8

Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

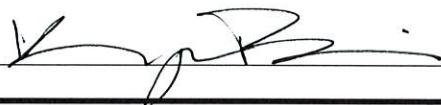
If **NO**, list deviations from test specifications:

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Madison Reese, Tessa Hunt-Woodland, Dan Hillenburg, and Nicole Denkinger

Signature



Date

05/02/2016



The SeaCrest Group

Ceriodaphnia Chronic TIE EDTA a Benchsheet

Form #: 113f

Effective: June 2013

Louisville, CO

Permittee:

IWC %:

Age & Source:

Test Conditions:

EIK Ridge

Template #:

Lab #:

Dilution Water:

Site:

Sample Date:

Test Start:

Test End:

U. 12ml of 2500 mg/L EDTA added to each 100 ml dilution set resulting in 3 mg/L

	0	1	2	3	4	5	6	7	8	Total
(C) 0	0	0	0	0	9	12	0	4		35
	0	0	0	7	8	14	0	1		29
	0	0	0	6	11	15	0	15		32
	0	0	0	6	10	16	0	18		33
	0	0	0	8	11	13	14	14		33
DO	7.0	7.0	7.0	7.1	7.5	7.4	7.3	7.1	7.2	
Temp	24.1	24.1	24.5	24.2	24.1	24.1	24.3	24.5	24.1	33.2
pH	8.1	8.0	7.8	8.1	8.0	8.2	8.2	8.0	7.9	
Cond	291	318	310	322	304	319	318	310		
(1) 50	0	0	0	0	6	7	0	0		19
	0	0	0	5	8	0	70			20
	0	0	0	5	10	0	10	9		25
	0	0	0	4	11	9	11	11		25
	0	0	0	4	11	10	11	18		27
DO	6.8	7.0	7.0	7.2	7.3	7.7	7.6	7.5	7.3	
Temp	24.2	24.1	24.5	24.5	24.4	24.2	24.1	24.3	24.5	23.2
pH	7.1	8.0	7.8	7.10	7.8	7.9	7.5	8.1	8.0	
Cond	1814		1775		1846					
(2) 60	0	0	0	3	8	10	0	0		21
	0	0	0	5	10	0	0	0		24
	0	0	0	4	9	0	10	8		23
	0	0	0	6	7	0	7	10		20
	0	0	0	4	11	11	8	8		24
DO	6.8	7.0	7.0	7.3	7.3	7.8	7.7	7.6	7.8	
Temp	24.3	24.2	24.5	24.7	24.4	24.2	24.1	24.3	24.5	22.4
pH	7.1	8.0	7.8	7.5	7.8	7.9	7.4	8.1	7.9	
Cond	1935		1913		2210					
(3) 70	0	0	0	0	6	8	0	0		15
	0	0	0	5	7	0	12	0		21
	0	0	0	4	8	0	3	12		15
	0	0	0	6	9	0	9	11		24
	0	0	0	5	11	9	11	8		26
DO	6.7	7.0	7.0	7.5	7.4	7.9	7.8	7.7	7.7	
Temp	24.5	24.2	24.5	24.9	24.4	24.2	24.1	24.3	24.5	20.2
pH	7.1	8.0	7.8	7.5	7.7	7.9	7.4	8.1	7.9	
Cond	2370		2400		2430					
(4) 100	0	0	0	0	6	0	0	0		6
	0	0	0	4	7	0	10			17
	0	0	0	3	7	0	4	10		16
	0	0	0	4	8	0	10	7		19
	0	0	0	4	11	6	0	10		17
DO	6.7	7.0	7.0	7.10	7.5	8.1	8.0	7.9	7.9	
Temp	24.7	24.2	24.5	25.2	24.4	24.2	24.1	24.3	24.5	15.0
pH	7.1	8.0	7.8	7.4	7.6	7.8	7.4	8.0	7.8	
Cond	3050	3050	3110	3230	3220	3210	3240	3100		
dilution water	0	0	0	0	8	14	0	11		31
blank	0	0	0	6	10	0	8	17		24
	0	0	0	5	10	12	0	14		27
	0	0	0	5	8	11	0	11		24
	0	0	0	0	11	0	9	11		31
DO	7.1	6.9	7.1	7.8	7.5	7.9	8.2	7.4	7.10	
Temp	24.3	24.3	24.5	24.2	24.4	24.2	24.1	24.3	24.5	27.4
pH	8.3	8.0	7.8	8.4	7.9	8.0	8.2	8.2	8.0	
Cond	294	325	310	321	307	312	312	315		
Algae	1801	1801	1801	1801	1801	1801	1801	1801	1801	
YCT	1801	1801	1801	1801	1801	1801	1801	1801	1801	
H ₂ O	1801	1801	1801	1801	1801	1801	1801	1801	1801	
Initials	1801	1801	1801	1801	1801	1801	1801	1801	1801	
Eff #1	Eff #2	Eff #3	Recon #1	Recon #2	Recon #3					
Hardness			47							
Alkalinity			60							
Chlorine			10.01							
Ammonia			10.03							

1. Exposure Chamber
Total Capacity: 30 ml
Test Solution Surface Area: cm²
Test Solution Volume: 10 ml
Water Depth (constant): cm
(cyclic): to cm
2. Feeding Schedule
Not fed: _____
Fed Irregularly: _____
Fed Daily: X
Food Used: YCT, algae

3. Aeration
#1 None: _____
#2 None: _____
#3 None: _____

- Before Use: _____
(minutes @ ~100 bubbles/min)
Before Use: _____
(minutes @ ~100 bubbles/min)

- Before Use: _____
(minutes @ ~100 bubbles/min)
4. Screened Animal Enclosures
Not Used: X
Used: _____

5. Condition/appearance of surviving organisms at end of test (i.e., alive but immobile; loss of orientation; erratic movement; etc.):

100%: red, round, mobile appear healthy

blank: red, round, mobile

6. Comments:

1	2	3	4	5
B10	C2	C3	C4	C8
x,y,z = board #.row.column				

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 3/15/2018 Test ID: 208pIEDTAA Sample ID: EFFFIN-Effluent Final
 End Date: 3/22/2018 Lab ID: SCG-Seacrest Group Sample Type: EFF2-Industrial
 Sample Date: Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia
 Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	0.0000	1.0000	1.0000	1.0000
60	1.0000	1.0000	1.0000	1.0000	1.0000
70	0.0000	1.0000	1.0000	1.0000	1.0000
100	0.0000	0.0000	1.0000	1.0000	1.0000
DWB	1.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
50	0.8000	0.8000	0.9425	0.5236	1.0472	24.845	5	0.9000	0.9000
60	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	0.9000	0.9000
70	0.8000	0.8000	0.9425	0.5236	1.0472	24.845	5	0.8000	0.8000
100	0.6000	0.6000	0.8378	0.5236	1.0472	34.233	5	0.6000	0.6000
DWB	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.05$)	0.76012	0.927	-1.4778	1.97749
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05*	25.000			
IC10	60.000			
IC15	65.000			
IC20	70.000			
IC25	77.500			
IC40	>100			
IC50	>100			

* indicates IC estimate less than the lowest concentration

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/15/2018	Test ID: 208plEDTAA	Sample ID: EFFFIN-Effluent Final
End Date: 3/22/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF2-Industrial
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	39.000	29.000	32.000	33.000	33.000
50	19.000	20.000	25.000	25.000	27.000
60	21.000	24.000	23.000	20.000	24.000
70	15.000	21.000	15.000	24.000	26.000
100	6.000	17.000	16.000	19.000	17.000
DWB	31.000	24.000	27.000	24.000	31.000

Conc-%	Mean	N-Mean	Transform: Untransformed					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	33.200	1.0000	33.200	29.000	39.000	10.943	5	33.200	1.0000
50	23.200	0.6988	23.200	19.000	27.000	15.055	5	23.200	0.6988
60	22.400	0.6747	22.400	20.000	24.000	8.110	5	22.400	0.6747
70	20.200	0.6084	20.200	15.000	26.000	25.097	5	20.200	0.6084
100	15.000	0.4518	15.000	6.000	19.000	34.319	5	15.000	0.4518
DWB	27.400	0.8253	27.400	24.000	31.000	12.800	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.96302	0.927	-0.4756	-0.1552
Bartlett's Test indicates equal variances ($p = 0.52$)	4.18919	15.0863		

Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)	Skew	
IC05*	8.300	1.625	5.810	14.379	2.1040
IC10*	16.600	3.250	11.621	28.758	2.1040
IC15*	24.900	4.706	17.431	43.138	1.6880
IC20*	33.200	5.886	23.242	57.476	1.2089
IC25*	41.500	6.576	29.052	67.398	0.6616
IC40	71.615	8.064	56.174	99.392	0.4643
IC50	90.769				

* indicates IC estimate less than the lowest concentration

**WET TEST REPORT FORM – CHRONIC
EDTA B TEST**

Permittee: Elk Ridge Mining and Reclamation **Outfall:** 013
Permit No.: CO0000213

Test Type: Routine ☐ TIE ☒
Test Species: *Ceriodaphnia dubia* **IWC:** 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1340	03-15-2018	1300	03-22-2018

Test Results	Lethality	Reproduction
IC ₂₅	59.4%	62.1%

Dilution(s) - % Effluent

Measurements	Control (0%)	50%	60%	70%	100%	Method Control
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	100	100	100	100
% Survival for day 3	100	100	100	100	100	100
% Survival for day 4	100	100	100	60	100	100
% Survival for day 5	100	100	80	60	100	100
% Survival for day 6	100	100	80	60	100	100
% Survival for day 7	100	100	60	60	100	100
Mean 3 Brood Total	30.4	24.0	25.8	15.0	14.4	25.8

Recon Water: 87

Recon Water: 60

pH (initial/final) – Control: 8.0/7.8 100%: 6.9/7.6

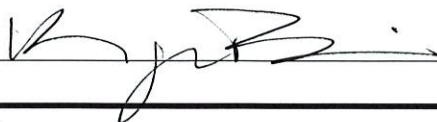
Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

If **NO**, list deviations from test specifications:

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Madison Reese, Tessa Hunt-Woodland, Dan Hillenburg, and Nicole Denkinger

Signature  Date 05/02/2018

The SeaCrest Group

Ceriodaphnia Chronic TIE EDTA b Benchsheet

Form #: 113g
Effective: June 2013

Louisville, CO

Permittee: ERL RidgeLab #: 418 205Site: 013IWC %: 100Template #: 5Dilution Water: MH 15-005Sample Date: 0307Age & Source: cerio 2005 CB1518Test Start: 031518

1340

Test End: 032218

1360

Test Conditions: 0.32ml of 2500 mg/L EDTA added to each 100 ml dilution set resulting in 8 mg/L

	0	1	2	3	4	5	6	7	8	Total
(C) 0	0	0	0	4	7	0	12	20		23
	0	0	0	6	11	12	15	15		29
	0	0	0	1	10	12	11	11		38
	0	0	0	4	8	11	13	13		25
	0	0	0	0	12	14	13	13		39
DO	7.0	7.1	10.8	7.0	7.1	7.4	7.8	10.7		
Temp	24.2	24.1	24.1	24.3	24.4	24.1	24.3	24.1		30.4
pH	8.0	8.1	7.8	8.0	7.8	8.0	8.2	7.9		
Cond	292	315	314	329	306	316	312	300		
(1) 50	0	0	0	4	7	0	12	20		23
	0	0	0	5	10	0	10	13		25
	0	0	0	11	7	8	11	11		19
	0	0	0	4	10	0	10	9		24
	0	0	0	7	8	9	14	14		32
DO	6.9	7.0	10.8	7.2	7.6	7.6	10.9	10.3		
Temp	24.3	24.1	24.1	24.4	24.2	24.1	24.3	24.1		24.0
pH	7.0	8.1	7.8	7.7	7.9	7.3	8.0	7.9		
Cond	1804	155	155	1826	1826	1826	1826	1826		
(2) 60	0	0	0	6	9	0	10	13		25
	0	0	0	7	10	0	11	14		29
	0	0	0	1	9	11	11	11		28
	0	0	0	6	9	50	10	10		20
	0	0	0	1	8	10	10	10		29
DO	6.8	7.0	10.8	7.3	7.7	7.7	7.6	7.1		
Temp	24.3	24.2	24.1	24.8	24.4	24.2	24.1	24.3		25.4
pH	6.9	8.0	7.8	7.1	7.7	7.9	7.2	8.0		
Cond	1929	155	155	2200	2200	2200	2200	2200		
(3) 70	0	0	0	4	30					7
	0	0	0	6	10					6
	0	0	0	4	7	8	7	8		19
	0	0	0	5	7	10	10	8		22
	0	0	0	0	6	7.1	0	7		21
DO	6.8	6.9	10.9	7.5	7.4	7.8	7.8	7.5		*
Temp	24.3	24.2	24.1	24.1	24.4	24.2	24.1	24.3		15.0
pH	6.9	8.0	7.8	7.1	7.7	7.9	7.2	8.0		
Cond	2300	1570	1570	2470	2470	2470	2470	2470		
(4) 100	0	0	0	4	5	0	0	0		9
	0	0	0	3	6	0	10	13		16
	0	0	0	1	6	7	1	5		19
	0	0	0	4	6	0	3	5		13
	0	0	0	2	6	2	1	4		13
DO	6.8	6.8	10.9	7.12	7.5	8.0	7.9	7.4		*
Temp	24.4	24.2	24.1	24.4	24.4	24.2	24.1	24.3		14.4
pH	6.9	8.0	7.8	7.0	7.6	7.8	7.2	7.9		
Cond	3060	3100	3010	3320	3250	3140	3150	3100		
dilution	0	0	0	5	7	0	12	11		24
water	0	0	0	4	7	0	10	11		17
blank	0	0	0	0	8	11	13	15		34
	0	0	0	5+1	0	12	13	14		19
	0	0	0	0	9	12	13	14		35
DO	7.0	7.1	7.0	7.8	7.4	8.0	8.8	7.7		
Temp	24.3	24.2	24.1	24.3	24.4	24.2	24.1	24.3		25.4
pH	8.7	8.2	7.9	8.12	7.8	7.9	8.7	8.2		
Cond	297	319	301	330	311	315	312	305		
Algae	1801	1801	1801	1801	1801	1801	1801	1801		
YCT	1801	1801	1801	1801	1801	1801	1801	1801		
Eff #1										
Eff #2										
Eff #3										
Recon #1										
Recon #2										
Recon #3										

1. Exposure Chamber
Total Capacity: 30 ml
Test Solution Surface Area: 29 cm²
Test Solution Volume: 10 ml
Water Depth (constant): 25 cm
(cyclic): to cm

2. Feeding Schedule
Not fed: _____
Fed Irregularly: _____
Fed Daily: X
Food Used: YCT, algae

3. Aeration
#1 None: _____
#2 None: _____
#3 None: _____

Before Use: _____
(_____ minutes @ ~100 bubbles/min)

Before Use: _____
(_____ minutes @ ~100 bubbles/min)

Before Use: _____
(_____ minutes @ ~100 bubbles/min)

4. Screened Animal Enclosures
Not Used: X
Used: _____

5. Condition/appearance of surviving organisms at end of test (i.e., alive but immobile; loss of orientation; erratic movement; etc.):

Some adults in
100% pale grey
(reps 1+5) grey
blank: ranna, red,
neatly looking

6. Comments:

1	2	3	4	5
07	D10	E1	E3	E8

x.y.z = board #: row: column

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 3/15/2018	Test ID: 208pIEDTAB	Sample ID: EFFFIN-Effluent Final
End Date: 3/22/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF2-Industrial
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000
60	1.0000	1.0000	0.0000	0.0000	1.0000
70	0.0000	0.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000
DWB	1.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
50	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
60	0.6000	0.6000	0.8378	0.5236	1.0472	34.233	5	0.7333	0.7333
70	0.6000	0.6000	0.8378	0.5236	1.0472	34.233	5	0.7333	0.7333
100	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	0.7333	0.7333
DWB	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.72963	0.927	-0.7449	0.82474
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	51.875			
IC10	53.750			
IC15	55.625			
IC20	57.500			
IC25	59.375			
IC40	>100			
IC50	>100			

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/15/2018	Test ID: 208pIEDTAB	Sample ID: EFFFFIN-Effluent Final
End Date: 3/22/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF2-Industrial
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	23.000	29.000	38.000	23.000	39.000
50	20.000	25.000	19.000	24.000	32.000
60	25.000	27.000	28.000	20.000	29.000
70	7.000	6.000	19.000	22.000	21.000
100	9.000	18.000	19.000	13.000	13.000
DWB	24.000	17.000	34.000	19.000	35.000

Conc-%	Mean	N-Mean	Transform: Untransformed					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	30.400	1.0000	30.400	23.000	39.000	25.649	5	30.400	1.0000
50	24.000	0.7895	24.000	19.000	32.000	21.449	5	24.900	0.8191
60	25.800	0.8487	25.800	20.000	29.000	13.813	5	24.900	0.8191
70	15.000	0.4934	15.000	6.000	22.000	52.281	5	15.000	0.4934
100	14.400	0.4737	14.400	9.000	19.000	28.464	5	14.400	0.4737
DWB	25.800	0.8487	25.800	17.000	35.000	32.359	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.93368	0.927	0.0234	-1.2723
Bartlett's Test indicates equal variances ($p = 0.49$)	4.44418	15.0863		

Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)	Skew	
IC05*	13.818	15.440	4.042	84.733	1.6549
IC10*	27.636	16.629	8.085	79.465	0.6461
IC15*	41.455	15.058	12.127	74.704	0.0787
IC20	60.586	12.127	13.513	67.267	-0.4523
IC25	62.121	8.954	23.697	69.724	-1.2478
IC40	66.727				
IC50	69.798				

* indicates IC estimate less than the lowest concentration

**WET TEST REPORT FORM – CHRONIC
C18 TEST**

Permittee: Elk Ridge Mining and Reclamation **Outfall:** 013

Permit No.: CO0000213

Test Type: Routine ☐ TIE ☒

Test Species: *Ceriodaphnia dubia*

IWC: 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1210	03-15-2018	1250	03-22-2018

Test Results	Lethality	Reproduction
IC ₂₅	72.5%	73.4%

Dilution(s) - % Effluent

Measurements	Control (0%)	50%	60%	70%	100%	Method Control
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	100	100	100	100
% Survival for day 3	100	100	100	100	100	100
% Survival for day 4	100	100	100	80	80	100
% Survival for day 5	100	100	100	80	60	100
% Survival for day 6	100	100	80	80	40	100
% Survival for day 7	100	100	80	80	20	100
Mean 3 Brood Total	26.8	26.0	24.8	21.4	9.8	28.6

Recon Water: 87

Recon Water: 60

pH (initial/final) – Control: 7.9/7.8 100%: 7.4/7.8

Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

If **NO**, list deviations from test specifications:

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Madison Reese, Tessa Hunt-Woodland, and Dan Hillenburg

Signature 

Date 05/02/2018

The SeaCrest Group
Louisville, CO

Ceriodaphnia Chronic TIE C18 Column Benchsheet

Form: 113c
Effective: January 2006

Permittee: Eik Ridge Lab #: 418 208 Site: 013
IWC %: 100 Template #: 5 Dilution Water: MH 18-005 Sample Date: 0307
Age & Source: cerio 2005 030518 Test Start: 1210 031518 Test End: 032118 1250
Test Conditions: filtered through glass fiber filter and C18 column

	0	1	2	3	4	5	6	7	8	Total
(C) 0	0	0	0	5	8	0	11	15		24
	0	0	0	6	8	11	14	11		29
	0	0	0	6	10	10	0	17		28
	0	0	0	4	8	11	0	14		29
	0	0	0	5	10	13	0	15		29
DO	7.0	10.7	10.5	7.0	6.9	7.1	6.9	7.2	7.1	11.0
Temp	24.1	24.1	24.1	24.2	24.9	25.1	24.3	25.3	24.1	24.1
pH	7.9	7.8	7.8	8.0	8.0	7.9	8.0	8.1	8.2	7.8
Cond	293	311	308	325	301	318	314	315		
(1) 60	0	0	0	6	9	0	5	8		20
	0	0	0	0	7	12	15	11		35
	0	0	0	4	9	10	15	11		29
	0	0	0	0	10	10	5	10		25
	0	0	0	5	9	0	7	9		21
DO	6.4	10.7	10.5	7.1	6.9	7.1	7.0	7.2	7.1	11.0
Temp	24.1	24.1	24.1	24.5	24.9	25.1	24.5	25.3	24.1	24.1
pH	7.6	7.8	7.8	7.8	7.9	7.9	7.9	8.0	8.2	7.8
Cond	1905	—	1808	—	1749	—	—	—	—	—
(2) 60	0	0	0	4	7	11	10	8	4	20
	0	0	0	0	7	8	15	0		30
	0	0	0	0	5	9	0	9	0	23
	0	0	0	0	9	11	0	0	0	29
	0	0	0	4	5	0	10	10		22
DO	6.0	10.7	10.5	7.2	6.8	7.2	7.0	7.2	7.1	11.0
Temp	24.1	24.1	24.1	24.2	24.9	25.1	24.6	25.3	24.1	24.1
pH	7.6	7.9	7.8	7.7	7.8	7.8	7.8	8.0	8.1	7.8
Cond	1934	—	1975	—	1952	—	—	—	—	—
(3) 70	0	0	0	3	8	0	5	4		16
	0	0	0	0	7	9	11	12		29
	0	0	0	5	10	8	5	11		23
	0	0	0	0	6	10	0	10		29
	0	0	0	5	5	0	—	—		10
DO	5.4	10.0	10.0	7.3	6.8	7.2	7.1	7.3	7.2	11.2
Temp	24.1	24.1	24.1	24.1	24.9	25.1	24.6	25.3	24.2	24.1
pH	7.4	7.9	7.9	7.7	7.7	7.8	7.8	7.9	8.1	7.8
Cond	2200	—	2280	—	2300	—	—	—	—	—
(4) 100	0	0	0	3	6	11	10	0		10
	0	0	0	0	7	10	0	0		17
	0	0	0	4	7	0	0	0		11
	0	0	0	0	8	10	0	0		18
	0	0	0	3	4	3	5	8		10
DO	4.1	10.0	10.0	7.3	6.8	7.2	7.2	7.3	7.2	11.2
Temp	24.1	24.1	24.1	24.1	24.9	25.1	24.6	25.3	24.2	24.1
pH	7.4	7.9	7.9	7.7	7.7	7.8	7.8	7.9	8.0	7.8
Cond	3030	3150	3150	3010	3060	3060	3090	2920	2950	
dilution water	0	0	0	3	10	0	11	11		24
blank	0	0	0	1	9	11	14	0		35
	0	0	0	6	11	9	5	14		26
	0	0	0	0	10	11	14	0		35
	0	0	0	5	8	10	0	15		23
DO	6.9	10.8	10.5	7.3	6.8	6.9	7.1	7.2	7.4	11.2
Temp	24.2	24.1	24.1	24.3	24.9	25.1	24.5	25.3	24.1	24.1
pH	7.9	7.7	7.8	8.0	7.8	7.8	8.0	8.1	8.0	7.9
Cond	288	318	312	304	304	297	307	302	315	
Algae	ABS	ABS	ABS	ABS	ABS	ABS	ABS	ABS		
YCT	1821	1821	1821	1821	1821	1821	1821	1821		
H ₂ O	1821	1821	1821	1821	1821	1821	1821	1821		
Initials	TRW	TRW	TRW	TRW	TRW	TRW	TRW	TRW		
Eff #1										
Eff #2										
Eff #3										
Recon #1										
Recon #2										
Recon #3										
Hardness										
Alkalinity										
Chlorine										
Ammonia										

1. Exposure Chamber
Total Capacity: 30 ml
Test Solution Surface Area: cm²
Test Solution Volume: 10 ml
Water Depth (constant): cm
(cyclic): to cm

2. Feeding Schedule
Not fed: _____
Fed Irregularly: _____
Fed Daily: X
Food Used: YCT, algae

3. Aeration
#1 None: _____
#2 None: _____
#3 None: _____
Before Use: _____
(minutes @ ~100 bubbles/min)
Before Use: _____
(minutes @ ~100 bubbles/min)

4. Screened Animal Enclosures
Not Used: X
Used: _____

5. Condition/appearance of surviving organisms at end of test (i.e., alive but immobile; loss of orientation; erratic movement; etc.):
admits in 70% and 100% path moving erratically, appear unhealthy
blank, red, round, healthy

6. Comments:

1 2 3 4 5

x:y:z = board #:row:column

*eeso

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 3/15/2018	Test ID: 208pIC18	Sample ID: EFFFFIN-Effluent Final
End Date: 3/22/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF2-Industrial
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000
60	1.0000	1.0000	0.0000	1.0000	1.0000
70	1.0000	1.0000	1.0000	1.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	1.0000
DWB	1.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
50	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
60	0.8000	0.8000	0.9425	0.5236	1.0472	24.845	5	0.8000	0.8000
70	0.8000	0.8000	0.9425	0.5236	1.0472	24.845	5	0.8000	0.8000
100	0.2000	0.2000	0.6283	0.5236	1.0472	37.268	5	0.2000	0.2000
DWB	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.78643	0.927	-0.7449	4.3922
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)	Skew	
IC05	52.500	6.579	50.618	82.500	1.3053
IC10	55.000	7.521	51.237	85.000	0.6573
IC15	57.500	7.608	51.855	87.500	0.6546
IC20	70.000	7.487	47.473	85.000	-0.1653
IC25	72.500	7.882	48.092	87.500	-0.1967
IC40	80.000				
IC50	85.000				

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/15/2018	Test ID: 208plC18	Sample ID: EFFFFIN-Effluent Final
End Date: 3/22/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF2-Industrial
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	24.000	29.000	28.000	24.000	29.000
50	20.000	35.000	29.000	25.000	21.000
60	20.000	30.000	23.000	29.000	22.000
70	16.000	29.000	23.000	29.000	10.000
100	10.000	17.000	11.000	1.000	10.000
DWB	24.000	35.000	26.000	35.000	23.000

Conc-%	Mean	N-Mean	Transform: Untransformed					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	26.800	1.0000	26.800	24.000	29.000	9.658	5	26.800	1.0000
50	26.000	0.9701	26.000	20.000	35.000	23.709	5	26.000	0.9701
60	24.800	0.9254	24.800	20.000	30.000	17.897	5	24.800	0.9254
70	21.400	0.7985	21.400	10.000	29.000	38.900	5	21.400	0.7985
100	9.800	0.3657	9.800	1.000	17.000	58.351	5	9.800	0.3657
DWB	28.600	1.0672	28.600	23.000	35.000	20.774	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.96902	0.927	-0.0907	-0.6892
Bartlett's Test indicates equal variances ($p = 0.46$)	4.66675	15.0863		

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	54.500	16.243	0.000	79.553 -0.5836
IC10	62.000	10.593	18.873	79.641 -0.9129
IC15	65.941	6.972	41.839	81.589 -0.4723
IC20	69.882	5.937	53.880	84.089 -0.1319
IC25	73.362	5.780	58.603	86.685 -0.0546
IC40	83.759	6.269	60.517	97.101 -0.5523
IC50	90.690			

TIER 2

WET TEST REPORT FORM – CHRONIC
BASELINE TEST

Permittee: Elk Ridge Mining and Reclamation Outfall: 013
Permit No.: CO0000213

Test Type: Routine ☐ TIE ☒
Test Species: *Ceriodaphnia dubia* IWC: 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1230	03-27-2018	1205	04-03-2018

Test Results	Lethality	Reproduction
IC ₂₅	54.2%	41.4%*

*Estimated

Dilution(s) - % Effluent

Measurements	Control (0%)	50%	60%	70%	100%
% Survival for day 1	100	100	80	100	80
% Survival for day 2	100	100	80	60	80
% Survival for day 3	100	100	40	60	80
% Survival for day 4	100	100	40	60	80
% Survival for day 5	100	100	40	40	80
% Survival for day 6	100	100	40	40	80
% Survival for day 7	100	100	40	40	20
3 Mean Brood Total	33.8	23.6	8.8	4.0	6.0

Recon Water: 100

Recon Water: 64

pH (initial/final) – Control: 8.0/7.8 100%: 6.8/7.8

Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

If **NO**, list deviations from test specifications:

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Madison Reese, Tessa Hunt-Woodland, Kyra Brisson, and Nicole Denkinger

Signature 

Date 05/02/2018

BASELINE

11/1/2

The SeaCrest Group
Louisville, CO

Ceriodaphnia Chronic TIE Initial/Baseline Benchsheet

Form #: 113a
Effective: January 2006

Permittee: Eik ridge Lab #: 418 208 Site: 013
IWC %: 100 Template #: 4 Dilution Water: MM 15-000 Sample Date: 030718
Age & Source: cerio 2006 032718 Test Start: 03280218 Test End: 040318 1205
Test Conditions:

	0	1	2	3	4	5	6	7	8	Total	
(C) 0	0	0	0	7	0	11	16	2	30	30	1. Exposure Chamber
	0	0	0	10	0	13	16	14	30	30	Total Capacity: 30 ml
	0	0	0	7	9 +1	0	18	10	35	35	Test Solution Surface Area: cm ²
	0	0	0	7	0	12	15	10	35	35	Test Solution Volume: 10 ml
	0	0	0	4	10	13	14	15	35	35	Water Depth (constant): cm
	0	0	0	4	10	13	14	15	35	35	(cyclic): to cm
DO	7.1	6.8	7.3	7.1	7.0	6.6	7.2	7.3	6.7	7.0	2. Feeding Schedule
Temp	24.1	24.5	24.4	24.2	24.1	24.3	25.1	24.4	24.8	24.2	Not fed: _____
pH	8.0	7.9	7.9	7.9	7.8	8.0	8.1	8.0	8.0	7.8	Fed Irregularly: _____
Cond	302	328	310	324	312	334	334	334	329	329	Fed Daily: <u>X</u>
(1) 50	0	0	0	5+2	0	7	9	0		23	Food Used: <u>YCT, algae</u>
	0	0	0	5+1	0	9	11	0		27	3. Aeration
	0	0	0	10	7	10	14	9		27	#1 None: _____
	0	0	0	10	4	7	4	11		15	#2 None: _____
	0	0	0	10	5	0	15	14		20	#3 None: _____
DO	6.9	6.8	7.3	7.1	7.0	6.8	7.2	7.4	7.0	7.0	Before Use: _____
Temp	24.4	24.5	24.4	24.2	24.1	24.3	25.2	24.4	24.8	24.2	(minutes @ ~100 bubbles/min)
pH	6.9	7.9	7.9	6.9	7.8	8.0	7.9	7.9	7.8	7.8	Before Use: _____
Cond	1824	—	1808	—	1861	—	—	—	—	—	(minutes @ ~100 bubbles/min)
(2) 60	0	0	0	0	0	8	9	4		21	Before Use: _____
	0	0	0	0	0	8	9	4		0	(minutes @ ~100 bubbles/min)
	0	0	0	0	0	8	9	4		0	4. Screened Animal Enclosures
	0	0	0	0	0	8	9	4		0	Not Used: <u>X</u>
DO	6.9	6.8	7.3	7.2	7.1	6.8	7.2	7.4	7.1	7.1	Used: _____
Temp	24.6	24.5	24.4	24.2	24.1	24.3	25.3	24.4	24.8	24.2	5. Condition/appearance of surviving organisms at end of test (i.e., alive but immobile; loss of orientation; erratic movement; etc.):
pH	6.8	7.8	7.9	6.9	7.9	8.0	7.0	7.8	7.8	7.8	active and mobile
Cond	1980	—	1942	—	2260	—	—	—	—	—	disturb 3 + 4 slightly
(3) 70	0	0	0	0	0	0	0	0		0	more latratic/slow
	0	0	0	0	0	0	0	0		0	
	0	0	0	0	0	0	0	0		0	
	0	0	0	0	0	0	0	0		0	
DO	6.8	6.8	7.4	7.2	7.1	6.7	7.2	7.4	7.1	7.1	
Temp	24.5	24.5	24.4	24.3	24.1	24.3	25.4	24.4	24.8	24.2	
pH	6.8	7.8	8.0	6.9	7.9	8.1	7.0	7.7	7.7	7.8	
Cond	2300	—	2390	—	2520	—	—	—	—	—	
(4) 100	0	0	0	0	0	0	0	0		8	
	0	0	0	0	0	0	0	0		6	
	0	0	0	0	0	0	0	0		0	
	0	0	0	0	0	0	0	0		0	
DO	6.7	6.8	7.4	7.3	7.1	6.7	7.2	7.5	7.2	7.2	
Temp	25.0	24.5	24.4	24.3	24.1	24.3	25.5	24.4	24.8	24.2	
pH	6.8	7.7	8.0	6.9	7.9	8.1	6.9	7.6	7.7	7.8	
Cond	3110	3010	3150	3150	3280	3280	3490	3440	3440	3100	
Algae	185/180	185/180	185/180	185/180	185/180	185/180	185/180	185/180	185/180	185/180	
YCT	1802	1802	1802	1802	1802	1802	1802	1802	1802	1802	
H ₂ O											
Initials	THW	THW	THW	THW	THW	THW	THW	THW	THW	THW	
Eff #1	Eff #2	Eff #3	Recon #1	Recon #2	Recon #3						
Hardness			100								
Alkalinity			104								
Chlorine			20.01								
Ammonia			20.03								
1	2	3	4	5							
153	PM	155	156	157							
x:y:z = board #:row:column											

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 3/27/2018	Test ID: 208TiiBase	Sample ID: EFFFIN-Effluent Final
End Date: 4/3/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000
60	1.0000	0.0000	0.0000	0.0000	1.0000
70	0.0000	0.0000	1.0000	0.0000	1.0000
100	0.0000	0.0000	0.0000	0.0000	1.0000

Conc-%	Transform: Arcsin Square Root							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
50	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
60	0.4000	0.4000	0.7330	0.5236	1.0472	39.123	5	0.4000	0.4000
70	0.4000	0.4000	0.7330	0.5236	1.0472	39.123	5	0.4000	0.4000
100	0.2000	0.2000	0.6283	0.5236	1.0472	37.268	5	0.2000	0.2000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.82926	0.918	0.89303	-0.1393
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)	Skew	
IC05	50.833	0.458	50.449	53.333	2.1859
IC10	51.667	0.917	50.897	56.667	2.1859
IC15	52.500	1.375	51.346	60.000	2.1859
IC20	53.333	2.358	51.795	63.333	3.8908
IC25	54.167	2.650	52.244	64.792	3.7590
IC40	56.667	5.208	53.590	76.667	2.0246
IC50	58.333				

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/27/2018	Test ID: 208TiiBase	Sample ID: EFFFIN-Effluent Final
End Date: 4/3/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	36.000	35.000	35.000	35.000	28.000
50	23.000	27.000	27.000	15.000	26.000
60	21.000	0.000	0.000	0.000	23.000
70	0.000	0.000	7.000	0.000	13.000
100	8.000	6.000	0.000	5.000	11.000

Conc-%	Mean	N-Mean	Transform: Untransformed					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	33.800	1.0000	33.800	28.000	36.000	9.678	5	33.800	1.0000
50	23.600	0.6982	23.600	15.000	27.000	21.523	5	23.600	0.6982
60	8.800	0.2604	8.800	0.000	23.000	137.166	5	8.800	0.2604
70	4.000	0.1183	4.000	0.000	13.000	146.842	5	5.000	0.1479
100	6.000	0.1775	6.000	0.000	11.000	67.700	5	5.000	0.1479

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.94014	0.918	0.44702	0.02483
Bartlett's Test indicates equal variances ($p = 0.08$)	8.23929	13.2767		

Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)	Skew	
IC05*	8.284	2.342	4.357	18.235	1.1540
IC10*	16.569	4.684	8.714	36.470	1.1540
IC15*	24.853	6.932	13.071	54.706	1.0610
IC20*	33.137	7.917	17.428	59.209	0.4116
IC25*	41.422	7.107	21.784	56.764	-0.2846
IC40	52.243	2.328	41.871	57.887	-1.8861
IC50	54.527	2.112	50.674	64.079	1.1686

* indicates IC estimate less than the lowest concentration

**WET TEST REPORT FORM – CHRONIC
pH 3 TEST**

Permittee: Elk Ridge Mining and Reclamation

Outfall: 013

Permit No.: CO0000213

Test Type: Routine ☐ TIE ☒

Test Species: *Ceriodaphnia dubia*

IWC: 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1325	03-27-2018	1240	04-03-2018

Test Results	Lethality	Reproduction
IC ₂₅	56.3%	53.4%

Dilution(s) - % Effluent

Measurements	Control (0%)	50%	60%	70%	100%	Method Control
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	100	80	40	100
% Survival for day 3	100	100	80	60	40	100
% Survival for day 4	100	100	60	40	20	100
% Survival for day 5	100	100	60	40	20	100
% Survival for day 6	100	100	60	40	0	80
% Survival for day 7	100	100	60	40	0	80
Mean 3 Brood Total	29.6	26.2	14.6	8.0	1.6	25.6

Recon Water: 100

Recon Water: 64

pH (initial/final) – Control: 8.1/7.8 100%: 6.5/8.0

Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

If **NO**, list deviations from test specifications:

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Tessa Hunt-Woodland, Kyra Brisson, Dan Hillenburg, and Nicole Denkinger

Signature 

Date 05/02/2018

PH3 (lime green)

The SeaCrest Group

Louisville, CO

Permittee: ER Ridge

IWC #: 100

Age & Source: cerio 2006 03 21 18

Test Conditions: Test brought to pH 3 and back to pH 1

Ceriodaphnia Chronic TIE pH 3 Benchsheet

Lab #: 418 208

Site: 013

Dilution Water: MH 15-0010

Test Start: 030718 1325

Form: 113m

Effective: June 2013

Sample Date: 030718

Test End: 040318 1240

	0	1	2	3	4	5	6	7	8	Total
(C) 0	0	0	0	6	0	12	16	14		34
	0	0	0	5	0	11	15	12		31
	0	0	0	5	0	0	12	13		30
	0	0	0	6	6	12	18	12	24	56
	0	0	0	5	0	12	12	0		29
DO	7.1	6.9	7.5	7.1	7.42	6.7	7.3	6.9	6.5	7.1
Temp	24.1	24.3	24.5	24.1	24.2	24.1	24.2	24.9	24.3	24.5
pH	8.0	7.9	7.9	8.0	7.98	8.1	7.9	7.9	7.8	
Cond	304	309	311	317	314	315	315	328		
(1) 50	0	0	0	4	0	11	14	9		29
	0	0	0	5	0	11	10	10		27
	0	0	0	7	4	0	12	11		23
	0	0	0	5	4	0	8	8		25
	0	0	0	6	0	0	11	0		27
DO	7.1	7.0	7.5	7.3	7.2	6.8	7.3	6.9	6.8	7.4
Temp	24.3	24.3	24.5	24.3	24.2	24.1	24.2	24.9	24.3	24.5
pH	8.0	8.0	7.9	8.0	8.0	7.8	8.0	7.8		
Cond	2130	-	2130	-	2190	-	-	-		
(2) 60	0	0	0	0	3	9	11	8	23	38
	0	0	0	5	0	0	12	0	1	16
	0	0	0	0	0	0	12	0	1	20
	0	0	0	0	0	0	11	0		0
	0	0	0	4	0	1	0	9		24
DO	7.2	7.0	7.6	7.4	7.2	6.9	7.4	7.0	6.9	7.5
Temp	24.4	24.3	24.5	24.4	24.2	24.1	24.2	24.9	24.3	24.5
pH	8.0	8.0	8.0	8.0	8.0	7.8	8.0	7.8		
Cond	2590	-	2640	-	2650	-	-	-		
(3) 70	0	0	0	0	4	9	12	6	21	38
	0	0	0	4	6	0	9	9		19
	0	0	0	0	0	0	0	0		0
	0	0	0	0	0	0	0	0		0
DO	7.2	7.1	7.6	7.5	7.2	7.0	7.4	7.0	6.9	7.6
Temp	24.4	24.3	24.5	24.4	24.2	24.1	24.2	24.9	24.3	24.5
pH	8.0	8.0	8.0	8.0	8.0	7.8	8.0	7.8		
Cond	2890	-	2880	-	3050	-	-	2950		
(4) 100	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
DO	7.2	7.2	7.7	7.5	7.4	7.1	7.5	7.0	7.0	7.6
Temp	24.5	24.3	24.5	24.8	24.3	24.1	25.1	24.9	24.3	24.5
pH	8.1	8.1	8.1	8.0	8.0	8.0	6.7	7.8	8.1	8.0
Cond	3580	3720	3840	3960	3990	3900	3900	3900	3970	
dilution water	0	0	0	6	7	6	13	0		22
blank	0	0	0	4	0	8	13	0		26
	0	0	0	5	5	0	13	16		23
	0	0	0	6	0	11	13	0		30
	0	0	0	6	6	0	15	15		27
DO	7.5	7.3	7.4	7.6	7.42	6.7	7.4	7.1	6.6	7.3
Temp	24.4	24.3	24.5	24.7	24.3	25.2	25.1	24.9	24.3	24.5
pH	7.8	8.1	7.8	7.9	8.0	8.0	7.8	8.0	7.8	8.0
Cond	536	537	547	552	553	545	537	538		
Algae	NS/NO	NS/NO	NS/NO	NS/NO	NS/NO	NS/NO	NS/NO	NS/NO		
YCT	1802	1802	1802	1802	1802	1802	1802	1802		
H ₂ O										
Initials	PHU	ND	PHU	PHU	PHU	PHU	PHU	PHU		
Eff #1										
Eff #2										
Eff #3										
Recon #1										
Recon #2										
Recon #3										
Hardness					100					
Alkalinity					64					
Chlorine					10.01					
Ammonia					10.03					

- Exposure Chamber
 - Total Capacity: 30 ml
 - Test Solution Surface Area: 31 cm²
 - Test Solution Volume: 10 ml
 - Water Depth (constant): 10 cm
 - (cyclic): to 10 cm
- Feeding Schedule
 - Not fed: _____
 - Fed Irregularly: _____
 - Fed Daily: ☒ X
 - Food Used: YCT, algae
- Aeration
 - #1 None: _____
 - #2 None: _____
 - #3 None: _____
- Before Use: _____
 - (minutes @ ~100 bubbles/min)
- Before Use: _____
 - (minutes @ ~100 bubbles/min)
- Screened Animal Enclosures
 - Not Used: ☒ X
 - Used: _____
- Condition/appearance of surviving organisms at end of test (i.e., alive but immobile; loss of orientation; erratic movement; etc.):

active and mobile
direction very pale
and slow

6. Comments:

1	2	3	4	5
A7	A9	A10	B1	B2

x.y.z = board #: row:column

A7 A9 A10 B1 B2

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 3/27/2018	Test ID: 208TiipH3	Sample ID: EFFFIN-Effluent Final
End Date: 4/3/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000
60	1.0000	0.0000	1.0000	0.0000	1.0000
70	0.0000	1.0000	1.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000
Blank	0.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Transform: Arcsin Square Root							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
50	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
60	0.6000	0.6000	0.8378	0.5236	1.0472	34.233	5	0.6000	0.6000
70	0.4000	0.4000	0.7330	0.5236	1.0472	39.123	5	0.4000	0.4000
100	0.0000	0.0000	0.5236	0.5236	0.5236	0.000	5	0.0000	0.0000
Blank	0.8000	0.8000	0.9425	0.5236	1.0472	24.845	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.92295	0.918	-0.4465	-0.1393
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)	Skew	
IC05	51.250	2.358	50.446	65.625	3.4064
IC10	52.500	3.056	50.893	67.594	3.0435
IC15	53.750	3.381	51.339	68.891	2.3713
IC20	55.000	4.417	51.786	77.500	1.8417
IC25	56.250	4.604	52.232	79.688	1.8364
IC40	60.000	6.074	53.571	86.250	1.0955
IC50	65.000	6.870	53.214	89.375	0.7149

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/27/2018	Test ID: 208TiipH3	Sample ID: EFFFIN-Effluent Final
End Date: 4/3/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	34.000	31.000	30.000	24.000	29.000
50	29.000	27.000	23.000	25.000	27.000
60	23.000	6.000	20.000	0.000	24.000
70	0.000	21.000	19.000	0.000	0.000
100	0.000	0.000	0.000	8.000	0.000
Blank	22.000	26.000	23.000	30.000	27.000

Conc-%	Mean	N-Mean	Transform: Untransformed					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	29.600	1.0000	29.600	24.000	34.000	12.321	5	29.600	1.0000
50	26.200	0.8851	26.200	23.000	29.000	8.704	5	26.200	0.8851
60	14.600	0.4932	14.600	0.000	24.000	74.654	5	14.600	0.4932
70	8.000	0.2703	8.000	0.000	21.000	137.216	5	8.000	0.2703
100	1.600	0.0541	1.600	0.000	8.000	223.607	5	1.600	0.0541
Blank	25.600	0.8649	25.600	22.000	30.000	12.537	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.98081	0.927	-0.0008	0.16273
Bartlett's Test indicates unequal variances ($p = 6.83E-03$)	16.0053	15.0863		

Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)	Skew	
IC05*	21.765	11.828	7.735	65.342	0.9294
IC10*	43.529	9.056	15.470	56.465	-0.5425
IC15	50.897	4.263	30.404	55.113	-1.9389
IC20	52.172	1.693	48.383	57.480	0.2217
IC25	53.448	1.923	50.150	60.786	1.2266
IC40	57.276	3.156	53.001	70.365	1.7222
IC50	59.828	4.275	54.268	80.030	1.6437

* indicates IC estimate less than the lowest concentration

WET TEST REPORT FORM – CHRONIC
pH 10 TEST

Permittee: Elk Ridge Mining and Reclamation

Outfall: 013

Permit No.: CO0000213

Test Type: Routine ☐ TIE ☒

Test Species: *Ceriodaphnia dubia*

IWC: 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1330	03-27-2018	1300	04-03-2018

Test Results	Lethality	Reproduction
IC ₂₅	>100%	62.9%

Dilution(s) - % Effluent

Measurements	Control (0%)	50%	60%	70%	100%	Method Control
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	100	100	100	100
% Survival for day 3	100	100	100	100	100	100
% Survival for day 4	100	100	100	100	100	80
% Survival for day 5	100	100	100	100	100	80
% Survival for day 6	100	100	100	100	100	80
% Survival for day 7	100	100	100	100	100	80
Mean 3 Brood Total	29.2	22.8	24.6	17.4	13.0	24.4

Recon Water: 100

Recon Water: 64

pH (initial/final) – Control: 8.0/7.9 100%: 6.7/8.0

Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

If **NO**, list deviations from test specifications:

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Tessa Hunt-Woodland, Kyra Brisson, Dan Hillenburg, and Nicole Denkinger

Signature 

Date 05/02/2018

The SeaCrest Group

Ceriodaphnia Chronic TIE pH 10 Benchsheet

Form: 113q

Louisville, CO

Permittee:

Elk Ridge

Lab #:

418 208

Site:

013

Effective: June 2013

IWC %:

100

Template #:

4

Dilution Water:

MFI 18-006

Sample Date:

030718

Age & Source:

cerio 2016 CBZ18

Test Start:

032718 1330

Test End:

040318 1300

Test Conditions: Test brought to pH 10 and back to pH

	0	1	2	3	4	5	6	7	8	Total
(C) 0	0	0	0	7	6	0	18	16		31
	0	0	0	0	7	8	0	15		30
	0	0	0	7	8	0	16	13		31
	0	0	0	6	5	0	15	15		26
	0	0	0	5	6	0	12	15		23
DO	7.1	6.7	7.2	7.1	7.4	6.5	7.1	7.2	6.5	7.0
Temp	24.1	24.3	24.5	24.1	24.3	24.5	25.1	24.9	24.3	24.5
pH	8.0	7.8	7.8	7.9	7.9	7.9	8.4	7.9	7.9	7.9
Cond	302	310	311	312	311	314	317	310	308	29.2
(1) 50	0	0	0	4	6	0	14	6		21
	0	0	0	4	3	0	13	13		23
	0	0	0	4	4	0	13	9		21
	0	0	0	5	4	0	11	12		21
	0	0	0	6	7	0	10	11		23
DO	7.1	6.9	7.3	7.1	7.2	6.4	7.1	7.3	6.5	7.1
Temp	24.2	24.3	24.5	24.4	24.3	24.5	25.2	24.9	24.3	24.5
pH	7.1	7.8	7.9	7.1	7.9	7.9	7.7	8.0	8.0	7.9
Cond	1975	—	1998	—	1964	—	—	—	—	*
(2) 60	0	0	0	5	2	0	13	10		30
	0	0	0	0	2	0	0	11		27
	0	0	0	4	5	0	12	12		21
	0	0	0	5	6	0	11	10		22
	0	0	0	0	8	10	5	8		23
DO	7.1	7.0	7.4	7.0	7.2	6.4	7.0	7.3	6.6	7.1
Temp	24.2	24.3	24.5	24.4	24.3	24.5	25.2	24.9	24.3	24.5
pH	7.1	7.8	8.0	7.0	7.9	8.6	6.9	8.0	8.0	8.0
Cond	2410	—	2490	—	2520	—	—	—	—	24.6
(3) 70	0	0	0	0	4	5	10	5		22
	0	0	0	0	6	11	0	6		23
	0	0	0	0	5	12	0	5		12
	0	0	0	0	3	11	0	2	7	13
	0	0	0	4	6	0	0	7		17
DO	7.1	7.1	7.4	7.0	7.3	6.5	7.0	7.3	6.6	7.1
Temp	24.2	24.3	24.5	24.8	24.2	24.3	25.2	24.9	24.3	24.5
pH	7.1	7.9	8.0	7.0	7.9	8.1	6.8	8.0	8.0	8.0
Cond	2710	—	2790	—	2850	—	—	—	—	*
(4) 100	0	0	0	0	1	13	0	8	5	17
	0	0	0	0	6	11	0	1	13	11
	0	0	0	0	2	13	0	2	8	15
	0	0	0	0	0	0	0	4	4	8
	0	0	0	5	4	11	0	2	12	14
DO	7.1	7.3	7.4	7.0	7.4	6.4	7.0	7.3	6.6	7.2
Temp	24.3	24.3	24.5	25.1	24.2	24.3	25.3	24.9	24.3	24.5
pH	6.7	7.9	8.1	6.7	7.9	8.1	6.8	8.0	8.1	8.0
Cond	3650	3570	3690	3650	3650	3850	3800	3830	3710	130
dilution water	0	0	0	0	5	0	10	12		21
blank	0	0	0	0	10	0	0	7		37
	0	0	0	6	8	0	13	14		27
	0	0	0	7	0	—	—	—		7
	0	0	0	6	10	0	14	17		30
DO	7.4	7.6	7.6	7.4	7.4	6.1	7.2	7.2	6.7	7.2
Temp	24.2	24.3	24.5	25.0	24.2	24.3	24.9	24.4	24.3	24.5
pH	7.9	7.9	7.9	7.9	7.9	6.1	7.9	8.0	8.0	7.9
Cond	374	389	380	375	375	391	392	388	383	24.4
Algae	NS/AB/ABO	NS/AB/ABO	NS/AB/ABO	NS/AB/ABO	NS/AB/ABO	NS/AB/ABO	NS/AB/ABO	NS/AB/ABO	NS/AB/ABO	
YCT	1802	1802	1802	1802	1802	1802	1802	1802	1802	
H ₂ O										
Initials	THW	ND	THW	THW	THW	THW	THW	THW	THW	
Eff #1	Eff #2	Eff #3	Recon #1	Recon #2	Recon #3					
Hardness			100							
Alkalinity			64							
Chlorine			1.00							
Ammonia			2.00							

1. Exposure Chamber
 Total Capacity: 30 ml
 Test Solution Surface Area: cm²
 Test Solution Volume: 10 ml
 Water Depth (constant): cm
 (cyclic): to cm
2. Feeding Schedule
 Not fed: _____
 Fed Irregularly: _____
 Fed Daily: X
 Food Used: YCT, algae

3. Aeration
 #1 None: _____
 #2 None: _____
 #3 None: _____

- Before Use: _____
 (_____ minutes @ ~100 bubbles/min)
 Before Use: _____
 (_____ minutes @ ~100 bubbles/min)

4. Screened Animal Enclosures
 Not Used: X
 Used: _____

5. Condition/appearance of surviving organisms at end of test (i.e., alive but immobile; loss of orientation; erratic movement; etc.):

- active and mobile, dilute
 3, 4 smaller, more translucent

6. Comments:

-

-

-

-

-

-

- 1 2 3 4 5
 C9 D1 D2 D3 D4
 x.y.z = board #: row:column

C9 D1 D2 D3 D4 D5

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 3/27/2018	Test ID: 208TiipH10	Sample ID: EFFFIN-Effluent Final
End Date: 4/3/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000
60	1.0000	1.0000	1.0000	1.0000	1.0000
70	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000
Blank	1.0000	1.0000	1.0000	0.0000	1.0000

Conc-%	Transform: Arcsin Square Root							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
50	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
60	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
70	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
100	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
Blank	0.8000	0.8000	0.9425	0.5236	1.0472	24.845	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.05$)	0.41613	0.927	-3.8705	19.8512
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/27/2018	Test ID: 208TiipH10	Sample ID: EFFFIN-Effluent Final
End Date: 4/3/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia

Conc-%	1	2	3	4	5
D-Control	31.000	35.000	31.000	26.000	23.000
50	24.000	25.000	21.000	21.000	23.000
60	30.000	27.000	21.000	22.000	23.000
70	22.000	23.000	12.000	13.000	17.000
100	17.000	11.000	15.000	8.000	14.000
Blank	21.000	37.000	27.000	7.000	30.000

Conc-%	Transform: Untransformed							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	29.200	1.0000	29.200	23.000	35.000	16.136	5	29.200	1.0000
50	22.800	0.7808	22.800	21.000	25.000	7.846	5	23.700	0.8116
60	24.600	0.8425	24.600	21.000	30.000	15.372	5	23.700	0.8116
70	17.400	0.5959	17.400	12.000	23.000	28.908	5	17.400	0.5959
100	13.000	0.4452	13.000	8.000	17.000	27.196	5	13.000	0.4452
Blank	24.400	0.8356	24.400	7.000	37.000	46.331	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.93711	0.927	-0.7611	3.30104
Bartlett's Test indicates equal variances ($p = 0.02$)	13.3638	15.0863		

Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)	Skew	
IC05*	13.273	8.392	6.569	58.954	2.7004
IC10*	26.545	12.303	13.137	78.428	1.3812
IC15*	39.818	12.240	19.706	74.662	0.4596
IC20	60.540	9.989	22.551	69.424	-0.4842
IC25	62.857	6.395	34.597	77.165	-1.4967
IC40	69.810	6.928	63.984	96.464	0.8362
IC50	89.091				

* indicates IC estimate less than the lowest concentration

**WET TEST REPORT FORM – CHRONIC
pH 3 FILTERED TEST**

Permittee: Elk Ridge Mining and Reclamation

Outfall: 013

Permit No.: CO0000213

Test Type: Routine ☐ TIE ☒

Test Species: *Ceriodaphnia dubia*

IWC: 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1515	03-27-2018	1500	04-03-2018

Test Results	Lethality	Reproduction
IC ₂₅	68.3%	35.6%*

*Estimated

Dilution(s) - % Effluent

Measurements	Control (0%)	50%	60%	70%	100%	Method Control
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	100	100	100	100
% Survival for day 3	100	100	100	100	100	80
% Survival for day 4	100	100	100	100	100	80
% Survival for day 5	100	100	100	80	100	80
% Survival for day 6	100	100	100	60	80	80
% Survival for day 7	100	100	100	60	80	80
Mean 3 Brood Total	33.0	21.4	18.4	12.0	8.0	23.8

Recon Water: 100

Recon Water: 64

pH (initial/final) – Control: 8.0/7.9 100%: 6.6/8.0

Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

If **NO**, list deviations from test specifications:

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Madison Reese, Tessa Hunt-Woodland, Dan Hillenburg and Nicole Denkinger

Signature 

Date 05/02/2018

The SeaCrest Group

Ceriodaphnia Chronic TIE pH 3 Filter Benchsheet

Form: 1130

Effective: June 2013

Louisville, CO

Permittee: Env RidgeLab #: 418 208Site: 013IWC %: 100Template #: 41Dilution Water: MM 15-006Sample Date: 03/27/18Age & Source: cerio2006 CB2718Test Start: 03/27/181450Test End: 040318-1500Test Conditions: Test brought to pH 3 filtered and back to pH 1515

	0	1	2	3	4	5	6	7	8	Total
(C) 0	0	0	0	7	12	0	15	11		34
	0	0	0	0	5	12	12	0		29
	0	0	0	0	6	12	13	0		31
	0	0	0	0	8	11	0	15		34
	0	0	0	5	4	13	18	13		37
DO	7.1	7.0	6.9	7.5	6.9	7.3	7.3	7.1		33.0
Temp	24.2	24.7	24.3	24.1	24.3	24.1	24.3	24.1		
pH	8.0	7.9	7.8	8.1	8.3	8.4	8.2	7.9		
Cond	303	317	302	308	305	327	326	326		
(1) 50	0	0	0	35	6	1	59	6		21
	0	0	0	0	6	9	0	5		20
	0	0	0	0	4	10	0	8	10	24
	0	0	0	0	5	7	0	12		24
	0	0	0	2	5	8	43	0		18
DO	7.0	7.0	7.0	7.7	7.0	7.0	7.3	7.3		*
Temp	24.6	24.7	24.3	24.1	24.1	24.3	24.1	24.1		21.4
pH	7.3	7.9	7.9	7.0	8.0	8.3	8.2	7.9		
Cond	1998	—	2130	—	2180	—	—	—		
(2) 60	0	0	0	5	6	0	8	0		19
	0	0	0	0	4	6	0	4		14
	0	0	0	0	5	6	10	7		19
	0	0	0	0	5	7	10	8		22
	0	0	0	0	3	8	8	0		19
DO	6.9	7.0	7.0	7.7	7.0	7.1	7.5	7.3		*
Temp	24.9	24.7	24.3	24.1	24.1	24.3	24.1	24.2		19.4
pH	7.1	7.9	7.9	6.9	8.1	8.3	8.2	8.0		
Cond	2480	—	2480	—	2550	—	—	—		
(3) 70	0	0	0	2	0	40	—	—		6
	0	0	0	0	4	6	0	6		16
	0	0	0	0	4	5	0	5		14
	0	0	0	0	5	0	5	4		14
	0	0	0	0	3	7	0	—		10
DO	6.9	7.0	7.0	7.7	7.2	7.2	7.6	7.3		*
Temp	25.2	24.7	24.3	24.1	24.1	24.2	24.3	24.4		17.0
pH	6.9	7.9	7.9	6.8	8.1	8.4	8.2	8.0		
Cond	2780	—	2850	—	2930	—	—	—		
(4) 100	0	0	0	1	7	0	6	0		14
	0	0	0	0	0	0	5	7		12
	0	0	0	0	0	0	4	0		4
	0	0	0	0	4	0	11	10		6
	0	0	0	0	1	13	0	0		4
DO	6.7	7.0	7.1	7.8	7.3	7.3	7.7	7.4		*
Temp	25.6	24.7	24.3	24.1	24.1	24.2	24.3	24.4		6.0
pH	6.6	7.9	8.0	6.7	8.2	8.4	8.2	8.0		
Cond	3750	3570	3750	3740	3820	3820	3900	3640		3710
dilution water	0	0	0	35	11	0	12	10		28
blank	0	0	0	0	6	12	10	12		28
	0	0	0	0	8	12	0	14		34
	0	0	0	0	6	13	0	9		28
	0	0	0	10	—	—	—	—		1
DO	7.3	7.0	7.3	7.8	7.2	7.0	7.8	7.9		7.6
Temp	25.4	24.7	24.3	24.1	24.1	24.2	24.3	24.4		24.1
pH	7.2	7.9	7.8	7.9	8.1	8.4	8.0	8.1		7.9
Cond	514	524	511	528	525	541	525	533		
Algae	ABS/AR0	ABS/AR0	ABS/AR0	ABS/AR0	ABS/AR0	ABS/AR0	ABS/AR0	ABS/AR0		
YCT	1802	1802	1802	1802	1802	1802	1802	1802		
H ₂ O	—	—	—	—	—	—	—	—		
Initials	THW	THW	—	—	—	—	—	—		
Eff #1	Eff #2	Eff #3	Recon #1	Recon #2	Recon #3					
Hardness			106							
Alkalinity			64							
Chlorine			LO-01							
Ammonia			LO-03							

1. Exposure Chamber
Total Capacity: 30 ml
Test Solution Surface Area: cm²
Test Solution Volume: 10 ml
Water Depth (constant): cm
(cyclic): to cm
2. Feeding Schedule
Not fed: _____
Fed Irregularly: _____
Fed Daily: ☒ X
Food Used: YCT, algae
3. Aeration
#1 None: _____
#2 None: _____
#3 None: _____
Before Use: _____
(minutes @ ~100 bubbles/min)
Before Use: _____
(minutes @ ~100 bubbles/min)
4. Screened Animal Enclosures
Not Used: ☒ X
Used: _____
5. Condition/appearance of surviving organisms at end of test (i.e., alive but immobile; loss of orientation; erratic movement; etc.):
Mobile and active

6. Comments:

1	2	3	4	5
Ca	D1	D3	D5	D10
x,y,z = board #:row:column				

*7.9

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 3/27/2018	Test ID: 208Tii3F	Sample ID: EFFFIN-Effluent Final
End Date: 4/3/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000
60	1.0000	1.0000	1.0000	1.0000	1.0000
70	0.0000	1.0000	1.0000	1.0000	0.0000
100	1.0000	1.0000	1.0000	1.0000	0.0000
Blank	1.0000	1.0000	1.0000	1.0000	0.0000

Conc-%	Transform: Arcsin Square Root							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
50	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
60	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
70	0.6000	0.6000	0.8378	0.5236	1.0472	34.233	5	0.7000	0.7000
100	0.8000	0.8000	0.9425	0.5236	1.0472	24.845	5	0.7000	0.7000
Blank	0.8000	0.8000	0.9425	0.5236	1.0472	24.845	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.05$)	0.76012	0.927	-1.4778	1.97749
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	61.667			
IC10	63.333			
IC15	65.000			
IC20	66.667			
IC25	68.333			
IC40	>100			
IC50	>100			

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/27/2018	Test ID: 208Tii3F	Sample ID: EFFFIN-Effluent Final
End Date: 4/3/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	34.000	29.000	31.000	34.000	37.000
50	21.000	20.000	24.000	24.000	18.000
60	19.000	14.000	19.000	21.000	19.000
70	6.000	16.000	14.000	14.000	10.000
100	14.000	12.000	4.000	6.000	4.000
Blank	28.000	28.000	34.000	28.000	1.000

Conc-%	Transform: Untransformed							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	33.000	1.0000	33.000	29.000	37.000	9.340	5	33.000	1.0000
50	21.400	0.6485	21.400	18.000	24.000	12.185	5	21.400	0.6485
60	18.400	0.5576	18.400	14.000	21.000	14.172	5	18.400	0.5576
70	12.000	0.3636	12.000	6.000	16.000	33.333	5	12.000	0.3636
100	8.000	0.2424	8.000	4.000	14.000	58.630	5	8.000	0.2424
Blank	23.800	0.7212	23.800	1.000	34.000	54.654	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.05$)	0.81696	0.927	-2.1975	8.72161
Bartlett's Test indicates unequal variances ($p = 3.61E-03$)	17.5202	15.0863		

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC05*	7.112	1.026	5.239	9.971
IC10*	14.224	2.053	10.478	19.942
IC15*	21.336	3.079	15.717	29.913
IC20*	28.448	4.106	20.956	39.884
IC25*	35.560	4.712	26.196	49.855
IC40	55.333	4.022	42.694	63.980
IC50	62.969	2.127	56.242	68.876

* indicates IC estimate less than the lowest concentration

**WET TEST REPORT FORM – CHRONIC
pH 10 FILTERED TEST**

Permittee: Elk Ridge Mining and Reclamation

Outfall: 013

Permit No.: CO0000213

Test Type: Routine ☐ TIE ☒

Test Species: *Ceriodaphnia dubia*

IWC: 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1500	03-27-2018	1426	04-03-2018

Test Results	Lethality	Reproduction
IC ₂₅	>100%	>100%

Dilution(s) - % Effluent

Measurements	Control (0%)	50%	60%	70%	100%	Method Control
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	100	100	100	100
% Survival for day 3	100	100	100	100	100	100
% Survival for day 4	100	100	100	100	100	100
% Survival for day 5	100	100	100	100	100	100
% Survival for day 6	80	100	100	100	100	100
% Survival for day 7	80	100	100	100	100	100
Mean 3 Brood Total	25.8	30.0	27.4	26.6	26.8	29.0

Recon Water: 100

Recon Water: 64

pH (initial/final) – Control: 8.0/7.8 100%: 6.7/8.0

Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

If **NO**, list deviations from test specifications:

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Madison Reese, Tessa Hunt-Woodland, Dan Hillenburg and Nicole Denkinger

Signature 

Date 05/02/2018

The SeaCrest Group

Ceriodaphnia Chronic TIE pH 10 Filter Benchsheet

Form: 113s

Effective: June 2013

Louisville, CO

Permittee:

Eik Ridge

Lab #:

418 205

Site:

013

IWC %:

100

Template #:

4

Dilution Water:

MPT 1800

Sample Date:

030718

Age & Source:

cerio 13218 2000

Test Start:

032718

Test End:

03040318 - 1426

Test Conditions:

Test brought to pH(10) filtered and back to pH

1500

	0	1	2	3	4	5	6	7	8	Total
(C) 0	0	0	0	5	5	8	15	14		25
	0	0	0	0	5	12	12	0		29
	0	0	0	0	7	0	24	6		27
	0	0	0	0	11	0	15	10		32
	0	0	0	0	5	11	0			16
DO	7.1	6.7	7.1	7.5	10.8	7.3	7.3	7.1	7.6	
Temp	24.2	24.7	24.3	24.1	24.1	24.2	24.3	24.4	24.3	25.9
pH	8.0	8.0	7.8	7.9	8.0	8.1	8.2	8.2	7.8	
Cond	302	319	302	310	307	321	333	317		
(1) 50	0	0	0	0	5	0	15	13		30
	0	0	0	0	5	12	16	0		33
	0	0	0	0	5	0	16	11		30
	0	0	0	0	5	0	16	10		30
	0	0	0	0	6	10	0	11		27
DO	7.0	6.7	7.2	7.7	10.8	7.3	7.3	7.5		
Temp	24.3	24.7	24.3	24.1	24.1	24.2	24.3	24.4	24.3	30.0
pH	7.9	8.0	7.9	6.9	8.0	8.1	7.3	8.2	7.9	
Cond	1737		1765		1864					
(2) 100	0	0	0	0	7	0	13	11		21
	0	0	0	0	6	10	14	0		30
	0	0	0	0	8	0	15	15		27
	0	0	0	0	7	0	14	10		25
	0	0	0	0	5	10	0	14		29
DO	7.0	6.8	7.2	7.8	10.9	7.4	7.3	7.5		
Temp	24.3	24.7	24.3	24.1	24.1	24.2	24.3	24.4	24.3	27.4
pH	7.2	8.0	8.0	6.8	8.1	8.2	7.2	8.2	7.9	
Cond	2270		2240		2290					
(3) 70	0	0	0	5	7	0	14	8		21
	0	0	0	0	5	11	12	12		28
	0	0	0	5	12	0	11	12		28
	0	0	0	4	6	41	0	11		22
	0	0	0	0	5	11	0	11		27
DO	7.0	6.8	7.2	7.9	7.0	7.4	7.4	7.5		
Temp	24.4	24.7	24.3	24.1	24.1	24.3	24.4	24.4		26.6
pH	7.0	8.1	8.1	6.8	8.2	8.2	7.1	8.2	7.9	
Cond	2430		2420		2550					
(4) 100	0	0	0	2	5	0	12	9		28
	0	0	0	0	4	10	11	13		28
	0	0	0	3	5	0	12	9		29
	0	0	0	0	5	0	12	8		25
	0	0	0	0	5	9	0	10		24
DO	7.0	6.8	7.3	8.0	7.0	7.4	7.4	7.6	7.5	
Temp	24.4	24.7	24.3	24.1	24.1	24.3	24.4	24.4		26.8
pH	6.7	8.1	8.2	6.7	8.3	8.2	6.7	8.2	8.0	
Cond	3300	3190	3300	3310	3390	3440	3300	3400		
dilution water blank	0	0	0	0	9	0	11	10		30
	0	0	0	0	6	11	12	8.0		29
	0	0	0	0	4	0	14	8		26
	0	0	0	0	10	0	14	6		30
	0	0	0	0	6	11	0	13		30
DO	7.4	7.0	7.2	8.1	7.1	7.4	7.6	7.4	7.3	
Temp	24.3	24.7	24.3	24.1	24.1	24.2	24.1	24.3	24.4	29.0
pH	7.7	8.0	8.0	7.8	8.2	8.1	7.8	8.3	8.0	
Cond	381	391	379	385	392	428	414	395		
Algae	ABS/NO	ABS/NO	ABS/NO	ABS/NO	ABS/NO	ABS/NO	ABS/NO	ABS/NO	ABS/NO	
YCT	1802	1802	1802	1802	1802	1802	1802	1802	1802	
H ₂ O										
Initials	MM	MM	MM	MM	MM	MM	MM	MM	MM	
Eff #1										
Eff #2										
Eff #3										
Recon #1										
Recon #2										
Recon #3										
Hardness										
Alkalinity										
Chlorine										
Ammonia										

1. Exposure Chamber
Total Capacity: 30 ml
Test Solution Surface Area: 29 cm²
Test Solution Volume: 10 ml
Water Depth (constant): 10 cm
(cyclic): to 10 cm
2. Feeding Schedule
Not fed: _____
Fed Irregularly: _____
Fed Daily: X
Food Used: YCT, algae
3. Aeration
#1 None: _____
#2 None: _____
#3 None: _____
- Before Use: _____
(minutes @ ~100 bubbles/min)
Before Use: _____
(minutes @ ~100 bubbles/min)
4. Screened Animal Enclosures
Not Used: X
Used: _____
5. Condition/appearance of surviving organisms at end of test (i.e., alive but immobile; loss of orientation; erratic movement; etc.):
Mobile and active

6. Comments:

250k

1	2	3	4	5
C9	D1	D2	D4	D5
x,y,z = board #:row:column				

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 3/27/2018	Test ID: 208Tii10F	Sample ID: EFFFIN-Effluent Final
End Date: 4/3/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
ON-Control	1.0000	1.0000	1.0000	1.0000	1.0000
SN--Control	1.0000	1.0000	1.0000	1.0000	0.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000
60	1.0000	1.0000	1.0000	1.0000	1.0000
70	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000
Blank	1.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Transform: Arcsin Square Root							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
ON-Control	1.0000	1.2500	1.0472	1.0472	1.0472	0.000	5		
SN--Control	0.8000	1.0000	0.9425	0.5236	1.0472	24.845	5	0.9600	1.0000
50	1.0000	1.2500	1.0472	1.0472	1.0472	0.000	5	0.9600	1.0000
60	1.0000	1.2500	1.0472	1.0472	1.0472	0.000	5	0.9600	1.0000
70	1.0000	1.2500	1.0472	1.0472	1.0472	0.000	5	0.9600	1.0000
100	1.0000	1.2500	1.0472	1.0472	1.0472	0.000	5	0.9600	1.0000
Blank	1.0000	1.2500	1.0472	1.0472	1.0472	0.000	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.05$)	0.41613	0.927	-3.8705	19.8512
Equality of variance cannot be confirmed				
The control means are not significantly different ($p = 0.35$)	1	2.306		

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/27/2018	Test ID: 208Tii10F	Sample ID: EFFFIN-Effluent Final
End Date: 4/3/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
ON-Control	25.000	29.000	27.000	32.000	16.000
SN--Control	25.000	29.000	27.000	32.000	
50	30.000	33.000	30.000	30.000	27.000
60	26.000	30.000	27.000	25.000	29.000
70	26.000	30.000	28.000	22.000	27.000
100	28.000	28.000	29.000	25.000	24.000
Blank	30.000	29.000	26.000	30.000	30.000

Conc-%	Mean	N-Mean	Transform: Untransformed					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
ON-Control	25.800	0.9133	25.800	16.000	32.000	23.481	5	27.900	1.0000
SN--Control	28.250	1.0000	28.250	25.000	32.000	10.570	4		
50	30.000	1.0619	30.000	27.000	33.000	7.071	5	27.900	1.0000
60	27.400	0.9699	27.400	25.000	30.000	7.568	5	27.400	0.9821
70	26.600	0.9416	26.600	22.000	30.000	11.152	5	26.700	0.9570
100	26.800	0.9487	26.800	24.000	29.000	8.089	5	26.700	0.9570
Blank	29.000	1.0265	29.000	26.000	30.000	5.973	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.92742	0.927	-1.1183	3.52388
Bartlett's Test indicates equal variances ($p = 0.09$)	9.57273	15.0863		
The control means are not significantly different ($p = 0.49$)	0.73349	2.36462		

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

**WET TEST REPORT FORM – CHRONIC
pH 3 AERATED TEST**

Permittee: Elk Ridge Mining and Reclamation **Outfall:** 013
Permit No.: CO0000213

Test Type: Routine ☐ TIE ☒
Test Species: *Ceriodaphnia dubia* **IWC:** 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1240	03-27-2018	1215	04-03-2018

Test Results	Lethality	Reproduction
IC ₂₅	>100%	57.8%

Dilution(s) - % Effluent

Measurements	Control (0%)	50%	60%	70%	100%	Method Control
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	100	100	100	100
% Survival for day 3	100	100	100	100	100	100
% Survival for day 4	100	100	100	100	100	100
% Survival for day 5	100	100	100	100	100	100
% Survival for day 6	100	100	100	100	100	100
% Survival for day 7	100	100	100	100	100	100
Mean 3 Brood Total	24.0	23.0	16.6	15.4	5.4	24.4

Recon Water: 100

Recon Water: 64

pH (initial/final) – Control: 8.0/8.0 100%: 6.7/7.2

Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

If **NO**, list deviations from test specifications:

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Madison Reese, Tessa Hunt-Woodland, Dan Hillenburg and Nicole Denkinger

Signature 

Date 05/02/2018

pH 3

The SeaCrest Group

Ceriodaphnia Chronic TIE pH 3 Aerate Benchsheet

Form: 113n

Louisville, CO

Permittee: Eik Ridge

Lab #: 418 208

Site: 013

Effective: June 2013

IWC %: 100

Template #: 4

Dilution Water: MH 18-006

Sample Date: 030718

Age & Source: cerio 2016 032718

Test Start: 082718 1240

Test End: 040318 1215

Test Conditions: Test brought to pH 3 Aerated for one hour and back to pH 1

	0	1	2	3	4	5	6	7	8	Total
(C) 0	0	0	0	0	0	0	0	0	0	0
DO	7.1	7.5	7.8	7.1	7.5	7.6	7.5	7.4	7.3	7.4
Temp	24.1	24.3	24.8	24.2	24.3	24.3	24.2	24.3	24.0	24.0
pH	8.0	8.2	8.1	8.0	8.0	8.0	8.0	8.1	8.0	8.0
Cond	303	317	311	319	313	326	323	323	323	323
(1) 50	0	0	0	0	0	0	0	0	0	0
DO	7.1	7.6	7.8	7.4	7.5	7.7	7.6	7.6	7.3	7.7
Temp	24.3	24.3	24.8	24.2	24.3	24.3	24.2	24.3	24.0	24.0
pH	7.5	8.2	7.7	7.5	7.7	7.7	7.6	7.8	7.7	7.7
Cond	2090	2100	2100	2100	2100	2100	2100	2100	2100	2100
(2) 60	0	0	0	0	0	0	0	0	0	0
DO	7.1	7.7	7.9	7.6	7.5	7.8	7.7	7.7	7.8	7.8
Temp	24.3	24.2	24.8	24.2	24.3	24.3	24.2	24.3	24.0	24.0
pH	7.5	8.2	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Cond	2440	2450	2450	2450	2450	2450	2450	2450	2450	2450
(3) 70	0	0	0	0	0	0	0	0	0	0
DO	7.1	7.8	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8
Temp	24.4	24.2	24.8	24.2	24.2	24.2	24.1	24.3	24.0	24.0
pH	7.4	8.2	7.3	7.4	7.2	7.3	7.0	7.5	7.5	7.4
Cond	2720	2720	2720	2720	2720	2720	2720	2720	2720	2720
(4) 100	0	0	0	0	0	0	0	0	0	0
DO	7.1	7.9	8.1	8.1	7.8	8.0	7.9	7.9	7.9	7.9
Temp	24.5	24.2	24.8	24.2	24.2	24.2	24.1	24.3	24.0	24.0
pH	7.1	8.2	7.1	6.5	7.0	7.0	7.0	7.1	7.4	7.2
Cond	3150	3810	31020	3810	3810	3810	3810	3810	3810	3810
dilution water	0	0	0	0	0	0	0	0	0	0
blank	0	0	0	0	0	0	0	0	0	0
DO	7.2	7.9	8.1	8.3	7.5	8.0	8.0	7.7	7.6	7.8
Temp	24.5	24.1	24.8	24.2	24.2	24.2	24.1	24.3	24.0	24.0
pH	7.8	8.2	7.3	7.9	7.3	7.5	7.8	7.2	7.5	7.5
Cond	431	529	441	411	453	459	464	470	470	470
Algae	1802	1802	1802	1802	1802	1802	1802	1802	1802	1802
YCT	1802	1802	1802	1802	1802	1802	1802	1802	1802	1802
H ₂ O	1802	1802	1802	1802	1802	1802	1802	1802	1802	1802
Initials	THW	OH	THW	OH	THW	OH	THW	OH	THW	OH
Hardness										
Alkalinity										
Chlorine										
Ammonia										

1. Exposure Chamber
Total Capacity: 30 ml
Test Solution Surface Area: 10 cm²
Test Solution Volume: 10 ml
Water Depth (constant): 10 cm
(cyclic): to 10 cm

2. Feeding Schedule
Not fed:
Fed Irregularly:
Fed Daily: X
Food Used: YCT, algae

3. Aeration
#1 None:
#2 None:
#3 None:
Before Use: minutes @ ~100 bubbles/min
Before Use: minutes @ ~100 bubbles/min
Before Use: minutes @ ~100 bubbles/min

4. Screened Animal Enclosures
Not Used: X
Used:

5. Condition/appearance of surviving organisms at end of test (i.e., alive but immobile; loss of orientation; erratic movement; etc.): active and mobile

6. Comments:

1	2	3	4	5
C1	C2	C5	C7	C8

x,y,z = board #, row, column

C1 C2 C5 C7 C8

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/27/2018	Test ID: 208TiipH3A	Sample ID: EFFFIN-Effluent Final
End Date: 4/3/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	27.000	29.000	19.000	17.000	28.000
50	24.000	21.000	32.000	18.000	20.000
60	12.000	18.000	16.000	18.000	19.000
70	12.000	18.000	6.000	19.000	22.000
100	5.000	8.000	2.000	8.000	4.000
Blank	25.000	23.000	27.000	25.000	22.000

Conc-%	Transform: Untransformed							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	24.000	1.0000	24.000	17.000	29.000	23.199	5	24.000	1.0000
50	23.000	0.9583	23.000	18.000	32.000	23.814	5	23.000	0.9583
60	16.600	0.6917	16.600	12.000	19.000	16.824	5	16.600	0.6917
70	15.400	0.6417	15.400	6.000	22.000	41.477	5	15.400	0.6417
100	5.400	0.2250	5.400	2.000	8.000	48.290	5	5.400	0.2250
Blank	24.400	1.0167	24.400	22.000	27.000	7.989	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.9882	0.927	-0.1554	0.07707
Bartlett's Test indicates equal variances ($p = 0.17$)	7.78136	15.0863		

Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)	Skew	
IC05	50.313	16.728	0.000	53.931	-0.3661
IC10	52.188	10.799	7.691	57.110	-0.9950
IC15	54.063	6.436	23.647	60.275	-1.8214
IC20	55.938	5.253	39.602	78.196	-0.0874
IC25	57.813	5.943	48.583	81.288	1.0126
IC40	73.000	6.454	52.520	86.070	-0.3364
IC50	80.200	5.620	58.900	90.835	-0.6207

**WET TEST REPORT FORM – CHRONIC
pH 10 AERATED TEST**

Permittee: Elk Ridge Mining and Reclamation **Outfall:** 013
Permit No.: CO0000213

Test Type: Routine ☐ TIE ☒
Test Species: *Ceriodaphnia dubia* **IWC:** 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1315	03-27-2018	1235	04-03-2018

Test Results	Lethality	Reproduction
IC ₂₅	>100%	73.6%

Dilution(s) - % Effluent

Measurements	Control (0%)	50%	60%	70%	100%	Method Control
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	100	100	100	100
% Survival for day 3	100	100	100	100	100	100
% Survival for day 4	100	100	100	100	100	100
% Survival for day 5	100	100	100	100	100	80
% Survival for day 6	100	100	100	100	100	80
% Survival for day 7	100	100	100	100	100	80
Mean 3 Brood Total	21.0	18.0	20.6	16.2	12.4	18.4

Recon Water: 100

Recon Water: 64

pH (initial/final) – Control: 8.0/7.9 100%: 6.9/8.0

Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

If **NO**, list deviations from test specifications:

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Madison Reese, Tessa Hunt-Woodland, Dan Hillenburg and Nicole Denkinger

Signature  Date 05/02/2018

PH10

The SeaCrest Group

Ceriodaphnia Chronic TIE pH 10 Aerate Benchsheet

Form: 113r

Louisville, CO

Permittee:

Eik Ridge

Lab #:

418 208

Site:

013

Effective: June 2013

IWC %:

100

Template #:

4

Dilution Water:

MM 18-006

Sample Date:

03/07/14

Age & Source:

cerio 2006 03/27/14

Test Start:

03/27/14 1315

Test End:

04/03/18-1235

Test Conditions:

Test brought to pH 10 aerated for one hour and back to pH 11

	0	1	2	3	4	5	6	7	8	Total
(C) 0	0	0	0	8	6	14	+2	15		30
	0	0	0	7	7	0	15	16		29
	0	0	0	0	0	0	0	1		0
	0	0	0	2	6	41	0	15		22
	0	0	0	5	6	0	13	16		24
DO	7.1	7.4	7.8	7.1	7.0	7.3	7.2	7.4	7.3	
Temp	24.2	24.2	24.8	24.2	24.1	24.1	24.2	25.3	25.0	24.9
pH	8.0	7.9	8.0	7.9	8.0	8.3	8.2	8.1	8.1	7.9
Cond	304	310	310	312	311	340	329	327		
(1) 50	0	0	0	10	+10	0	0	82		9
	0	0	0	5	7	0	10	10		22
	0	0	0	10	6	0	11	15		23
	0	0	0	3	5	11	0	17		17
	0	0	0	5	4	0	8	12		17
DO	7.3	7.4	7.8	7.4	7.0	7.4	7.3	7.5	7.1	7.3
Temp	24.6	24.2	24.8	24.3	24.1	24.1	24.2	25.3	25.0	24.9
pH	7.9	7.9	8.1	7.9	8.0	8.3	8.2	8.0	8.1	7.9
Cond	1809	—	1886	—	2220	—	—	—	—	—
(2) 60	0	0	0	10	3	0	13	9		24
	0	0	0	5	4	0	11	13		20
	0	0	0	4	6	0	11	15		21
	0	0	0	10	4	0	8	8		20
	0	0	0	4	6	0	10	9		20
DO	7.4	7.4	7.9	7.6	7.1	7.4	7.4	7.6	7.2	7.6
Temp	24.9	24.3	24.8	24.3	24.1	24.1	24.1	25.3	25.0	24.9
pH	7.9	7.9	8.1	7.9	8.0	8.3	8.2	8.0	8.1	7.9
Cond	2402	—	2420	—	2490	—	—	—	—	—
(3) 70	0	0	0	10	4	0	9	0		19
	0	0	0	4	+10	28.5	+30	0		13
	0	0	0	4	4	0	10	12		18
	0	0	0	7	4	0	8	13		19
	0	0	0	3	+3	0	6	7		12
DO	7.4	7.5	7.9	7.6	7.1	7.5	7.4	7.7	7.3	7.6
Temp	25.2	24.3	24.8	24.3	24.1	24.2	24.1	25.3	25.0	24.9
pH	7.9	7.9	8.2	7.9	8.0	8.3	8.2	8.0	8.1	8.0
Cond	2570	—	2620	—	2810	—	—	—	—	—
(4) 100	0	0	0	4	+2	0	5	+20		13
	0	0	0	3	+1	0	2	+2		9
	0	0	0	2	+1	0	0	6	+10	10
	0	0	0	1	+1	0	0	2	+20	6
	0	0	0	1	5	0	0	9	9	24
DO	7.5	7.5	7.9	7.8	7.2	7.7	7.5	7.8	7.4	7.8
Temp	25.5	24.3	24.8	24.4	24.1	24.2	24.1	25.3	25.0	24.9
pH	8.0	8.0	8.2	8.0	8.0	8.3	8.2	8.0	8.1	8.0
Cond	3430	3480	3480	3480	3750	3870	3570	3870	3870	3870
dilution water blank	0	0	0	3	0	0	8	11		22
	0	0	0	0	0	3	10	12		25
	0	0	0	3	+1	0	0	6	8	18
	0	0	0	0	3	50	—	—	—	8
	0	0	0	3	+1	0	4	11		19
DO	7.9	7.4	7.9	8.1	7.1	7.4	7.5	7.9	7.5	7.7
Temp	25.2	24.2	24.8	24.4	24.1	24.1	24.1	25.3	25.0	24.9
pH	7.9	7.8	8.2	8.0	8.0	8.5	8.1	8.3	8.3	8.2
Cond	355	360	360	373	3540	359	388	381	394	
Algae	AB5/AP0	AB5/AP0	AB5/AP0	AB5/AP0	AB5/AP0	AB5/AP0	AB5/AP0	AB5/AP0	AB5/AP0	
YCT	1802	1802	1802	1802	1802	1802	1802	1802	1802	
H ₂ O										
Initials	PHN	PHN	PHN	PHN	PHN	PHN	PHN	PHN	PHN	
Eff #1										
Eff #2										
Eff #3										
Recon #1										
Recon #2										
Recon #3										
Hardness										
Alkalinity										
Chlorine										
Ammonia										

- Exposure Chamber
Total Capacity: 30 ml
Test Solution Surface Area: cm²
Test Solution Volume: 10 ml
Water Depth (constant): cm
(cyclic): to cm
- Feeding Schedule
Not fed: ☐
Fed Irregularly: ☐
Fed Daily: ☒
Food Used: YCT, algae
- Aeration
#1 None: ☐
#2 None: ☐
#3 None: ☐
Before Use: ☐
(minutes @ ~100 bubbles/min)
Before Use: ☐
(minutes @ ~100 bubbles/min)
- Screened Animal Enclosures
Not Used: ☒
Used: ☐
- Condition/appearance of surviving organisms at end of test (i.e., alive but immobile; loss of orientation; erratic movement, etc.):

Mobile and active

Mobile and active FE

1	2	3	4	5
A1	A2	A3	A4	A5
x,y,z = board #, row, column				

A1 A2 A3 A4 A5 A6

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 3/27/2018	Test ID: 208Ti10A	Sample ID: EFFFIN-Effluent Final
End Date: 4/3/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000
60	1.0000	1.0000	1.0000	1.0000	1.0000
70	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000
Blank	1.0000	1.0000	1.0000	0.0000	1.0000

Conc-%	Transform: Arcsin Square Root							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
50	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
60	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
70	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
100	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	5	1.0000	1.0000
Blank	0.8000	0.8000	0.9425	0.5236	1.0472	24.845	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.05$)	0.41613	0.927	-3.8705	19.8512
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/27/2018	Test ID: 208Ti10A	Sample ID: EFFFIN-Effluent Final
End Date: 4/3/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	30.000	29.000	0.000	22.000	24.000
50	9.000	22.000	23.000	19.000	17.000
60	24.000	20.000	21.000	18.000	20.000
70	19.000	13.000	18.000	19.000	12.000
100	13.000	9.000	10.000	6.000	24.000
Blank	22.000	25.000	18.000	8.000	19.000

Conc-%	Mean	N-Mean	Transform: Untransformed					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	21.000	1.0000	21.000	0.000	30.000	58.126	5	21.000	1.0000
50	18.000	0.8571	18.000	9.000	23.000	30.932	5	19.300	0.9190
60	20.600	0.9810	20.600	18.000	24.000	10.635	5	19.300	0.9190
70	16.200	0.7714	16.200	12.000	19.000	21.114	5	16.200	0.7714
100	12.400	0.5905	12.400	6.000	24.000	56.047	5	12.400	0.5905
Blank	18.400	0.8762	18.400	8.000	25.000	34.927	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.05$)	0.92523	0.927	-1.2091	3.39387
Bartlett's Test indicates equal variances ($p = 0.04$)	11.3853	15.0863		

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05*	30.882			
IC10	61.290			
IC15	64.677			
IC20	68.065			
IC25	73.553			
IC40	98.421			
IC50	>100			

* indicates IC estimate less than the lowest concentration

WET TEST REPORT FORM – CHRONIC
pH 3 C18 TEST

Permittee: Elk Ridge Mining and Reclamation Outfall: 013
Permit No.: CO0000213

Test Type: Routine ☐ TIE ☒
Test Species: *Ceriodaphnia dubia* IWC: 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1510	03-27-2018	1442	04-03-2018

Test Results	Lethality	Reproduction
IC ₂₅	>100%	84.9%

Measurements	Control (0%)	50%	60%	70%	100%	Method Control
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	100	100	100	100
% Survival for day 3	100	100	100	100	100	100
% Survival for day 4	100	100	100	100	100	100
% Survival for day 5	100	100	100	100	100	100
% Survival for day 6	100	100	100	100	100	100
% Survival for day 7	100	100	100	100	100	100
Mean 3 Brood Total	24.2	20.8	22.6	22.8	14.2	27.0

Recon Water: 100

Recon Water: 64

pH (initial/final) – Control: 8.0/7.9 100%: 6.7/7.5

Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

If **NO**, list deviations from test specifications:

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Kyra Brisson, Tessa Hunt-Woodland, Dan Hillenburg and Nicole Denkinger

Signature 

Date 05/02/2018

Louisville, CO

Permittee: Eik RidgeIWC %: 100Age & Source: cerioTest Conditions: Test brought to pH 3 filtered through C18 column and back to pHTemplate #: 4Lab #: 418 208Site: 013Dilution Water: IMPI 15-0006Test Start: 032718Test End: 040318-1442

Effective: June 2013

Sample Date: 030718

	0	1	2	3	4	5	6	7	8	Total
(C) 0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
DO	7.0	6.7	7.3	7.4	7.3	6.7	7.3	7.0	6.8	7.1
Temp	24.2	24.3	24.2	24.1	24.2	24.3	25.1	24.5	24.7	24.8
pH	8.0	7.9	8.3	8.2	8.0	7.9	8.1	8.0	8.2	7.9
Cond	303	322	307	317	312	327	327	330	329	324
(1) 50	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
DO	10.8	6.7	7.4	7.5	7.3	6.7	7.3	7.0	6.8	7.1
Temp	24.4	24.3	24.2	24.1	24.2	24.3	25.1	24.5	24.7	24.8
pH	7.3	7.5	8.1	7.6	7.7	7.6	7.6	7.7	7.8	7.8
Cond	1918	—	1972	—	1958	—	—	—	—	—
(2) 60	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
DO	10.3	6.7	7.5	7.5	7.3	6.7	7.3	7.0	6.8	7.1
Temp	24.6	24.3	24.2	24.1	24.2	24.3	25.1	24.5	24.7	24.8
pH	7.3	7.4	8.0	7.5	7.6	7.6	7.6	7.7	7.7	7.7
Cond	2310	—	2370	—	2470	—	—	—	—	—
(3) 70	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
DO	10.0	6.8	7.5	7.5	7.4	6.7	7.3	7.1	7.2	7.7
Temp	24.7	24.3	24.2	24.1	24.1	24.3	25.3	24.5	24.7	24.8
pH	7.2	7.3	7.9	7.4	7.5	7.4	7.4	7.2	7.7	7.6
Cond	2150	—	2680	—	2730	—	—	—	—	—
(4) 100	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
DO	10.8	6.8	7.6	7.5	7.4	6.5	7.4	7.1	7.2	8.0
Temp	24.8	24.3	24.2	24.1	24.1	24.2	25.3	24.5	24.7	24.8
pH	7.1	7.1	7.7	7.6	7.3	7.1	7.6	7.0	7.5	7.5
Cond	3520	3550	3550	3530	3590	3600	3620	3620	3620	3620
dilution water blank	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
DO	10.8	7.0	7.8	7.5	7.2	6.1	7.0	7.1	7.2	7.9
Temp	24.8	24.3	24.2	24.1	24.1	24.2	24.9	24.5	24.7	24.8
pH	8.0	7.2	7.8	7.6	7.3	7.6	7.8	7.1	7.6	7.6
Cond	475	470	454	471	461	4630	461	467	466	466
Algae	AB/AB	AB/AB	AB/AB	AB/AB	AB/AB	AB/AB	AB/AB	AB/AB	AB/AB	AB/AB
YCT	1802	1802	1802	1802	1802	1802	1802	1802	1802	1802
H ₂ O										
Initials	THW	THW	ND	DH	KB	THW	THW	ND		
Eff #1										
Eff #2										
Eff #3										
Recon #1										
Recon #2										
Recon #3										
Hardness										
Alkalinity										
Chlorine										
Ammonia										

1. Exposure Chamber
Total Capacity: 30 ml
Test Solution Surface Area: cm²
Test Solution Volume: 10 ml
Water Depth (constant): cm
(cyclic): to cm
2. Feeding Schedule
Not fed: _____
Fed Irregularly: _____
Fed Daily: X
Food Used: YCT, algae
3. Aeration
#1 None: _____
#2 None: _____
#3 None: _____
- Before Use: _____ minutes @ ~100 bubbles/min
Before Use: _____ minutes @ ~100 bubbles/min
Before Use: _____ minutes @ ~100 bubbles/min
4. Screened Animal Enclosures
Not Used: X
Used: _____
5. Condition/appearance of surviving organisms at end of test (i.e., alive but immobile; loss of orientation; erratic movement; etc.):
Mobile and active.
6. Comments: _____

1	2	3	4	5
E ₂	E ₃	E ₅	E ₆	E ₉
x,y,z = board #, row, column				

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/27/2018	Test ID: 208Ti3C18	Sample ID: EFFFIN-Effluent Final
End Date: 4/3/2018	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia
Comments:		

Conc-%	1	2	3	4	5
D-Control	33.000	23.000	22.000	19.000	24.000
50	35.000	19.000	4.000	25.000	21.000
60	26.000	25.000	20.000	18.000	24.000
70	19.000	31.000	19.000	19.000	26.000
100	13.000	12.000	22.000	13.000	11.000
Blank	34.000	20.000	24.000	30.000	27.000

Conc-%	Mean	N-Mean	Transform: Untransformed					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	24.200	1.0000	24.200	19.000	33.000	21.748	5	24.200	1.0000
50	20.800	0.8595	20.800	4.000	35.000	54.009	5	22.067	0.9118
60	22.600	0.9339	22.600	18.000	26.000	15.200	5	22.067	0.9118
70	22.800	0.9421	22.800	19.000	31.000	24.103	5	22.067	0.9118
100	14.200	0.5868	14.200	11.000	22.000	31.257	5	14.200	0.5868
Blank	27.000	1.1157	27.000	20.000	34.000	19.945	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.92574	0.918	-0.1038	2.26998
Bartlett's Test indicates equal variances ($p = 0.16$)	6.56027	13.2767		

Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)	Skew	
IC05*	28.359	23.246	1.017	98.279	0.0495
IC10	71.093	20.074	0.000	84.370	-0.4707
IC15	75.708	16.411	7.736	91.162	-0.9974
IC20	80.322	12.712	20.625	99.088	-1.5126
IC25	84.936				
IC40	98.780				
IC50	>100				

* indicates IC estimate less than the lowest concentration

**WET TEST REPORT FORM – CHRONIC
pH 10 C18 TEST**

Permittee: Elk Ridge Mining and Reclamation **Outfall:** 013
Permit No.: CO0000213

Test Type: Routine ☐ TIE ☒
Test Species: *Ceriodaphnia dubia* **IWC:** 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1525	03-27-2018	1450	04-03-2018

Test Results	Lethality	Reproduction
IC ₂₅	>100%	>100%

Dilution(s) - % Effluent

Measurements	Control (0%)	50%	60%	70%	100%	Method Control
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	100	100	100	100
% Survival for day 3	100	100	100	100	100	100
% Survival for day 4	100	100	100	100	100	100
% Survival for day 5	100	100	100	100	100	100
% Survival for day 6	100	100	100	100	100	100
% Survival for day 7	100	100	100	100	100	100
Mean 3 Brood Total	28.8	26.8	30.0	26.2	24.6	28.6

Recon Water: 100

Recon Water: 64

pH (initial/final) – Control: 8.0/8.0 100%: 6.6/8.1

Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

If **NO**, list deviations from test specifications:

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Kyra Brisson, Tessa Hunt-Woodland, Dan Hillenburg and Nicole Denkinger

Signature 

Date 05/02/2018

The SeaCrest Group

Ceriodaphnia Chronic TIE pH 10 C18 Benchsheet

Form: 113t

Louisville, CO

Effective: June 2013

Permittee:

Erik Ridge

Lab #:

418 208

Site:

013

IWC %:

100

Template #:

41

Dilution Water:

MH 18-0016

Sample Date:

030718

Age & Source:

cerio 032118 20010

Test Start:

032718 1525

Test End:

040318-1450

Test Conditions:

Test brought to pH 10 filtered through C18 column and back to pH

	0	1	2	3	4	5	6	7	8	Total
(C) 0	0	0	0	0	6	10	12	12	12	28
	0	0	0	7	0	10	13	0		30
	0	0	0	4	4	12	0	17		30
	0	0	0	6	0	8	0	21		35
	0	0	0	0	7	9	15	12		31
DO	7.0	7.0	7.3	7.4	6.8	6.2	7.1	7.3	7.0	7.1
Temp	24.2	24.3	24.2	24.1	24.1	24.4	25.0	24.5	24.7	24.8
pH	8.0	8.0	8.2	7.9	8.1	8.1	8.1	8.0	8.0	8.0
Cond	302	308	321	306	315	325	319	311		298
(1) 50	0	0	0	0	4	12	12	12	12	28
	0	0	0	5	0	10	15	18		30
	0	0	0	0	3	11	9	0		23
	0	0	0	6	0	10	10	10		26
	0	0	0	0	6	7	0	14		27
DO	11.8	7.0	7.5	7.5	6.9	6.3	7.1	7.3	7.0	7.3
Temp	24.4	24.3	24.2	24.1	24.1	24.6	25.1	24.5	24.7	24.8
pH	6.8	8.0	8.3	7.0	8.1	8.0	7.3	8.0	8.1	8.0
Cond	1750	—	1820	—	1875	—	—	—	—	—
(2) 60	0	0	0	0	5	13	14	11	10	33
	0	0	0	6	0	12	14	17		32
	0	0	0	0	0	9	0	21		30
	0	0	0	6	0	10	15	14		31
	0	0	0	0	7	10	0	9		18
DO	11.8	7.0	7.5	7.5	6.9	6.4	7.0	7.3	7.0	7.4
Temp	24.6	24.3	24.2	24.1	24.1	24.6	25.0	24.5	24.7	24.8
pH	6.7	8.0	8.3	7.0	8.1	8.1	7.3	8.0	8.1	8.1
Cond	1905	—	2180	—	2160	—	—	—	—	—
(3) 70	0	0	0	0	6	10	12	11	10	29
	0	0	0	5	0	11	14	15		30
	0	0	0	0	6	10	12	0		28
	0	0	0	5	0	10	10	0		25
	0	0	0	5	6	8	0	13		19
DO	11.4	7.0	7.5	7.5	6.9	6.5	7.1	7.3	7.1	7.5
Temp	24.8	24.3	24.2	24.1	24.2	24.6	25.0	24.5	24.7	24.8
pH	6.7	8.0	8.3	6.9	8.1	8.1	7.0	8.0	8.1	8.1
Cond	2210	—	2580	—	2560	—	—	—	—	—
(4) 100	0	0	0	0	3	10	11	0		24
	0	0	0	3	0	10	12	13		25
	0	0	0	0	1	7	0	14		22
	0	0	0	0	4	14	10	12		30
	0	0	0	0	2	8	0	12		22
DO	11.1	7.0	7.7	7.6	7.0	6.5	7.0	7.3	7.1	7.7
Temp	25.1	24.3	24.2	24.1	24.2	24.6	25.1	24.5	24.7	24.8
pH	6.6	8.0	8.4	6.8	8.1	8.0	6.8	8.0	8.1	8.1
Cond	3080	3190	3310	3310	3360	3330	3370	3370	3490	
dilution water	0	0	0	0	4	10	12	12		28
blank	0	0	0	6	0	10	8	17		21
	0	0	0	0	4	10	11	11		26
	0	0	0	7	0	11	13	18		31
	0	0	0	0	7	10	12	15		34
DO	5.8	6.9	7.8	7.6	6.7	6.0	6.7	6.9	7.1	7.4
Temp	25.0	24.3	24.2	24.1	24.1	24.6	25.1	24.5	24.7	24.8
pH	7.8	7.9	8.4	7.8	7.9	7.6	7.9	7.8	8.1	8.0
Cond	405	424	405	415	424	432	442	457		
Algae	1802	1802	1802	1802	1802	1802	1802	1802	1802	
YCT	1802	1802	1802	1802	1802	1802	1802	1802	1802	
H ₂ O	1802	1802	1802	1802	1802	1802	1802	1802	1802	
Initials	THW	THW	THW	THW	THW	THW	THW	THW	THW	
Eff #1	Eff #1	Eff #2	Eff #3	Recon #1	Recon #2	Recon #3				
Hardness				100						
Alkalinity				64						
Chlorine				20.01						
Ammonia				20.03						

- Exposure Chamber
 - Total Capacity: 30 ml
 - Test Solution Surface Area: cm²
 - Test Solution Volume: 10 ml
 - Water Depth (constant): cm
 - (cyclic): to cm
- Feeding Schedule
 - Not fed: _____
 - Fed Irregularly: _____
 - Fed Daily: ☒ X
 - Food Used: YCT, algae
- Aeration
 - #1 None: _____
 - #2 None: _____
 - #3 None: _____
- Before Use: _____
 - () minutes @ ~100 bubbles/min
- Before Use: _____
 - () minutes @ ~100 bubbles/min
- Screened Animal Enclosures
 - Not Used: ☒ X
 - Used: _____
- Condition/appearance of surviving organisms at end of test (i.e., alive but immobile; loss of orientation; erratic movement; etc.):

Mobile and active

6. Comments:

1	2	3	4	5
E ₁	E ₂	E ₃	E ₄	E ₅
x.y.z = board #.row.column				

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/27/2018 Test ID: 208Ti10C18 Sample ID: EFFFIN-Effluent Final
 End Date: 4/3/2018 Lab ID: SCG-Seacrest Group Sample Type: EFF1-POTW
 Sample Date: Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia
 Comments:

Conc-%	1	2	3	4	5
D-Control	28.000	30.000	20.000	35.000	31.000
50	28.000	30.000	23.000	26.000	27.000
60	33.000	32.000	36.000	31.000	18.000
70	29.000	30.000	28.000	25.000	19.000
100	24.000	25.000	22.000	30.000	22.000
Blank	28.000	24.000	26.000	31.000	34.000

Conc-%	Mean	N-Mean	Transform: Untransformed					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	28.800	1.0000	28.800	20.000	35.000	19.239	5	28.800	1.0000
50	26.800	0.9306	26.800	23.000	30.000	9.658	5	28.400	0.9861
60	30.000	1.0417	30.000	18.000	36.000	23.214	5	28.400	0.9861
70	26.200	0.9097	26.200	19.000	30.000	16.941	5	26.200	0.9097
100	24.600	0.8542	24.600	22.000	30.000	13.359	5	24.600	0.8542
Blank	28.600	0.9931	28.600	24.000	34.000	13.898	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.93618	0.927	-0.969	1.15794
Bartlett's Test indicates equal variances ($p = 0.48$)	4.47395	15.0863		

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	64.727			
IC10	75.250			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

Appendix 3 – QA/QC and Reference Toxicant Test Chart

Quality Assurance Check List – Chronic Whole Effluent Toxicity Test

Client: Elk Ridge Mining and Reclamation

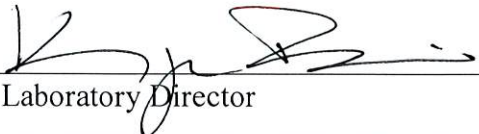
SeaCrest Sample No.: 418208.B

Species Tested: *Ceriodaphnia dubia*

Start Date of Test (Initial)

03-08-2018

Sample received in lab properly preserved (0-6°C)?	Y
Sample delivered on ice or equivalent?	Y
Test protocol conforms to CDPHE guidelines (<i>Ceriodaphnia dubia</i>)?	Y
Average test temp. $\pm 1^{\circ}\text{C}$ (<i>Ceriodaphnia dubia</i>)?	Y
DO level $\geq 4.0\text{mg/L}$; no super-saturation (<i>Ceriodaphnia dubia</i>)?	Y
Survival in control $\geq 90\%$, $\geq 80\%$ for chronic (<i>Ceriodaphnia dubia</i>)?	Y
<i>Ceriodaphnia dubia</i> neonates in control <24-hours old?	Y
Appropriate reference toxicity test conducted?	Y
Lab. Ref. Tox. test results within the confidence limits for the lab?	Y

Signature  Date 05/02/2018
Position: Laboratory Director

Method	Analyte	Date	LCS (rec)	%REC	%RPD	QC LIMITS
2320 B	Alkalinity - Total	3/5/2018	104.00%	97.22%	-3.39%	± 5.00%
2320 B	Alkalinity - Total	3/12/2018	104.00%	103.52%	-3.45%	± 5.00%
2320 B	Alkalinity - Total	3/21/2018	96.80%	102.77%	-4.03%	± 5.00%
2320 B	Alkalinity - Total	3/29/2018	96.80%	101.76%	4.44%	± 5.00%
4500 NH ₃ D	Ammonia	3/8/2018	104.60%	99.52%	2.38%	± 10.00%
4500 NH ₃ D	Ammonia	3/16/2018	100.25%	94.66%	-1.92%	± 10.00%
4500 NH ₃ D	Ammonia	3/21/2018	97.80%	97.14%	-2.20%	± 10.00%
4500 NH ₃ D	Ammonia	3/29/2018	97.80%	95.85%	-0.84%	± 10.00%
4500 Cl D	Chlorine	3/28/2018	96.97%	84.85%	0.00%	± 5.00, ± 20.00%
2340 B	Hardness - Total	3/8/2018	101.75%	98.16%	0.81%	± 5.00%
2340 B	Hardness - Total	3/14/2018	101.75%	98.29%	1.31%	± 5.00%
2340 B	Hardness - Total	3/22/2018	100.00%	96.48%	3.02%	± 5.00%
2340 B	Hardness - Total	3/29/2018	100.00%	95.76%	3.17%	± 5.00%

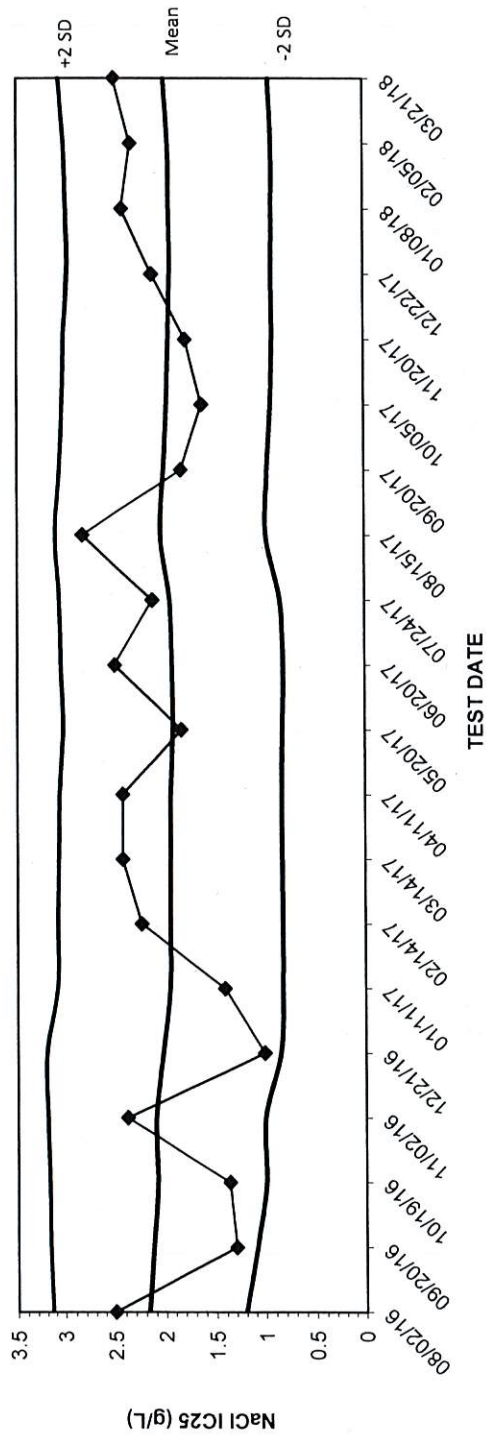
Method	Analyte	Date	LCS (rec)	%REC M1	%REC M2	QC Limits
4500 O	DO - Winkler	3/2/2018	N/A	98.67%	100.00%	± 5.00%
4500 O	DO - Winkler	3/9/2018	N/A	98.59%	101.45%	± 5.00%
4500 O	DO - Winkler	3/17/2018	N/A	98.59%	101.45%	± 5.00%
4500 O	DO - Winkler	3/23/2018	N/A	98.55%	100.00%	± 5.00%
4500 O	DO - Winkler	3/28/2018	N/A	98.63%	100.00%	± 5.00%

Method	Analyte	Date	Blank	%RPD	%REC MRS	QC Limits
2540 C	Dissolved Solids (TTL)	3/29/2018	99.9999%	1.18%	109.25%	±20%, ± 15%
2540 D	Suspended Solids (TTL)	3/29/2018	100.00163%	0.00%	88.19%	±20%, ± 15%

Signature: MPB Date: 04/05/18

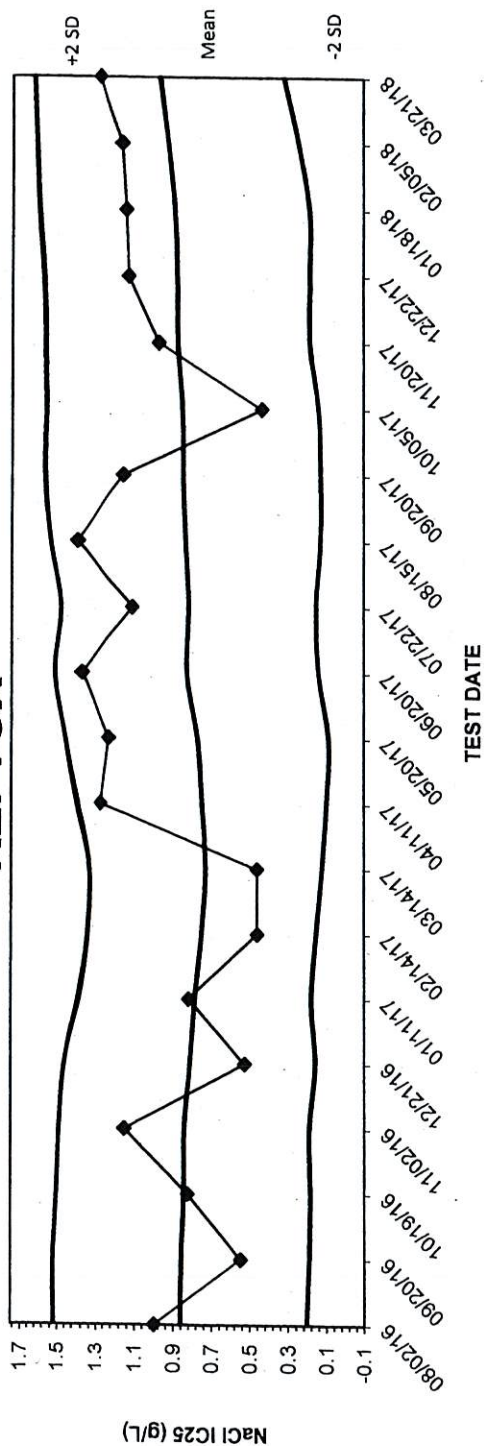
Signature: [Signature] Date: 04/04/2018

CERIODAPHNIA SURVIVAL IC25 NaCl REFTOX



Date	IC25	Mean	-2 SD	+2 SD
08/02/16	2.5000	2.1720	1.2059	3.1382
09/20/16	1.3000	2.1275	1.0900	3.1650
10/19/16	1.3674	2.0869	0.9991	3.1748
11/02/16	2.3750	2.0989	1.0038	3.1939
12/21/16	1.0083	2.0278	0.8515	3.2041
01/11/17	1.4100	1.9548	0.8280	3.0815
02/14/17	2.2353	1.9524	0.8284	3.0763
03/14/17	2.4211	1.9486	0.8318	3.0654
04/11/17	2.4211	1.9448	0.8353	3.0543
05/20/17	1.8333	1.9210	0.8252	3.0169
06/20/17	2.5000	1.9290	0.8182	3.0397
07/24/17	2.1250	1.9528	0.8480	3.0576
08/15/17	2.8284	2.0438	0.9834	3.1042
09/20/17	1.8333	2.0121	0.9693	3.0548
10/05/17	1.6250	1.9783	0.9334	3.0233
11/20/17	1.7857	1.9622	0.9162	3.0081
12/22/17	2.1250	1.9462	0.9223	2.9700
01/08/18	2.4211	1.9503	0.9191	2.9815
02/05/18	2.3333	1.9609	0.9183	3.0035
03/21/18	2.5000	2.0023	0.9459	3.0587

CERIODAPHNIA REPRODUCTION IC25 NaCl REFTOX



Date	IC25	Mean	-2 SD	+2 SD
08/02/16	1.0000	0.8617	0.2039	1.5195
09/20/16	0.5481	0.8571	0.1917	1.5226
10/19/16	0.8250	0.8454	0.1867	1.5041
11/02/16	1.1541	0.8415	0.1916	1.4915
12/21/16	0.5270	0.8117	0.1615	1.4619
01/11/17	0.8196	0.7868	0.1816	1.3920
02/14/17	0.4621	0.7522	0.1564	1.3480
03/14/17	0.4637	0.7320	0.1254	1.3387
04/11/17	1.2762	0.7495	0.1006	1.3985
05/20/17	1.2328	0.7742	0.0902	1.4581
06/20/17	1.3758	0.8305	0.1432	1.5178
07/22/17	1.1166	0.8209	0.1569	1.4848
08/15/17	1.3990	0.8376	0.1322	1.5430
09/20/17	1.1638	0.8516	0.1313	1.5718
10/05/17	0.4375	0.8546	0.1423	1.5669
11/20/17	0.9798	0.8800	0.1893	1.5707
12/22/17	1.1379	0.8836	0.1881	1.5791
01/18/18	1.1509	0.8962	0.1904	1.6019
02/05/18	1.1717	0.9318	0.2475	1.6161
03/21/18	1.2810	0.9761	0.3242	1.6281

Appendix 4 – Analytical Data

Client: Elk Ridge NHM
Analyte: Chloride

Prep Date: 03/14/2018
 Analysis Date: 03/14/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: SM 4500-Cl--1997
 Analytical Method ID: SM 4500-Cl--1997
 Instrument: Titrimetric

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
NPDES 013	03/07/18	418208.B	3		2	mg/L

Client: Elk Ridge NHM
Analyte: Bicarbonate (As HCO₃)

Prep Date: 03/14/2018
 Analysis Date: 03/14/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2320 B.
 Analytical Method ID: Std. Methods 2320 B.
 Instrument: Titrimetric

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: SE

<u>Location ID</u>	<u>SmpDate</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
NPDES 013	03/07/18	418208.B	461		10	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Client: Elk Ridge NHM
Analyte: Sulfate, SO₄²⁻

Prep Date: 03/14/2018
 Analysis Date: 03/14/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: ASTM D516-07
 Analytical Method ID: ASTM D516-07
 Instrument: Evo 160, UV/VIS

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL Dilution Factor: 100
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
NPDES 013	03/07/18	418208.B	1,889		12	59	mg/L

Client: Elk Ridge NHM
Analyte: Calcium, Ca – Total

Prep Date: 03/09/2018
 Analysis Date: 03/13/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 250
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
NPDES 013	03/07/18	418208.B	464		2.5	12.5	mg/L

Qualifiers:
 E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Client: Elk Ridge NHM
Analyte: Magnesium, Mg – Total

Prep Date: 03/09/2018
 Analysis Date: 03/13/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 250
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
NPDES 013	03/07/18	418208.B	215		0.15	0.78	mg/L

Client: Elk Ridge NHM
Analyte: Potassium, K – Total

Prep Date: 03/09/2018
 Analysis Date: 03/13/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 50
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
NPDES 013	03/07/18	418208.B	24.2		0.50	3.0	mg/L

Qualifiers:
 E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Client: Elk Ridge NHM
Analyte: Sodium, Na – Total

Prep Date: 03/09/2018
 Analysis Date: 03/13/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 3030 E.
 Analytical Method ID: Std. Methods 3111 B.
 Instrument: iCE 3500, FLAA

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 50 mL Dilution Factor: 100
 Analyst: SE

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>MDL</u>	<u>RL</u>	<u>Units</u>
NPDES 013	03/07/18	418208.B	129		0.25	1.25	mg/L

Client: Elk Ridge NHM
Analyte: Residue – filterable (TDS)

Prep Date: 03/09/2018
 Analysis Date: 03/10/2018
 Approved Method Source: 40 CFR 136.3
 Prep ID: Std. Methods 2540 C
 Analytical Method ID: Std. Methods 2540 C
 Instrument: AE-240 Dual Range Analytical Balance

Matrix: Aqueous (water, wastewater, groundwater)
 Sample volume used: 100 mL
 Analyst: KB

<u>Location ID</u>	<u>Smp Date</u>	<u>SCG #</u>	<u>Results</u>	<u>Flags</u>	<u>RL</u>	<u>Units</u>
NPDES 013	03/07/18	418208.B	3,200		10	mg/L

Qualifiers:

E – Extrapolated value. Value exceeds calibration range
 H – Analysis exceeded holding time
 J – Estimated value detected below the RL/MRL
 S – Spike recovery outside acceptance limits
 U – Analyte not detected
 X – See case narrative

Batch Number(s): 418203-214.A
Analysis Date: 3/14/2018
Instrument: EVO 160
QC Method: ASTM D516-90 (SO4)
Results File Location: \\SEACRESTSERV\Operations\Analytical\VISION_DATA

Analyst: S. Eubanks
Analyte: SO_4^{2-}

		QC Limits
Calibration Line Fit:	0.9990	≥ 0.995

	% Recovery	QC Limits
Quality Control Sample:	99.45%	90 - 110%
	100.33%	90 - 110%

	% Difference	QC Limits
Laboratory Control Duplicates:	-0.27%	-15 - 15%

Analysis Anomalies: None

Method Required Preservation: $\leq 0-4^{\circ}\text{C}$

Client Contact: None

Comments: None



Validated

Batch Number(s): 418208-216.A
Analysis Date: 3/13/2018
Instrument: iCE 3500 FLAA
QC Method: Std Methods 3111 B
Results File Location: \\SEACRESTSERV\Operations\Analytical\SOLAAR_DATA\Results

Calibration Line Fit:	0.9996	QC Limits ≥ 0.995
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Quality Control Sample:	% Recovery 97.45%	QC Limits 90 - 110%
	96.98%	90 - 110%

Laboratory Fortified Blank:	% Recovery 93.64%	QC Limits 85 - 115%
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Laboratory Control Duplicates:	% Difference 1.73%	QC Limits -15 - 15%
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Analysis Anomalies: None

Method Required Preservation: HNO₃/ ≤0-4°C

Client Contact: None

Comments: None


Validated

Batch Number(s): 418208-216.A
Analysis Date: 3/13/2018
Instrument: iCE 3500 FLAA
QC Method: Std Methods 3111 B
Results File Location: \\SEACRESTSERV\Operations\Analytical\SOLAAR_DATA\Results

Calibration Line Fit:	0.9992	QC Limits ≥ 0.995
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Quality Control Sample:	% Recovery 103.26%	QC Limits 90 - 110%
	102.99%	90 - 110%

Laboratory Fortified Blank:	% Recovery 101.61%	QC Limits 85 - 115%
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Laboratory Control Duplicates:	% Difference -8.78%	QC Limits -15 - 15%
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Analysis Anomalies: None

Method Required Preservation: HNO₃/ ≤0-4°C

Client Contact: None

Comments: None



Validated

Batch Number(s): 418208.A
Analysis Date: 3/13/2018
Instrument: iCE 3500 FLAA
QC Method: Std Methods 3111 B
Results File Location: \\SEACRESTSERV\Operations\Analytical\SOLAAR_DATA\Results

Calibration Line Fit:	0.9995	QC Limits ≥ 0.995
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Quality Control Sample:	% Recovery 101.93%	QC Limits 90 - 110%
	101.05%	90 - 110%

Laboratory Fortified Blank:	% Recovery 99.63%	QC Limits 85 - 115%
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Laboratory Control Duplicates:	% Difference -0.92%	QC Limits -15 - 15%
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Analysis Anomalies: None

Method Required Preservation: HNO₃/ ≤0-4°C

Client Contact: None

Comments: None



Validated

Batch Number(s): 418208-216.A
Analysis Date: 3/13/2018
Instrument: iCE 3500 FLAA
QC Method: Std Methods 3111 B
Results File Location: \\SEACRESTSERV\Operations\Analytical\SOLAAR_DATA\Results

Calibration Line Fit:	0.9996	QC Limits ≥ 0.995
Quality Control Sample:	% Recovery	QC Limits
	102.83%	90 - 110%
	102.28%	90 - 110%
Laboratory Fortified Blank:	% Recovery 101.24%	QC Limits 85 - 115%
Laboratory Control Duplicates:	% Difference -0.67%	QC Limits -15 - 15%

Analysis Anomalies: None

Method Required Preservation: HNO₃/ ≤0-4°C

Client Contact: None

Comments: None



Validated