



TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION, INC.

HEADQUARTERS: P.O. BOX 33695 DENVER, COLORADO 80233-0695 303-452-6111

April 17, 2019

VIA Electronic Mail: brock.bowles@state.co.us

Mr. Brock Bowles
Division of Reclamation, Mining, & Safety
Coal Program Support Staff
1313 Sherman Street, RM 215
Denver, Colorado 80203

RE: March 2019 Discharge Monitoring Report Submittal
CDPS Permit #CO-0000213
Elk Ridge Mining and Reclamation, New Horizon Mine
DRMS Mine Permit #C-1981-008

Dear Mr. Bowles:

Enclosed are the Discharge Monitoring Reports (DMR) for the Elk Ridge Mining and Reclamation, LLC, New Horizon Mine CDPS Permit No. CO-0000213 for March 2019. Tri-State Generation and Transmission Association, Inc. (Tri-State) is the parent to Elk Ridge Mining and Reclamation. The enclosed March DMRs were submitted electronically through the EPA's NetDMR program.

If you have any questions about the enclosed reports, please contact Darlene Crosby at 303-254-3055.

Sincerely,

Daniel J. Casiraro
Senior Manager
Environmental Services

DJC:DC:der

Enclosures

cc: Darlene Crosby (via email)
Tom Fry (via email)
Chantell Johnson (via email)
File G474-11.3(10)a-9a

AN EQUAL OPPORTUNITY / AFFIRMATIVE ACTION EMPLOYER

A Touchstone Energy® Cooperative



CRAIG STATION
P.O. BOX 1307
CRAIG, CO 81626-1307
970-824-4411

ESCALANTE STATION
P.O. BOX 577
PREWITT, NM 87045
505-972-5200

NUCLA STATION
P.O. BOX 698
NUCLA, CO 81424-0698
970-864-7316

From: netdmr-notification@epa.gov
To: [Crosby, Darlene](#); [Johnson, Chantell](#); [Walz, Barbara](#)
Subject: [EXTERNAL] NetDMR DMR(s) Submittal Passed for: CO0000213
Date: Tuesday, April 23, 2019 4:31:05 PM

The following signed 7 DMR(s) were submitted to EPA and were successfully processed:

CDX Transaction ID: _690f279d-3e63-4bef-9547-dab852b870a0
User ID: BARBARAWALZ1
Timestamp: 04/23/2019 16:09:17

Permitted Facility Name: NEW HORIZON MINE
Permit ID: CO0000213
Permitted Feature: 012
Discharge: A - SR and Mine Drainage to Tuttle Draw
Monitoring Period End Date: 03/31/19

Permitted Facility Name: NEW HORIZON MINE
Permit ID: CO0000213
Permitted Feature: 012
Discharge: Q - Quarterly Monitoring for 012A
Monitoring Period End Date: 03/31/19

Permitted Facility Name: NEW HORIZON MINE
Permit ID: CO0000213
Permitted Feature: 013
Discharge: A - SR & Mine Drainage to Tuttle Draw
Monitoring Period End Date: 03/31/19

Permitted Facility Name: NEW HORIZON MINE
Permit ID: CO0000213
Permitted Feature: 013
Discharge: Q - Quarterly Monitoring for 013A
Monitoring Period End Date: 03/31/19

Permitted Facility Name: NEW HORIZON MINE
Permit ID: CO0000213
Permitted Feature: 013
Discharge: X - CHRONIC WET TESTING FOR 013A
Monitoring Period End Date: 03/31/19

Permitted Facility Name: NEW HORIZON MINE
Permit ID: CO0000213
Permitted Feature: 016
Discharge: A - SR & Mine Drainage Tributary to Tuttle Draw
Monitoring Period End Date: 03/31/19

Permitted Facility Name: NEW HORIZON MINE
Permit ID: CO0000213
Permitted Feature: 016
Discharge: Q - Quarterly Monitoring for 016A
Monitoring Period End Date: 03/31/19

Thank you.

This notification was sent from the Colorado instance of "Production NetDMR" the official NPDES reporting environment for Colorado clean water discharge permits

DMR Copy of Record

Permit

Permit #:

CO0000213

Major:

No

Permittee:

Elk Ridge Mining and Reclamation LLC

Permittee Address:

PO Box 33695
Denver, CO 80233-0695

Facility:

NEW HORIZON MINE

Facility Location:

27646 W 5 AVE
NUCLA, CO 81424

Permitted Feature:

012
External Outfall

Discharge:

012-A
SR and Mine Drainage to Tuttle Draw

Report Dates & Status

Monitoring Period:

From 03/01/19 to 03/31/19

DMR Due Date:

04/28/19

Status:

NetDMR Validated

Considerations for Form Completion

TSS & Fe limits will be waived & settleable solids limit applied for 10YR/24HR precip event - see pp 8-9 for requirements.

Principal Executive Officer

First Name:

Barbara

Last Name:

Walz

Title:

SVP, Policy and Compliance, CCO

Telephone:

303-452-6111

No Data Indicator (NODI)

Form NODI:

--

Parameter		Monitoring Location	Season #	Param. NODI		Quantity or Loading					Quality or Concentration							# of Ex.	Frequency of Analysis	Sample Type
Code	Name					Qualifier 1	Value 1	Qualifier 2	Value 2	Units	Qualifier 1	Value 1	Qualifier 2	Value 2	Qualifier 3	Value 3	Units			
00400	pH	1 - Effluent Gross	0	--	Sample														02/30 - Twice Per Month	GR - GRAB
					Permit Req.						>=	6.5 MINIMUM			<=	9 MAXIMUM	12 - SU			
					Value NODI							C - No Discharge				C - No Discharge				
00530	Solids, total suspended	1 - Effluent Gross	0	--	Sample														02/30 - Twice Per Month	GR - GRAB
					Permit Req.								<=	35 30DA AVG	<=	70 MX 7D AV	19 - mg/L			
					Value NODI									C - No Discharge		C - No Discharge				
00980	Iron, total recoverable	1 - Effluent Gross	0	--	Sample														02/30 - Twice Per Month	GR - GRAB
					Permit Req.								<=	3000 30DA AVG	<=	6000 DAILY MX	28 - ug/L			
					Value NODI									C - No Discharge		C - No Discharge				
03582	Oil and grease	1 - Effluent Gross	0	--	Sample														77/77 - Contingent	GR - GRAB
					Permit Req.										<=	10 INST MAX	19 - mg/L			
					Value NODI											C - No Discharge				
50050	Flow, in conduit or thru treatment plant	1 - Effluent Gross	0	--	Sample														01/30 - Monthly	IN - INSTAN
					Permit Req.	<=	1.09 30DA AVG		Req Mon DAILY MX	03 - MGD										
					Value NODI		C - No Discharge		C - No Discharge											
84066	Oil and grease visual	1 - Effluent Gross	0	--	Sample														01/07 - Weekly	VI - VISUAL
					Permit Req.				Req Mon INST MAX	9P - N=0;Y=1										
					Value NODI				C - No Discharge											

Submission Note

If a parameter row does not contain any values for the Sample nor Effluent Trading, then none of the following fields will be submitted for that row: Units, Number of Excursions, Frequency of Analysis, and Sample Type.

Edit Check Errors

No errors.

Comments

Attachments

No attachments.

Report Last Saved By

Elk Ridge Mining and Reclamation LLC

User:

dcrosby@tristategt.org

Name:

Darlene Crosby

E-Mail:

dcrosby@tristategt.org

Date/Time:

2019-03-29 10:00 (Time Zone: -06:00)

Report Last Signed By

User:

BARBARAWALZ1

Name:

Barbara Walz

E-Mail:

bwalz@tristategt.org

Date/Time:

2019-04-23 14:09 (Time Zone: -06:00)

DMR Copy of Record

Permit

Permit #:

CO0000213

Major:

No

Permittee:

Elk Ridge Mining and Reclamation LLC

Permittee Address:

PO Box 33695
Denver, CO 80233-0695

Facility:

NEW HORIZON MINE

Facility Location:

27646 W 5 AVE
NUCLA, CO 81424

Permitted Feature:

012
External Outfall

Discharge:

012-Q
Quarterly Monitoring for 012A

Report Dates & Status

Monitoring Period:

From 01/01/19 to 03/31/19

DMR Due Date:

04/28/19

Status:

NetDMR Validated

Considerations for Form Completion

Quarterly monitoring - see Appendix B, #29, pg 43.

Principal Executive Officer

First Name:

Barbara

Last Name:

Walz

Title:

SVP, Policy and Compliance, CCO

Telephone:

303-452-6111

No Data Indicator (NODI)

Form NODI:

--

Submission Note

If a parameter row does not contain any values for the Sample nor Effluent Trading, then none of the following fields will be submitted for that row: Units, Number of Excursions, Frequency of Analysis, and Sample Type.

Edit Check Errors

No errors.

Comments

Attachments

No attachments.

Report Last Saved By

Elk Ridge Mining and Reclamation LLC

User:

dcrosby@tristategt.org

Name:

Darlene Crosby

E-Mail:

dcrosby@tristategt.org

Date/Time:

2019-03-29 10:00 (Time Zone: -06:00)

Report Last Signed By

BARBARAWALZ1

User:

BARBARAWALZ1

Name:

Barbara Walz

E-Mail:

bwalz@tristategt.org

Date/Time:

2019-04-23 14:09 (Time Zone: -06:00)

DMR Copy of Record

Permit

Permit #:

CO0000213

Major:

No

Permittee:

Elk Ridge Mining and Reclamation LLC

Permittee Address:

PO Box 33695
Denver, CO 80233-0695

Facility:

NEW HORIZON MINE

Facility Location:

27646 W 5 AVE
NUCLA, CO 81424

Permitted Feature:

013
External Outfall

Discharge:

013-A
SR & Mine Drainage to Tuttle Draw

Report Dates & Status

Monitoring Period:

From 03/01/19 to 03/31/19

DMR Due Date:

04/28/19

Status:

NetDMR Validated

Considerations for Form Completion

TSS & Fe limits will be waived & settleable solids limit applied for 10YR/24HR precip event - see pg 7 for requirements.

Principal Executive Officer

First Name:

Barbara

Last Name:

Walz

Title:

SVP, Policy and Compliance, CCO

Telephone:

303-452-6111

No Data Indicator (NODI)

Form NODI: --

Submission Note

If a parameter row does not contain any values for the Sample nor Effluent Trading, then none of the following fields will be submitted for that row: Units, Number of Excursions, Frequency of Analysis, and Sample Type.

Edit Check Errors

No errors.

Comments

Attachments

No attachments.

Report Last Saved By

Elk Ridge Mining and Reclamation LLC

User:

dcrosby@tristategt.org

Name:

Darlene Crosby

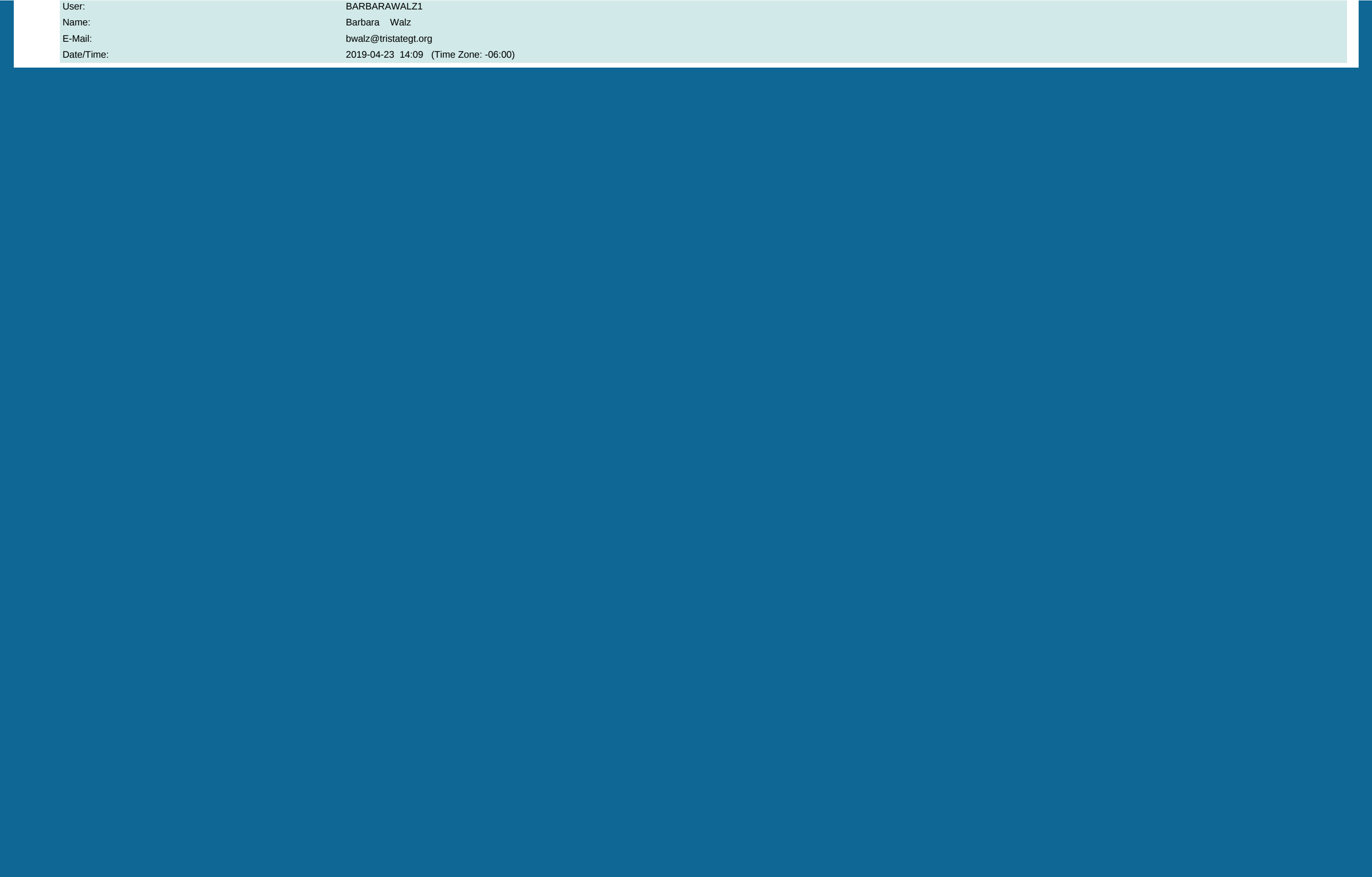
E-Mail:

dcrosby@tristategt.org

Date/Time:

2019-04-19 10:56 (Time Zone: -06:00)

Report Last Signed By



DMR Copy of Record

Permit

Permit #:

CO0000213

Major:

No

Permittee:

Elk Ridge Mining and Reclamation LLC

Permittee Address:

PO Box 33695
Denver, CO 80233-0695

Facility:

NEW HORIZON MINE

Facility Location:

27646 W 5 AVE
NUCLA, CO 81424

Permitted Feature:

013
External Outfall

Discharge:

013-Q
Quarterly Monitoring for 013A

Report Dates & Status

Monitoring Period:

From 01/01/19 to 03/31/19

DMR Due Date:

04/28/19

Status:

NetDMR Validated

Considerations for Form Completion

Quarterly Monitoring - see Appendix B, #29, pg 43

Principal Executive Officer

First Name:

Barbara

Last Name:

Walz

Title:

SVP, Policy and Compliance, CCO

Telephone:

303-452-6111

No Data Indicator (NODI)

Form NODI:

--

Parameter	Monitoring Location	Season #	Param. NODI		Quantity or Loading					Quality or Concentration						# of Ex.	Frequency of Analysis	Sample Type
Code	Name				Qualifier 1	Value 1	Qualifier 2	Value 2	Units	Qualifier 1	Value 1	Qualifier 2	Value 2	Qualifier 3	Value 3	Units		
00530	Solids, total suspended	1 - Effluent Gross	0	--								=	12			19 - mg/L	01/07 - Weekly	GR - GRAB
					Sample							<=	35 30DA AVG	<=	70 MX 7D AV	19 - mg/L	01/90 - Quarterly	GR - GRAB
					Permit Req. Value NODI													
50092	Mercury, total low level	1 - Effluent Gross	0	--								=	0.0021			28 - ug/L	01/90 - Quarterly	GR - GRAB
					Sample								Req Mon 30DA AVG			28 - ug/L	01/90 - Quarterly	GR - GRAB
					Permit Req. Value NODI													
70295	Solids, total dissolved	1 - Effluent Gross	0	--								=	3100	=	3100	19 - mg/L	03/90 - Three Every Quarter	GR - GRAB
					Sample								Req Mon 30DA AVG		Req Mon DAILY MX	19 - mg/L	01/90 - Quarterly	GR - GRAB
					Permit Req. Value NODI													

Submission Note

If a parameter row does not contain any values for the Sample nor Effluent Trading, then none of the following fields will be submitted for that row: Units, Number of Excursions, Frequency of Analysis, and Sample Type.

Edit Check Errors

No errors.

Comments

Attachments

No attachments.

Report Last Saved By

Elk Ridge Mining and Reclamation LLC

User:

dcrosby@tristategt.org

Name:

Darlene Crosby

E-Mail:

dcrosby@tristategt.org

Date/Time:

2019-04-22 14:25 (Time Zone: -06:00)

Report Last Signed By

User:

BARBARAWALZ1

Name:

Barbara Walz

E-Mail:

bwalz@tristategt.org

Date/Time:

2019-04-23 14:09 (Time Zone: -06:00)

DMR Copy of Record

Permit

Permit #:

CO0000213

Major:

No

Permittee:

Elk Ridge Mining and Reclamation LLC

Permittee Address:

PO Box 33695
Denver, CO 80233-0695

Facility:

NEW HORIZON MINE

Facility Location:

27646 W 5 AVE
NUCLA, CO 81424

Permitted Feature:

013
External Outfall

Discharge:

013-X
CHRONIC WET TESTING FOR 013A

Report Dates & Status

Monitoring Period:

From 01/01/19 to 03/31/19

DMR Due Date:

04/28/19

Status:

NetDMR Validated

Considerations for Form Completion

See Part I.D.1 of permit for details of test procedure. Report NOEC using test code "S". Report IC25 using test code "P". Report highest number between "P" and "S" at "T" for each parameter. IWC=100%.

Principal Executive Officer

First Name:

Barbara

Last Name:

Walz

Title:

SVP, Policy and Compliance, CCO

Telephone:

303-452-6111

No Data Indicator (NODI)

Form NODI:

--

Parameter		Monitoring Location	Season #	Param. NODI		Quantity or Loading					Quality or Concentration					# of Ex.	Frequency of Analysis	Sample Type
Code	Name					Qualifier 1	Value 1	Qualifier 2	Value 2	Units	Qualifier 1	Value 1	Qualifier 2	Value 2	Qualifier 3	Value 3	Units	
TKP3B	Static Renewal 7 Day Chronic Ceriodaphnia dubia	P - See Comments	1	--	Sample						=	18.5					2G - tox chronic	0
					Permit Req.							Req Mon SINGSAMP					2G - tox chronic	
					Value NODI													
TKP3B	Static Renewal 7 Day Chronic Ceriodaphnia dubia	S - See Comments	1	--	Sample						=	20					2G - tox chronic	0
					Permit Req.							Req Mon MN VALUE					2G - tox chronic	
					Value NODI													
TKP3B	Static Renewal 7 Day Chronic Ceriodaphnia dubia	T - See Comments	1	--	Sample						=	20					2G - tox chronic	0
					Permit Req.							Req Mon MN VALUE					2G - tox chronic	
					Value NODI													
TKP6C	Static Renewal 7 Day Chronic Pimephales promelas	P - See Comments	1	--	Sample						>	100					2G - tox chronic	0
					Permit Req.							Req Mon SINGSAMP					2G - tox chronic	
					Value NODI													
TKP6C	Static Renewal 7 Day Chronic Pimephales promelas	S - See Comments	1	--	Sample						=	100					2G - tox chronic	0
					Permit Req.							Req Mon MN VALUE					2G - tox chronic	
					Value NODI													
TKP6C	Static Renewal 7 Day Chronic Pimephales promelas	T - See Comments	1	--	Sample						>	100					2G - tox chronic	0
					Permit Req.							Req Mon MN VALUE					2G - tox chronic	
					Value NODI													

Submission Note

If a parameter row does not contain any values for the Sample nor Effluent Trading, then none of the following fields will be submitted for that row: Units, Number of Excursions, Frequency of Analysis, and Sample Type.

Edit Check Errors

No errors.

Comments

On April 10, 2019, Tri-State notified WQCD of Quarter 1 WET test results for Outfall 013 and initiated a Targeted Toxicity Identification Evaluation (attached).

Attachments

Name	Type	Size
NH2_CDPS_CO0000213_Outfall013_WETresults_March2019_COC.pdf	pdf	1998594
190410_NHM_Notification_of_Q1_2019_Chronic_Results_for_Outfall_013_Commencement_of_a_TIE_Walz_to_Mink.pdf	pdf	5021519

Report Last Saved By

Elk Ridge Mining and Reclamation LLC

User:

dcrosby@tristategt.org

Name:

Darlene Crosby

E-Mail:

dcrosby@tristategt.org

Date/Time:

2019-04-10 09:48 (Time Zone: -06:00)

Report Last Signed By

User:

BARBARAWALZ1

Name:

Barbara Walz

E-Mail:

bwalz@tristategt.org

Date/Time:

2019-04-23 14:09 (Time Zone: -06:00)

DMR Copy of Record

Permit

Permit #:

CO0000213

Major:

No

Permittee:

Elk Ridge Mining and Reclamation LLC

Permittee Address:

PO Box 33695
Denver, CO 80233-0695

Facility:

NEW HORIZON MINE

Facility Location:

27646 W 5 AVE
NUCLA, CO 81424

Permitted Feature:

016
External Outfall

Discharge:

016-A
SR & Mine Drainage Tributary to Tuttle Draw

Report Dates & Status

Monitoring Period:

From 03/01/19 to 03/31/19

DMR Due Date:

04/28/19

Status:

NetDMR Validated

Considerations for Form Completion

TSS & Fe limits will be waived & settleable solids limits applied for 10YR/24HR precip event - see pp 8-9 for requirements.

Principal Executive Officer

First Name:

Barbara

Last Name:

Walz

Title:

SVP, Policy and Compliance, CCO

Telephone:

303-452-6111

No Data Indicator (NODI)

Form NODI:

--

Submission Note

If a parameter row does not contain any values for the Sample nor Effluent Trading, then none of the following fields will be submitted for that row: Units, Number of Excursions, Frequency of Analysis, and Sample Type.

Edit Check Errors

No errors.

Comments

Attachments

No attachments.

Report Last Saved By

Elk Ridge Mining and Reclamation LLC

User:

dcrosby@tristategt.org

Name:

Darlene Crosby

E-Mail:

dcrosby@tristategt.org

Date/Time:

2019-03-29 10:01 (Time Zone: -06:00)

Report Last Signed By

User:

BARBARAWALZ1

Name:

Barbara Walz

E-Mail:

bwalz@tristategt.org

Date/Time:

2019-04-23 14:09 (Time Zone: -06:00)

DMR Copy of Record

Permit

Permit #:

CO0000213

Major:

No

Permittee:

Elk Ridge Mining and Reclamation LLC

Permittee Address:

PO Box 33695
Denver, CO 80233-0695

Facility:

NEW HORIZON MINE

Facility Location:

27646 W 5 AVE
NUCLA, CO 81424

Permitted Feature:

016
External Outfall

Discharge:

016-Q
Quarterly Monitoring for 016A

Report Dates & Status

Monitoring Period:

From 01/01/19 to 03/31/19

DMR Due Date:

04/28/19

Status:

NetDMR Validated

Considerations for Form Completion

Quarterly monitoring - see Appendix B, #29, pg 43.

Principal Executive Officer

First Name:

Barbara

Last Name:

Walz

Title:

SVP, Policy and Compliance, CCO

Telephone:

303-452-6111

No Data Indicator (NODI)

Form NODI:

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Submission Note

If a parameter row does not contain any values for the Sample nor Effluent Trading, then none of the following fields will be submitted for that row: Units, Number of Excursions, Frequency of Analysis, and Sample Type.

Edit Check Errors

No errors.

Comments

Attachments

No attachments.

Report Last Saved By

Elk Ridge Mining and Reclamation LLC

User:

dcrosby@tristategt.org

Name:

Darlene Crosby

E-Mail:

dcrosby@tristategt.org

Date/Time:

2019-03-29 10:02 (Time Zone: -06:00)

Report Last Signed By

User:

BARBARAWALZ1

Name:

Barbara Walz

E-Mail:

bwalz@tristategt.org

Date/Time:

2019-04-23 14:09 (Time Zone: -06:00)

**TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION, INC.**

HEADQUARTERS: P.O. BOX 33695 DENVER, COLORADO 80233-0695 303-452-6111

April 10, 2019

Submitted via email eric.mink@state.co.us

Mr. Eric Mink
Water Quality Control Division
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

RE: CDPS Permit #CO-0000213
New Horizon Mine (Outfall 013)
Notification of Q1 2019 Chronic WET Results for Outfall 013 and
Commencement of a TIE (targeted)

Dear Mr. Mink:

On March 29, 2019, the third party laboratory, The Seacrest Group, provided the enclosed analytical report to Tri-State Generation and Transmission Association (Tri-State) containing the first quarter (Q1) Whole Effluent Toxicity (WET) testing results for Outfall 013 at the Elk Ridge Mining and Reclamation, LLC (Elk Ridge) New Horizon Mine (CDPS Permit #CO-0000213). Tri-State is the parent of Elk Ridge. Therefore, we are providing the required notification of WET results, in accordance with Part I.D.1b of the permit.

Outfall	Species	Reproduction/Growth Results		IWC
		NOEC*	IC25**	
013	<i>Ceriodaphnia dubia</i>	20%	18.5%	100%

*NOEC means “no observed effect concentration” at which concentration there are no observable adverse effects on the organisms.

**IC25 means inhibition concentration causing a 25% reduction in the biological measurement.

The fourth and first quarter WET testing are “report only” at Outfall 013 until September 30, 2020 (delayed effective date). However, in accordance with the automatic compliance response requirements of the permit and our discussions in September 2018, the facility is planning to commence a targeted Toxicity Identification Evaluation (TIE) for *Ceriodaphnia dubia* for this outfall location. We will report these results to the Division when available and in accordance with the 60-day and 120-day status reports and 180-day final report.

We will also be submitting the initial WET test summary and chains of custody with the March 2019 Discharge Monitoring Report (DMR) by April 28, 2019.





Mr. Eric Mink, WQCD
April 10, 2019
Page 2

If you have any questions on this submittal, please contact Chantell Johnson at 303-254-3185 (cjohnson@tristategt.org) or Chris Gilbreath at 303-254-3291 (cgilbreath@tristategt.org).

Sincerely,

Barbara A. Walz
Senior Vice President
Policy and Compliance
Chief Compliance Officer

BAW:CJ:der

Enclosure

cc: Chris Gilbreath (via email)
Chantell Johnson (via email)
File G474-11.3(10)a-5



March 29, 2019

Mr. Thomas Fry
Elk Ridge Mining and Reclamation
27646 W 5th Ave.
Nucla, CO 81424

Dear Mr. Fry:

Enclosed is the report for chronic biomonitoring tests performed for Elk Ridge Mining and Reclamation on effluent from the New Horizon Mine NPDES 013 discharge. There were statistically significant sublethal toxicity effects to the *Ceriodaphnia dubia* species resulting in a violation, and a single lethal endpoint failure to the Fathead minnow species. The sample fails WET (Whole Effluent Toxicity) testing requirements for this sampling period.

If you have any questions or concerns, please do not hesitate to contact me at (303) 661-9324.

Best regards,

Tessa Hunt-Woodland
Laboratory Manager
Enclosure(s): Invoice
Report

**RESULTS OF CHRONIC BIOMONITORING TESTS
CONDUCTED FOR ELK RIDGE MINING AND RECLAMATION
ON THE
NEW HORIZON MINE OUTFALL 013 SITE**

Prepared for:

Mr. Thomas Fry
Elk Ridge Mining and Reclamation
P.O. Box 628
Nucla, CO 81424

Prepared by:

SeaCrest Group
500 S Arthur Ave. Suite 450
Louisville, Colorado 80027-3065
(303) 661-9324

March 29, 2019

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Chronic Toxicity Test Summary

Test:

- 7-day static renewal using *Ceriodaphnia dubia*.
- 7-day static renewal using Fathead minnow (*Pimephales Promelas*).

Client: Elk Ridge Mining and Reclamation

Test Procedure Followed:

- *Ceriodaphnia dubia*: EPA/821/R-02-013. Method 1002.0 (2002)
- Fathead minnow: EPA/821/R-02-013. Method 1000.0 (2002)

Sample Number: 419153.B

Sample	Time of Collection	Date of Collection	Time of Receipt	Date of Receipt
Effluent 1	1330	03-12-2019	0940	03-13-2019
Effluent 2	1100	03-13-2019	1025	03-15-2019
Effluent 3	0930	03-15-2019	1130	03-16-2019

	<i>Ceriodaphnia dubia</i>	Fathead minnow
Test Initiation Time	1245	1145
Test Initiation Date	03-13-2019	03-13-2019
Test Completion Time	1340	1130
Test Completion Date	03-19-2019	03-20-2019

Dilution Water:

- Moderately hard laboratory reconstituted water

Test Organism Source:

- *Ceriodaphnia dubia*
SeaCrest Group
- Fathead minnow
SeaCrest Group

Reference Toxicant:

- Sodium Chloride

Abstract of Results

Test Concentrations:	Control (0%), 20%, 40%, 60%, 80%, 100%
Number of Organisms/Concentration:	10 for <i>Ceriodaphnia dubia</i> 40 for Fathead minnow
Replicates at each Concentration:	10 for <i>Ceriodaphnia dubia</i> 4 for Fathead minnow

	<i>Ceriodaphnia dubia</i>	Fathead minnow
Test vessel size	30ml	500ml
Exposure volume	15ml	250ml
Pass/Fail Status	FAIL	PASS
Temperature Range (°C)	24.1 – 25.9	24.1 – 25.6
Dissolved Oxygen Range (mg/L)	6.9 – 8.6	4.1 – 8.5
pH Range	7.4 – 8.2	7.2 – 8.0
	CONTROL (Cerio/FHM)	100%
Hardness (mg/L as CaCO ₃)	84/86	2260/2120/1780
Alkalinity (mg/L as CaCO ₃)	58/58	407/263/347
Total residual chlorine (mg/L)	<0.01	<0.01/<0.01/0.01
Total ammonia (mg/L as NH ₃)	<0.03	1.67/0.88/2.05

INTRODUCTION

Biomonitoring provides an effective means by which the toxicity of discharges from municipal, industrial and mining operations can be tested. Among the advantages of biomonitoring is the ability to test complex effluents containing a broad range of contaminants. Biomonitoring, when used in conjunction with chemical analyses, can generate data capable of identifying a much wider range of contaminants.

The Colorado Water Quality Control Division requires certain NPDES permittees to perform acute and/or chronic biomonitoring tests. The chronic test measures significant differences in lethality and in reproduction (*Ceriodaphnia dubia*) or growth (Fathead minnow – *Pimephales promelas*) between control and exposed organisms.

The present report discusses the results of chronic biomonitoring tests conducted on effluent from Elk Ridge Mining and Reclamation New Horizon Mine 013 discharge. These tests were conducted in March 2019.

MATERIALS AND METHODS

Sample Collection

Two gallons of effluent were collected on three separate dates. Samples were delivered chilled to the SeaCrest lab where they were held at 0-6°C. Chain of custody forms showing sample collection and lab arrival times are included in Appendix 1.

Dilution Water

Laboratory reconstituted water was used as both the dilution water source and the control for the tests. Reconstituted water for the *Ceriodaphnia dubia* test was produced by adding sodium bicarbonate, calcium sulfate, magnesium sulfate, potassium chloride, and sodium selenate to deionized water. Reconstituted water for the Fathead minnow test was produced by adding sodium bicarbonate, calcium sulfate, magnesium sulfate, and potassium chloride to deionized water.

Test Organisms

The biomonitoring tests were conducted with *Ceriodaphnia dubia* and Fathead minnow. *Ceriodaphnia dubia* is cultured in the SeaCrest laboratory. Stock cultures are maintained in 5-gallon aquaria. Brood females are cultured in individual plastic beakers on brood boards for a period of up to 14-days. Neonates less than 24-hours old released from third or subsequent broods of eight or more within an 8-hour period are removed from the brood chambers and used in tests. Brood and stock organisms are fed daily with a mixture of Yeast, Cereal Leaves, and Trout Chow (YCT). This is supplemented with an equal volume of green algae (*Selenastrum capricornutum*).

Less than one-day-old Fathead minnow, cultured in the laboratory, were also used in the test. Adult fish are maintained in 10-gallon aquaria where females deposit their eggs on the under-surface of split PVC pipe sections. The eggs are collected daily and transferred to aerated containers where they hatch after three to four days. The larval fish are fed newly hatched Brine shrimp (*Artemia* sp.) at least twice per day.

In-house organisms are tested at least monthly in a reference toxicant test using sodium chloride to monitor overall health and test reproducibility.

Test Procedures

Upon receipt at the lab, samples are analyzed for alkalinity, hardness, conductivity, dissolved oxygen, ammonia, chlorine, and pH. Alkalinity and hardness are determined titrimetrically according to methods described in Hach Chemical Company¹. Ammonia is measured by a Thermo Orion ion-selective electrode according to the procedures in APHA/AWWA/WEF². Conductivity, dissolved oxygen, and pH probes were used to take these measurements.

The test followed the procedures in EPA³ and CDPHE⁴ guidelines. Exposure concentrations included control (0%), 20%, 40%, 60%, 80% and 100% mixtures, diluted with moderately hard laboratory reconstituted water.

Individual *Ceriodaphnia dubia* were placed in 30ml plastic containers containing approximately 15ml of exposure medium. Ten replicates at each concentration were used. The animals were fed daily with the YCT mixture and an equal volume of the green algae (*Selenastrum capricornutum*). The exposure medium was changed daily in each container and the number of young released overnight were counted and recorded. Young were removed from the containers daily and discarded. Routine measurements were made each day of temperature, dissolved oxygen, and pH before and after the water changes.

Fathead minnow were exposed in 500ml plastic cups to which 250ml of media was added and replaced daily. Four replicates were used at each concentration. Ten fish, less than 24-hours old, were placed in each cup. The fish were monitored daily for survival and fed live Brine shrimp at least twice per day. After seven days, the fish were removed from the cups, euthanized, and then placed in aluminum pans and dried in an oven for a minimum of six hours at 100°C. The pans were then weighed on a five-place analytical balance to determine the average dry weight of the fish from each replicate.

Data Analysis

Data from the test(s) were analyzed on a personal computer using the TOXCALC package developed by Tidepool Scientific Software. Statistical tests used in the analyses are shown in Table 1. Test acceptability was determined using control survival and performance criteria, concentration-response relationships and percent minimum significant differences (USEPA^{5,6}).

Table 1. Statistics methods used in testing for significant differences in test parameters.

Species	Normality		Homogeneity	
<i>Ceriodaphnia dubia</i>	Kolmogorov Test		Bartlett's Test	
Fathead minnow	Shapiro – Wilk's Test		Bartlett's Test	
Statistical Difference				
	Survival	Growth	Reproduction	IC ₂₅
<i>Ceriodaphnia dubia</i>	Fisher's Exact Test	N/A	Steel's Many-One Rank Test	IC _p
Fathead minnow	Steel's Many-One Rank Test	Dunnett's Test	N/A	IC _p

RESULTS

Ceriodaphnia dubia Test Results

Test results for the *Ceriodaphnia dubia* are summarized in Table 2 and provided on the data sheets located in Appendix 2. Survival was 90% in the 100% effluent concentration and ranged from 80% - 100% in the remaining effluent concentrations. Control survival was 100%. No statistically significant mortality was measured any effluent concentration when compared to the control. The No Observable Effect Concentration (NOEC) for lethality was 100%. The IC₂₅ for lethality was >100%.

Table 2. Summary of *Ceriodaphnia dubia* test results. Ten animals were exposed at each concentration. An asterisk (*) denotes a statistically significant difference from the control.

Concentration	No. Surviving	Mean Births	Min.	Max.	Significant Difference from Control
Control (0%)	10	31.4	12	40	
20%	9	22.9	5	34	
40%	8	18.8	0	29	*
60%	9	17.8	0	25	*
80%	9	16.6	3	22	*
100%	9	9.1	0	15	*

Average numbers of neonates was 9.1 in the 100% effluent concentration and ranged from 16.6 – 22.9 in the remaining effluent concentrations. Average number of neonates in the control was 31.4 for statistical analyses and for test acceptability criteria. A statistically significant difference in the number of neonates was found between the control and the 40%, 60%, 80% and 100% effluent concentrations. The NOEC for reproduction was 20%. The IC₂₅ for reproduction was estimated at 18.5%.

Fathead minnow Test Results

Fathead minnow results are summarized in Table 3 and are provided on data sheets in Appendix 3. Survival was 73% in the 100% effluent concentration and ranged from 70% - 90% in the remaining effluent concentrations. Control survival was 100%. No statistically significant mortality was measured in the 100% effluent concentration when compared to the control. The NOEC for lethality was 100%. The IC₂₅ for lethality was 93.3%.

Table 3. Summary of Fathead minnow test results. Forty fish were exposed at each concentration. An asterisk (*) denotes a statistically significant difference from the control.

Concentration	No. Alive	Avg. Wt. (mg)	Min.	Max.		
Control (0%)	40	0.411	0.3858	0.465		
20%	31	0.345	0.206	0.401		
40%	37	0.441	0.379	0.505		
60%	28	0.357	0.270	0.477		
80%	36	0.422	0.307	0.527		
100%	29	0.398	0.322	0.557		

Average weight in the 100% effluent concentration was 0.398mg per individual and ranged from 0.345mg - 0.441mg per individual in the remaining effluent concentrations. Average weight for the control fish was 0.411mg for statistical analyses and for test acceptability criteria. No statistically significant differences were measured for growth in any effluent concentration when compared to the control. The NOEC for growth was 100%. The IC₂₅ for growth was >100%.

Test Acceptability

Acceptable control survival was achieved in both tests. Similarly, *Ceriodaphnia dubia* reproduction and Fathead minnow growth in control organisms met required levels. PMSD was within the required limits for an acceptable test for the *Ceriodaphnia dubia* species, but was outside the limits for the Fathead minnow test due the presence of statistically significant toxicity resulting in an IC₂₅ value under the permitted IWC (Table 4).

Table 4. PMSD for chronic test parameters.

	Survival		Growth		Reproduction	
	<i>Ceriodaphnia dubia</i>	Fathead Minnow	Lower bound	Upper bound	Lower bound	Upper bound
			12	30	13	47
PMSD (% Minimum significant difference)	N/A	N/A	35.5		30.6	

DISCUSSION

A chronic WET test is considered a violation of a permit limitation when both the NOEC and the IC25 are at any effluent concentration less than the IWC. A chronic WET test is considered to have failed one of the two statistical endpoints when either the NOEC or the IC25 are at any effluent concentration less than the IWC. The IWC for this permit has been determined to be 100% effluent. Since the *Ceriodaphnia dubia* WET test meets the defined criteria for violation or failure, the effluent discharge fails WET testing requirements for this sampling period.

REFERENCES

1. **Hach Chemical Company.** 2008. *Hach's Water Analysis Handbook*. Fifth Edition. Hach Chemical Company, Loveland, Colorado. Digital Medium.
2. **APHA/AWWA/WEF.** 1998. *Standard Methods for the Examination of Water and Wastewater*. 20th Edition. American Public Health Association, Washington, D.C.
3. **USEPA.** 2002. *Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*. EPA-821-R-02-013. 335 pp.
4. **CDPHE (Colorado Department of Public Health and Environment).** 1998. *Laboratory Guidelines for Conducting Whole Effluent Toxicity Tests*. Water Quality Control Division.
5. **USEPA.** 2000. *Method of Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing* (40 CFR Part 136). EPA/821/B-00/004.
6. **USEPA.** 2000. *Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications under the National Pollutant Discharge Elimination System Program*. EPA/833/R-00/003.

Appendix 1 – Chain of Custody Form



(303) 661.9324 - FAX (303) 661.9325

Client/Project Name: <u>STATE GRIND TRAILS</u>									
P.O./Project Number: <u>NEW HORIZON MONITOR</u>									
Contact: <u>TERY</u>									
Address: <u>27646 W 5TH NELLA G 81424</u>									
Phone # <u>970 864 1073</u> E-Mail: <u>TERY@TRISTATEGTO.ORG</u>									
Fax # _____ Sampler: <u>TERY</u>									
Report By: ☐ Mail ☒ PDF ☐ FAX									
Sample Location or ID	Date	Time	Grab/Comp	Lab ID (LAB Use Only)	Analysis (Check all applicable)				
<u>NHRS 013</u>	<u>3.12.19</u>	<u>1330</u>	<u>6</u>	<u>4191535#1</u>					
					WET: Acute (Indicate Below)				
					WET: Chronic (Indicate Below)				
					WET: Accelerated (Indicate Below)				
					WET: PTI/TIE/TRE (Indicate Below)				
					Metals (List Below)				
					Solids (TS/TDS/TSS) (Circle)				
					Anions (List Below)				
					Chromium III/VI (Circle)				
					Oil and Grease				
					Coliform (Total/Fecal/E-Coli) (Circle)				
					BOD/COD (Circle)				
					Other Analysis (List Below)				
					Number of Containers				
					Total Volume				
Turnaround Requirements (Analytical Testing Only)					Test Species: ☐ Fathead Minnow ☐ Ceriodaphnia ☐ Daphnia magna ☐ Daphnia pulex ☐ Other (List Below)				
Standard (10 days) _____ 6-9 Day _____					Special Instructions/Comments:				
3-5 Day _____ 1-2 Day _____					Requested Report Date:				
Relinquished By (1)		Received By (1)		Relinquished By (2)		Received By (2)			
Signature <u>[Signature]</u>	Date/Time <u>3.12.19</u> <u>1400</u>	Signature <u>[Signature]</u>	Date/Time <u>[Signature]</u> <u>WPS</u>	Signature <u>[Signature]</u>	Date/Time <u>[Signature]</u> <u>WPS</u>	Signature <u>[Signature]</u>	Date/Time <u>[Signature]</u> <u>WPS</u>	Signature <u>[Signature]</u>	Date/Time <u>[Signature]</u> <u>WPS</u>

Sample Receipt Form

Project #: 419 153.B

Date: 03/3/19

Sample #: 1

Initials: JW

Samples Were:

1. Shipped Hand Delivered Messengered

(circle one)

Notes:

WFS

2. Chilled to Ship

Notes:

Ambient Chilled (circle one)

Wet Ice Blue Ice (circle one)

3. Cooler Received Broken or Leaking

Notes:

Y N NA

4. Sample Received Broken or Leaking

Notes:

Y N NA

5. Received Within Holding Times

Notes:

Y N

6. Aeration necessary

Notes:

Y N NA

7. Sample Received at Temperature between 0-6° C .

Notes:

Y N NA

8. Description of Sample (Color, Odor, and/or Presence of Particulate Matter):

eff: slightly yellow, with PM

rec'g

Temp	DO (mg/L)	DO (%Sat)	pH	Cond	Time	Aeration		
						DO (mg/L)	DO (%Sat)	pH
<u>5.9</u>	<u>8.0</u>	<u>117.9</u>	<u>7.9</u>	<u>2930</u>				

Custody Seals:

1. Present on Outer Package

Y N

2. Unbroken on Outer Package

Y N NA

3. Present on Sample

Y N

4. Unbroken on Sample

Y N NA

Custody Documentation:

1. Present Upon Receipt of Sample

Y N



(303) 661.9324 - FAX (303) 661.9325

Client/Project Name: TRISTATE General TRANS									
P.O./Project Number: New Horizon Marine									
Contact: TERRY									
Address: 27646 W 5th Ave, CO 81424									
Phone # 970 864 1073 E-Mail: TERRY@TRISTATEGATORS									
Fax # 970 864 1073 Sampler: TERRY@TRISTATEGATORS									
Report By: ☐ Mail ☐ PDF ☐ FAX									
Sample Location or ID	Date	Time	Grab/Comp	Lab ID (Lab Use Only)	Analysis (Check all applicable) ☐ WET: Acute (Indicate Below) ☐ WET: Chronic (Indicate Below) ☐ WET: Accelerated (Indicate Below) ☐ WET: PTI/TIE/TRE (Indicate Below) ☐ Metals (List Below) ☐ Solids (TS/TDS/TSS) (Circle) ☐ Anions (List Below) ☐ Chromium III/VI (Circle) ☐ Oil and Grease ☐ Coliform (Total/Fecal/E-Coli) (Circle) ☐ BOD/COD (Circle) ☐ Other Analysis (List Below)				
N2DZS013	3.13.19	1100	G	419153.82					
Turnaround Requirements (Analytical Testing Only)					Test Species: ☒ Fathead Minnow ☐ Ceriodaphnia ☐ Daphnia magna ☐ Daphnia pulex ☐ Other (List Below)				
Standard (10 days) _____ 6-9 Day _____					Special Instructions/Comments:				
3-5 Day _____ 1-2 Day _____					Requested Report Date:				
Relinquished By (1)		Received By (1)		Relinquished By (2)		Received By (2)			
Signature 	Date/Time 3.13.19 1200	Signature VPS	Date/Time	Signature VPS	Date/Time	Signature 	Date/Time 3.15.19 10:25		

Sample Receipt Form

Project #: 419 153.8

Sample #: 2

Date: 03/5/19

Initials: TU2

Samples Were:

1. Shipped Hand Delivered Messengered (circle one)

Notes: UPS

2. Chilled to Ship

Ambient Chilled (circle one)

Notes:

Wet Ice Blue Ice (circle one)

3. Cooler Received Broken or Leaking

Y N NA

Notes:

4. Sample Received Broken or Leaking

Y N NA

Notes: one bottle lost about 10 mL

5. Received Within Holding Times

Y N

Notes: delayed by UPS b/c of storm
(still rec'd within 48 hrs of sampling)

6. Aeration necessary

Y N NA

Notes:

7. Sample Received at Temperature between 0-6° C.

Y N NA

Notes:

8. Description of Sample (Color, Odor, and/or Presence of Particulate Matter):

eff: yellow-brown, some PM

rec'g

						Aeration			
	Temp	DO (mg/L)	DO (%Sat)	pH	Cond	Time	DO (mg/L)	DO (%Sat)	pH
	<u>5.9</u>	<u>7.9</u>	<u>114.8</u>	<u>7.1</u>	<u>1884</u>				

Custody Seals:

1. Present on Outer Package

Y N

2. Unbroken on Outer Package

Y N NA

3. Present on Sample

Y N

4. Unbroken on Sample

Y N NA

Custody Documentation:

1. Present Upon Receipt of Sample

Y N



1341 Cannon Street - Louisville, CO 80027
(303) 661.9324 - FAX (303) 661.9325

Client/Project Name: ELK RIVER MONITORING AND RESEARCH				Analysis (Check all applicable)																																																																																															
P.O./Project Number: NEW HORIZON MINT																																																																																																			
Contact: T. Fry																																																																																																			
Address: 27646 W 5TH AVE CO 81424																																																																																																			
Phone # 970 864 1073		E-Mail: TFRY@TRESMINT.ORG		WET: Acute (Indicate Below)		WET: Chronic (Indicate Below)		WET: Accelerated (Indicate Below)		WET: PTI/TIE/TRE (Indicate Below)		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="2">Metals (List Below)</td> <td colspan="2">Solids (TS/TDS/TSS) (Circle)</td> <td colspan="2">Anions (List Below)</td> <td colspan="2">Chromium III/VI (Circle)</td> <td colspan="2">Oil and Grease</td> <td colspan="2">Coliform (Total/Fecal/E-Coli) (Circle)</td> <td colspan="2">BOD/COD (Circle)</td> <td colspan="2">Other Analysis (List Below)</td> <td colspan="2">Number of Containers</td> <td colspan="2">Total Volume</td> </tr> <tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr> <tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr> <tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr> </table>								Metals (List Below)		Solids (TS/TDS/TSS) (Circle)		Anions (List Below)		Chromium III/VI (Circle)		Oil and Grease		Coliform (Total/Fecal/E-Coli) (Circle)		BOD/COD (Circle)		Other Analysis (List Below)		Number of Containers		Total Volume																																																													
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Report By: ☐ Mail ☒ PDF ☐ FAX		Lab ID (Lab Use Only)		Grab/Comp		Time		Date		Sample Location or ID		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="2">Metals (List Below)</td> <td colspan="2">Solids (TS/TDS/TSS) (Circle)</td> <td colspan="2">Anions (List Below)</td> <td colspan="2">Chromium III/VI (Circle)</td> <td colspan="2">Oil and Grease</td> <td colspan="2">Coliform (Total/Fecal/E-Coli) (Circle)</td> <td colspan="2">BOD/COD (Circle)</td> <td colspan="2">Other Analysis (List Below)</td> <td colspan="2">Number of Containers</td> <td colspan="2">Total Volume</td> </tr> <tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr> <tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr> <tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr> </table>								Metals (List Below)		Solids (TS/TDS/TSS) (Circle)		Anions (List Below)		Chromium III/VI (Circle)		Oil and Grease		Coliform (Total/Fecal/E-Coli) (Circle)		BOD/COD (Circle)		Other Analysis (List Below)		Number of Containers		Total Volume																																																													
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Turnaround Requirements (Analytical Testing Only)		Test Species: ☒ Fathead Minnow ☐ Ceriodaphnia ☐ Daphnia magna ☐ Other (List Below)		Standard (10 days)		6-9 Day		3-5 Day		1-2 Day		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="2">Metals (List Below)</td> <td colspan="2">Solids (TS/TDS/TSS) (Circle)</td> <td colspan="2">Anions (List Below)</td> <td colspan="2">Chromium III/VI (Circle)</td> <td colspan="2">Oil and Grease</td> <td colspan="2">Coliform (Total/Fecal/E-Coli) (Circle)</td> <td colspan="2">BOD/COD (Circle)</td> <td colspan="2">Other Analysis (List Below)</td> <td colspan="2">Number of Containers</td> <td colspan="2">Total Volume</td> </tr> <tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr> <tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr> <tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr> </table>								Metals (List Below)		Solids (TS/TDS/TSS) (Circle)		Anions (List Below)		Chromium III/VI (Circle)		Oil and Grease		Coliform (Total/Fecal/E-Coli) (Circle)		BOD/COD (Circle)		Other Analysis (List Below)		Number of Containers		Total Volume																																																													
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Sample Receipt Form

Project #: 419 153 B

Sample #: 153-B-3

Date: 3/16/19

Initials: ML

Samples Were:

1. Shipped Hand Delivered Messengered (circle one)

Notes:

2. Chilled to Ship

Ambient Chilled (circle one)

Notes:

Wet Ice Blue Ice (circle one)

3. Cooler Received Broken or Leaking

Y N NA

Notes:

4. Sample Received Broken or Leaking

Y N NA

Notes:

5. Received Within Holding Times

Y N

Notes:

6. Aeration necessary

Y N NA

Notes:

7. Sample Received at Temperature between 0-6° C .

Y N NA

Notes:

8. Description of Sample (Color, Odor, and/or Presence of Particulate Matter):

eff: clear, some PM

rec'g

	Temp	DO (mg/L)	DO (%Sat)	pH	Cond	Aeration			
						Time	DO (mg/L)	DO (%Sat)	pH
	5.9	8.4	116.5	7.5	2790				

Custody Seals:

1. Present on Outer Package

Y N

2. Unbroken on Outer Package

Y N NA

3. Present on Sample

Y N

4. Unbroken on Sample

Y N NA

Custody Documentation:

1. Present Upon Receipt of Sample

Y N

Appendix 2 – Data Sheets for the *Ceriodaphnia dubia* Test

WET TEST REPORT FORM – CHRONIC

Permittee: Elk Ridge Mining and Reclamation

Outfall: 013

Permit No.: CO-0000213

Test Type: Routine ☒ Accelerated ☐

Test Species: *Ceriodaphnia dubia*

IWC: 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1245	03-13-2019	1340	03-19-2019

Test Results	Lethality	Reproduction
NOEC	100%	20%
	PASS	FAIL
IC ₂₅	>100%	18.5%*
	PASS	FAIL

*indicates IC estimate less than lowest concentration

Dilution(s) - % Effluent

Measurements	Control (0%)	20%	40%	60%	80%	100%
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	100	90	100	100
% Survival for day 3	100	100	80	90	100	90
% Survival for day 4	100	100	80	90	100	90
% Survival for day 5	100	90	80	90	100	90
% Survival for day 6	100	90	80	90	90	90
Mean 3 Brood Total	31.4	22.9	18.8	17.8	16.6	9.1

Hardness (mg/L) – Receiving Water: N/A Effluent: 2260/2120/1780 Recon Water: 84

Alkalinity (mg/L) – Receiving Water: N/A Effluent: 407/263/347 Recon Water: 58

Chlorine (mg/L) – Effluent: <0.01/<0.01/0.01 pH (initial/final) – Control: 8.0/8.1 100%: 7.7/8.0

Total Ammonia as NH₃ (mg/L) - Effluent: 1.67/0.88/2.05

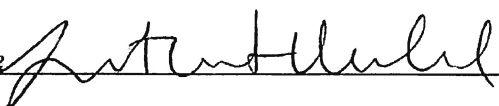
Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

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

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Jacquelyn Weaver, Taylor Couillard-Rodak, and Lauren Rettig

Signature  Date 03/29/19

Permittee: ELK RIDGE

Lab #: 419 153.8 Site: NPDES 013

IWC %: 100 Template #: 5 Dilution Water: MH19-006

Sample Date: 03/21/19

Age & Source: cerio 031319 4032 Test Start: 03/31/19 1245

Test End: 03/19/19 1340

Test Conditions:

	0	1	2	3	4	5	6	7	8	Total						
(C)	0	0	0	8	0	13	15			36						
	0	0	0	7	0	10	13			30						
	0	0	0	6	1+1	0	20			38						
	0	0	0	2+1	0	12	12			27						
	0	0	0	0	0	10	13			19						
	0	0	0	9	0	14	16			39						
	0	0	0	0	0	4	8			12						
	0	0	0	5	0	12	18			35						
	0	0	0	6	0	13	21			40						
	0	0	0	8	0	13	17			38						
DO	6.9	7.2	7.0	7.5	7.8	7.3	7.3	7.4	7.2	7.4	7.3	7.5				STAT
Temp	24.1	25.1	24.2	24.3	24.1	24.2	24.1	24.1	24.1	25.1	24.1	25.9				31.4
pH	8.0	8.2	7.6	7.8	7.6	8.0	7.9	8.1	7.6	8.2	8.0	8.1				ACCP
Cond	301	296	311	313	310	311										
(1)	0	0	0	4	0	12	16			32						
	0	0	0	6	0	8	20			34						
	0	0	0	5	0	0	0			5						
	0	0	0	0	0	0	8			8						
	0	0	0	0	0	0	6			6						
	0	0	0	4	0	12	11			27						
	0	0	0	6	0	12	10			28						
	0	0	0	5	0	9	13			27						
	0	0	0	6+1	0	10	15			32						
	0	0	0	6	0	9	15			30						
DO	6.9	7.2	7.3	7.5	7.8	7.3	7.5	7.4	7.3	7.6	7.4	7.5				
Temp	24.1	25.1	24.2	24.3	24.1	24.2	24.1	24.1	24.1	25.1	24.1	25.9				
pH	7.9	8.2	7.7	7.8	7.4	8.0	7.8	8.1	7.6	8.2	7.7	8.1				
Cond	1100	920	727	854	641	8910										22.9
(2)	0	1	2	3	4	5	6	7	8	Total						
	0	0	0	4	0	11	12			27						
	0	0	0	6	0	8	4			18						
	0	0	0	5	0	11	11			27						
	0	0	0	0	0	0	0			0						
	0	0	0	0	0	5	0			5						
	0	0	0	0	6	11	9			26						
	0	0	0	4	0	11	14			29						
	0	0	0	0	0	0	0			0						
	0	0	0	7	0	10	12			29						
	0	0	0	6	0	8	13			27						
DO	6.9	7.3	7.7	7.6	7.9	7.4	7.8	7.4	7.4	7.6	7.5	7.5				
Temp	24.1	25.1	24.2	24.3	24.1	24.2	24.1	24.1	24.1	25.1	24.1	25.9				
pH	7.8	8.1	7.7	7.8	7.2	8.1	7.7	8.1	7.5	8.2	7.6	8.1				
Cond	1570	1496	1075	1396	1050	1397										18.8
(3)	0	0	0	4	0	9	12			25						
	0	0	0	5	0	7	9			21						
	0	0	0	6	0	10	8			24						
	0	0	0	3	0	7	12			22						
	0	0	0	0	0	1	0			1						
	0	0	0	3+1	0	8	7			19						
	0	0	0	5	0	7	9			21						
	0	0	0	3	0	9	10			22						
	0	0	0	5	0	10	8			23						
DO	7.0	7.4	8.0	7.6	8.0	7.4	8.0	7.5	7.9	7.6	7.6	7.6				
Temp	24.1	25.1	24.2	24.3	24.1	24.2	24.1	24.1	24.1	25.1	24.1	25.9				
pH	7.8	8.0	7.7	7.8	7.2	8.1	7.6	8.0	7.4	8.1	7.6	8.0				
Cond	1910	1900	7.8	1406	1820	1371	1802									17.8

40

	0	1	2	3	4	5	6	7	8	Total
(4)	0	0	0	0	0	5	7			12
80	0	0	0	3	0	6	9			18
	0	0	0	5	0	8	9			22
	0	0	0	0	0	9	6			15
	0	0	0	0	0	3	8			11
	0	0	0	5	0	6	9			20
	0	0	0	0	0	1	6			7
	0	0	0	1	0	8	9			18
	0	0	0	5	0	8	6			19
	0	0	0	4	0	9	9			22
DO	7.0	7.5	8.3	7.7	8.2	7.5	7.0	7.6	7.7	7.6
Temp	24.1	25.1	24.2	24.3	24.1	24.7	24.1	25.1	24.1	25.9
pH	7.7	7.9	7.7	7.7	7.1	8.2	7.5	8.0	7.4	8.1
Cond	2530	2930	1664	2340	1642	2340				16.6
(5)	0	0	0	1	0	5	5			11
100	0	0	0	0	0	6	8			14
	0	0	0	5	0	5	4			15
	0	0	0	0	0					0
	0	0	0	0	0	1	0			1
	0	0	0	0	4	4	0			8
	0	0	0	0	0	3	12			7
	0	0	0	0	0	7	6			13
	0	0	0	0	0	4	5			9
	0	0	0	2	1	5	5			13
DO	7.0	7.5	8.0	7.8	8.3	7.5	7.7	7.6	7.8	7.6
Temp	24.1	25.1	24.2	24.3	24.1	24.7	24.1	25.1	24.1	25.9
pH	7.7	7.9	7.7	7.7	7.1	8.2	7.5	8.0	7.4	8.1
Cond	3060	3030	1872	2790	1863	2750				9.1
Algae	ABS/AR	ABS/AR	ABS/AR	ABS/AR	ABS/AR	ABS/AR	ABS/AR			
YCT	1901	1901	1902	1901	1901	1901				
H ₂ O	1	1	2	3	2	3				
Initials	TUR	SW	LR	TR	SW	SW	TUR			
	Eff #1	Eff #2	Eff #3	Recg #1	Recg #2	Recg #3	Recon #1	Recon #2	Recon #3	
Hardness	2260	2120	1780				84			
Alkalinity	407	263	347				58			
Chlorine	0.01	0.01	0.01				<0.01			
Ammonia	1.67	0.88	2.05				<0.01			

1. Exposure Chamber

Total Capacity: 30 ml
Test Solution Surface Area: cm²

Test Solution Volume: 15 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: cm diameter

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:

x,y,z = board #:row:column									
1	2	3	4	5	6	7	8	9	10
A ₂	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	C ₂	C ₃	C ₅

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 3/13/2019	Test ID: 419153cd	Sample ID: XX9999999-NPDES Permit #
End Date: 3/19/2019	Lab ID:	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	6	7	8	9	10
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
20	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
40	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
60	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
80	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
100	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical
D-Control	1.0000	1.0000	0	10	10	10		
20	0.9000	0.9000	1	9	10	10	0.5000	0.0500
40	0.8000	0.8000	2	8	10	10	0.2368	0.0500
60	0.9000	0.9000	1	9	10	10	0.5000	0.0500
80	0.9000	0.9000	1	9	10	10	0.5000	0.0500
100	0.9000	0.9000	1	9	10	10	0.5000	0.0500

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Fisher's Exact Test	100	>100		1
Treatments vs D-Control				

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 3/13/2019 Test ID: 419153cd Sample ID: XX9999999-NPDES Permit #
End Date: 3/19/2019 Lab ID: 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	6	7	8	9	10
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
20	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
40	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
60	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
80	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
100	1.0000	1.0000	1.0000	0.0000	1.0000	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
D-Control	1.0000	1.0000	1.0472	1.0472	1.0472	0.000	10	1.0000	1.0000
20	0.9000	0.9000	0.9948	0.5236	1.0472	16.644	10	0.9000	0.9000
40	0.8000	0.8000	0.9425	0.5236	1.0472	23.424	10	0.8750	0.8750
60	0.9000	0.9000	0.9948	0.5236	1.0472	16.644	10	0.8750	0.8750
80	0.9000	0.9000	0.9948	0.5236	1.0472	16.644	10	0.8750	0.8750
100	0.9000	0.9000	0.9948	0.5236	1.0472	16.644	10	0.8750	0.8750

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	3.13828	0.895	-2.5732	5.19915
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL	Skew
IC05*	10.000			
IC10	20.000			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

* indicates IC estimate less than the lowest concentration

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/13/2019	Test ID: 419153cd	Sample ID: XX9999999-NPDES Permit #
End Date: 3/19/2019	Lab ID:	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	6	7	8	9	10
D-Control	36.000	30.000	38.000	27.000	19.000	39.000	12.000	35.000	40.000	38.000
20	32.000	34.000	5.000	8.000	6.000	27.000	28.000	27.000	32.000	30.000
40	27.000	18.000	27.000	0.000	5.000	26.000	29.000	0.000	29.000	27.000
60	25.000	21.000	24.000	22.000	1.000	19.000	21.000	22.000	23.000	0.000
80	18.000	17.000	22.000	21.000	3.000	19.000	7.000	18.000	19.000	22.000
100	11.000	14.000	15.000	0.000	1.000	8.000	7.000	13.000	9.000	13.000

Conc.-%	Mean	N-Mean	Transform: Untransformed					Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%	N		
D-Control	31.400	1.0000	31.400	12.000	40.000	30.108	10		
20	22.900	0.7293	22.900	5.000	34.000	50.986	10	78.50	75.00
*40	18.800	0.5987	18.800	0.000	29.000	65.377	10	71.50	75.00
*60	17.800	0.5669	17.800	0.000	25.000	52.086	10	70.50	75.00
*80	16.600	0.5287	16.600	3.000	22.000	38.646	10	67.00	75.00
*100	9.100	0.2898	9.100	0.000	15.000	57.557	10	59.00	75.00

Auxiliary Tests		Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)		1.59283	0.895	-1.0301	-0.2646
Bartlett's Test indicates equal variances (p = 0.13)		8.56654	15.0863		
Hypothesis Test (1-tail, 0.05)		NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test		20	40	28.2843	5
Treatments vs D-Control					

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/13/2019	Test ID: 419153cd	Sample ID: XX9999999-NPDES Permit #
End Date: 3/19/2019	Lab ID:	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	6	7	8	9	10
D-Control	36.000	30.000	38.000	27.000	19.000	39.000	12.000	35.000	40.000	38.000
20	32.000	34.000	5.000	8.000	6.000	27.000	28.000	27.000	32.000	30.000
40	27.000	18.000	27.000	0.000	5.000	26.000	29.000	0.000	29.000	27.000
60	25.000	21.000	24.000	22.000	1.000	19.000	21.000	22.000	23.000	0.000
80	18.000	17.000	22.000	21.000	3.000	19.000	7.000	18.000	19.000	22.000
100	11.000	14.000	15.000	0.000	1.000	8.000	7.000	13.000	9.000	13.000

Conc-%	Mean	N-Mean	Transform: Untransformed					t-Stat	1-Tailed	
			Mean	Min	Max	CV%	N		Critical	MSD
D-Control	31.400	1.0000	31.400	12.000	40.000	30.108	10			
20	22.900	0.7293	22.900	5.000	34.000	50.986	10	2.020	2.287	9.623
*40	18.800	0.5987	18.800	0.000	29.000	65.377	10	2.994	2.287	9.623
*60	17.800	0.5669	17.800	0.000	25.000	52.086	10	3.232	2.287	9.623
*80	16.600	0.5287	16.600	3.000	22.000	38.646	10	3.517	2.287	9.623
*100	9.100	0.2898	9.100	0.000	15.000	57.557	10	5.299	2.287	9.623

Auxiliary Tests					Statistic	Critical	Skew	Kurt						
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)					1.59283	0.895	-1.0301	-0.2646						
Bartlett's Test indicates equal variances (p = 0.13)					8.56654	15.0863								
Hypothesis Test (1-tail, 0.05)					NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test					20	40	28.2843	5	9.62314	0.30647	546.187	88.5519	1.4E-04	5, 54
Treatments vs D-Control														

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 3/13/2019	Test ID: 419153cd	Sample ID: XX9999999-NPDES Permit #	
End Date: 3/19/2019	Lab ID:	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	6	7	8	9	10
D-Control	36.000	30.000	38.000	27.000	19.000	39.000	12.000	35.000	40.000	38.000
20	32.000	34.000	5.000	8.000	6.000	27.000	28.000	27.000	32.000	30.000
40	27.000	18.000	27.000	0.000	5.000	26.000	29.000	0.000	29.000	27.000
60	25.000	21.000	24.000	22.000	1.000	19.000	21.000	22.000	23.000	0.000
80	18.000	17.000	22.000	21.000	3.000	19.000	7.000	18.000	19.000	22.000
100	11.000	14.000	15.000	0.000	1.000	8.000	7.000	13.000	9.000	13.000

Conc-%	Mean	N-Mean	Transform: Untransformed					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	31.400	1.0000	31.400	12.000	40.000	30.108	10	31.400	1.0000
20	22.900	0.7293	22.900	5.000	34.000	50.986	10	22.900	0.7293
40	18.800	0.5987	18.800	0.000	29.000	65.377	10	18.800	0.5987
60	17.800	0.5669	17.800	0.000	25.000	52.086	10	17.800	0.5669
80	16.600	0.5287	16.600	3.000	22.000	38.646	10	16.600	0.5287
100	9.100	0.2898	9.100	0.000	15.000	57.557	10	9.100	0.2898

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution ($p \leq 0.05$)	1.59283	0.895	-1.0301	-0.2646
Bartlett's Test indicates equal variances ($p = 0.13$)	8.56654	15.0863		

Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL		Skew
IC05*	3.694	4.496	2.204	21.827	2.6356
IC10*	7.388	5.977	4.407	26.053	1.6277
IC15*	11.082	7.339	6.611	29.734	1.5747
IC20*	14.776	9.068	8.814	40.532	1.8199
IC25*	18.471	11.096	11.018	48.128	1.6005
IC40	39.805	19.353	17.628	84.088	0.4514
IC50	82.400	17.846	32.939	91.198	-1.1690

* indicates IC estimate less than the lowest concentration

Appendix 3 – Data Sheets for Fathead minnow Test

WET TEST REPORT FORM – CHRONIC

Permittee: Elk Ridge Mining and Reclamation

Outfall: 013

Permit No.: CO-0000213

Test Type: Routine ☒ Accelerated ☐

Test Species: Fathead minnow

IWC: 100%

Test Start Time	Test Start Date	Test End Time	Test End Date
1145	03-13-2019	1130	03-20-2019

Test Results	Lethality	Growth
NOEC	100%	100%
	PASS	PASS
IC ₂₅	93.3%	>100%
	FAIL	PASS

Dilution(s) - % Effluent

Measurements	Control (0%)	20%	40%	60%	80%	100%
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	98	100	100	100
% Survival for day 3	100	95	98	98	98	98
% Survival for day 4	100	80	95	73	95	88
% Survival for day 5	100	80	95	70	90	78
% Survival for day 6	100	78	95	70	90	73
% Survival for day 7	100	75	93	70	90	73
Mean Dry Wt. (mg)	0.411	0.345	0.441	0.357	0.422	0.398

Hardness (mg/L) – Receiving Water: N/A Effluent: 2260/2120/1780 Recon Water: 86
Alkalinity (mg/L) – Receiving Water: N/A Effluent: 407/263/347 Recon Water: 58
Chlorine (mg/L) – Effluent: <0.01/<0.01/0.01 pH (initial/final) – Control: 8.0/7.3 100%: 7.9/7.5

Total Ammonia as NH₃ (mg/L) – Effluent: 1.67/0.88/2.05

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: Daniel Hillenburg and Nicholas Cipoletti

Signature [Signature] Date 03/29/19

Fathead Minnow Chronic Benchsheet

Effective: January 2009

Client Elk Ridge
Test Start 03/31/2019
Site ADPES 013
Test End 03/31/2019

Lab # 419/53.B Sample Date 03/2 IWC 100

Dilution H₂O AH19-011

[illegible]

Larval Fish Growth and Survival Test-7 Day Survival

Start Date: 3/13/2019	Test ID: 419153fhm	Sample ID: XX9999999-NPDES Permit #
End Date: 3/20/2019	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: PP
Comments:		

Conc-%	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
20	1.0000	0.8000	0.9000	0.3000
40	0.9000	1.0000	0.8000	1.0000
60	1.0000	0.4000	1.0000	0.4000
80	0.6000	1.0000	1.0000	1.0000
100	0.6000	1.0000	0.5000	0.8000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%	N		
D-Control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4		
20	0.7500	0.7500	1.0870	0.5796	1.4120	33.159	4	12.00	10.00
40	0.9250	0.9250	1.2951	1.1071	1.4120	11.347	4	14.00	10.00
60	0.7000	0.7000	1.0484	0.6847	1.4120	40.053	4	14.00	10.00
80	0.9000	0.9000	1.2805	0.8861	1.4120	20.536	4	16.00	10.00
100	0.7250	0.7250	1.0477	0.7854	1.4120	26.497	4	12.00	10.00

Auxiliary Tests					Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)					0.94051	0.916	-0.3817	-0.5132
Equality of variance cannot be confirmed								
Hypothesis Test (1-tail, 0.05)			NOEC	LOEC	ChV	TU		
Steel's Many-One Rank Test			100	>100		1		
Treatments vs D-Control								

Larval Fish Growth and Survival Test-7 Day Survival

Start Date: 3/13/2019	Test ID: 419153fhm	Sample ID: XX9999999-NPDES Permit #
End Date: 3/20/2019	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: PP
Comments:		

Conc-%	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
20	1.0000	0.8000	0.9000	0.3000
40	0.9000	1.0000	0.8000	1.0000
60	1.0000	0.4000	1.0000	0.4000
80	0.6000	1.0000	1.0000	1.0000
100	0.6000	1.0000	0.5000	0.8000

Conc-%	Transform: Arcsin Square Root							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	1.0000	1.0000
20	0.7500	0.7500	1.0870	0.5796	1.4120	33.159	4	0.8375	0.8375
40	0.9250	0.9250	1.2951	1.1071	1.4120	11.347	4	0.8375	0.8375
60	0.7000	0.7000	1.0484	0.6847	1.4120	40.053	4	0.8000	0.8000
80	0.9000	0.9000	1.2805	0.8861	1.4120	20.536	4	0.8000	0.8000
100	0.7250	0.7250	1.0477	0.7854	1.4120	26.497	4	0.7250	0.7250

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.94051	0.916	-0.3817	-0.5132
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)		Skew
IC05*	6.154	7.665	2.260	60.308	3.9327
IC10*	12.308	19.060	4.521	122.917	2.0002
IC15*	18.462				
IC20	80.000				
IC25	93.333				
IC40	>100				
IC50	>100				

* indicates IC estimate less than the lowest concentration

Larval Fish Growth and Survival Test-7 Day Growth

Start Date: 3/13/2019	Test ID: 419153fhm	Sample ID: XX9999999-NPDES Permit #
End Date: 3/20/2019	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: PP
Comments:		

Conc-%	1	2	3	4
D-Control	0.3930	0.4010	0.4650	0.3850
20	0.4010	0.3970	0.3760	0.2060
40	0.4810	0.4000	0.3790	0.5050
60	0.4080	0.2700	0.4770	0.2740
80	0.3070	0.4310	0.5270	0.4230
100	0.3220	0.5570	0.3500	0.3610

Conc-%	Mean	N-Mean	Transform: Untransformed				N	t-Stat	1-Tailed	
			Mean	Min	Max	CV%			Critical	MSD
D-Control	0.4110	1.0000	0.4110	0.3850	0.4650	8.902	4			
20	0.3450	0.8394	0.3450	0.2060	0.4010	27.047	4	1.090	2.410	0.1459
40	0.4412	1.0736	0.4412	0.3790	0.5050	13.860	4	-0.500	2.410	0.1459
60	0.3572	0.8692	0.3572	0.2700	0.4770	28.664	4	0.888	2.410	0.1459
80	0.4220	1.0268	0.4220	0.3070	0.5270	21.341	4	-0.182	2.410	0.1459
100	0.3975	0.9672	0.3975	0.3220	0.5570	27.068	4	0.223	2.410	0.1459

Auxiliary Tests					Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)					0.98412	0.916	0.16602	-0.449
Bartlett's Test indicates equal variances ($p = 0.64$)					3.40427	15.0863		
Hypothesis Test (1-tail, 0.05)					NOEC	LOEC	ChV	TU
Dunnett's Test					100	>100		1
Treatments vs D-Control					0.14587	0.3549	0.00564	0.00733
							0.58347	5, 18

Larval Fish Growth and Survival Test-7 Day Growth

Start Date: 3/13/2019	Test ID: 419153fhm	Sample ID: XX9999999-NPDES Permit #
End Date: 3/20/2019	Lab ID: SCG-Seacrest Group	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01	Test Species: PP
Comments:		

Conc-%	1	2	3	4
D-Control	0.3930	0.4010	0.4650	0.3850
20	0.4010	0.3970	0.3760	0.2060
40	0.4810	0.4000	0.3790	0.5050
60	0.4080	0.2700	0.4770	0.2740
80	0.3070	0.4310	0.5270	0.4230
100	0.3220	0.5570	0.3500	0.3610

Conc-%	Mean	N-Mean	Transform: Untransformed					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	0.4110	1.0000	0.4110	0.3850	0.4650	8.902	4	0.4110	1.0000
20	0.3450	0.8394	0.3450	0.2060	0.4010	27.047	4	0.3931	0.9565
40	0.4412	1.0736	0.4412	0.3790	0.5050	13.860	4	0.3931	0.9565
60	0.3572	0.8692	0.3572	0.2700	0.4770	28.664	4	0.3922	0.9544
80	0.4220	1.0268	0.4220	0.3070	0.5270	21.341	4	0.3922	0.9544
100	0.3975	0.9672	0.3975	0.3220	0.5570	27.068	4	0.3922	0.9544

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.98412	0.916	0.16602	-0.449
Bartlett's Test indicates equal variances ($p = 0.64$)	3.40427	15.0863		

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew

IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

Appendix 4 – 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.: 419153.B

Species Tested: *Ceriodaphnia dubia* and Fathead minnow

Start Date of Test (<i>Ceriodaphnia dubia</i>)	Start Date of Test (Fathead minnow)
03-13-2019	03-13-2019

Sample received in lab properly preserved (0-6°C)?	Y
Sample delivered on ice or equivalent?	Y
Test initiated within 36-hours of collection?	Y
Test protocol conforms to CDPHE guidelines (<i>Ceriodaphnia dubia</i>)?	Y
Test protocol conforms to CDPHE guidelines (Fathead minnow)?	Y
Average test temp. $\pm 1^{\circ}\text{C}$ (<i>Ceriodaphnia dubia</i>)?	Y
Average test temp. $\pm 1^{\circ}\text{C}$ (Fathead minnow)?	Y
DO level $\geq 4.0\text{mg/L}$; no super-saturation (<i>Ceriodaphnia dubia</i>)?	Y
DO level $\geq 4.0\text{mg/L}$; no super-saturation (Fathead minnow)?	Y
Survival in control $\geq 90\%$, $\geq 80\%$ for chronic (<i>Ceriodaphnia dubia</i>)?	Y
Survival in control $\geq 90\%$, $\geq 80\%$ for chronic (Fathead minnow)?	Y
<i>Ceriodaphnia dubia</i> neonates <24-hours old?	Y
Fathead minnow larvae <24-hours old?	Y
Appropriate reference toxicity test conducted?	Y
Lab. Ref. Tox. test results within the confidence limits for the lab?	Y

Signature

Position: Laboratory Manager

Date

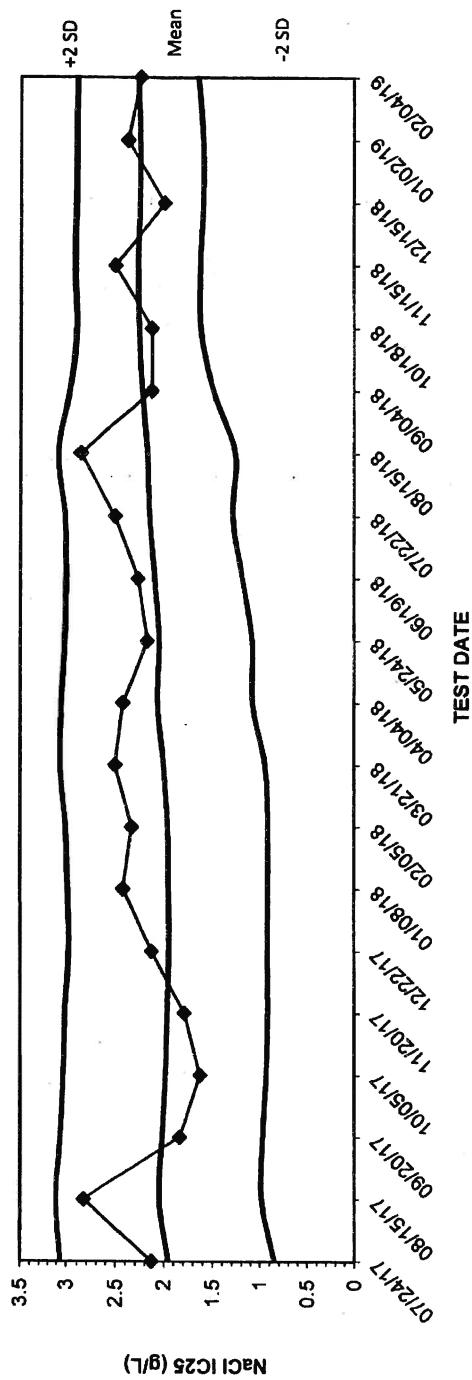
03/29/19



METHOD QC

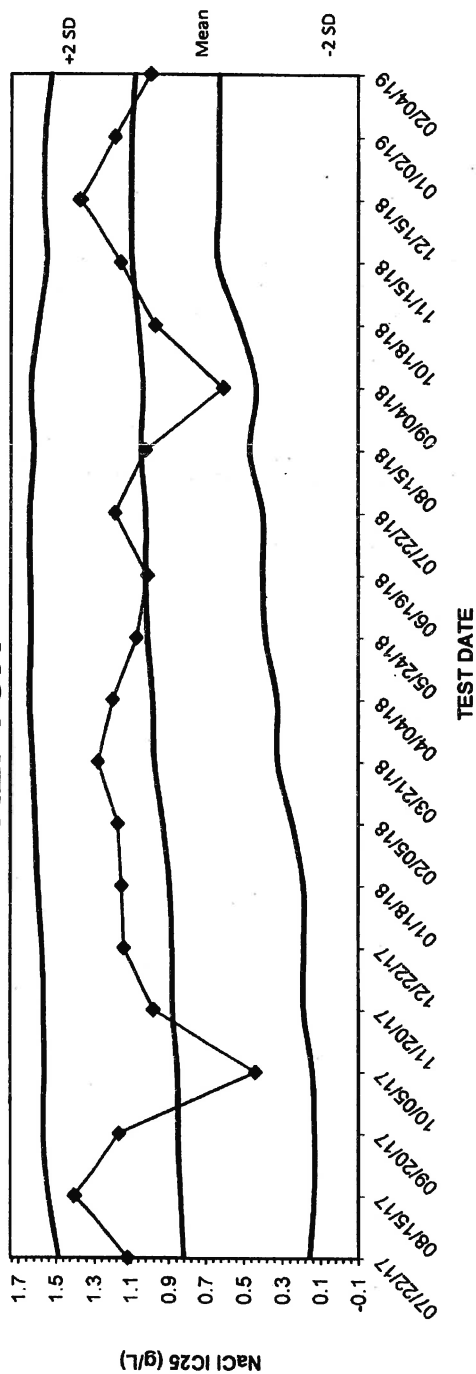
Method	Analyte	Date	LCS (rec)	%REC	%RPD	QC LIMITS
2320 B	Alkalinity - Total	2/6/2019	99.20%	99.33%	0.00%	± 5.00%
2320 B	Alkalinity - Total	2/14/2019	104.80%	98.95%	2.47%	± 5.00%
2320 B	Alkalinity - Total	2/21/2019	100.80%	99.85%	-1.87%	± 5.00%
2320 B	Alkalinity - Total	2/27/2019	99.00%	100.00%	1.44%	± 5.00%
4500 NH ₃ D	Ammonia	2/9/2019	92.40%	101.62%	0.74%	± 10.00%
4500 NH ₃ D	Ammonia	2/16/2019	95.80%	95.53%	0.00%	± 10.00%
4500 NH ₃ D	Ammonia	2/19/2019	96.20%	102.00%	-2.91%	± 10.00%
4500 NH ₃ D	Ammonia	2/27/2019	97.60%	99.29%	0.70%	± 10.00%
4500 Cl D	Chlorine	2/28/2019	103.13%	103.13%	0.00%	± 5.00, ± 20.00%
2340 B	Hardness - Total	2/6/2019	101.75%	99.77%	0.35%	± 5.00%
2340 B	Hardness - Total	2/14/2019	100.00%	101.00%	2.15%	± 5.00%
2340 B	Hardness - Total	2/19/2019	102.00%	101.00%	1.17%	± 5.00%
2340 B	Hardness - Total	2/27/2019	101.75%	100.22%	0.90%	± 5.00%
4500 O	DO - Winkler	2/7/2019	N/A	100.00%	101.43%	± 5.00%
4500 O	DO - Winkler	2/14/2019	N/A	98.57%	98.57%	± 5.00%
4500 O	DO - Winkler	2/18/2019	N/A	98.65%	100.00%	± 5.00%
4500 O	DO - Winkler	2/28/2019	N/A	98.63%	100.00%	± 5.00%
2540 C	Dissolved Solids (TTL)	2/20/2019	Blank	%REC MRS	%RPD	QC Limits
2540 D	Suspended Solids (TTL)	2/20/2019	99.9966%	103.00%	0.00%	±20%, ± 15%
			100.00028%	97.90%	0.00%	±20%, ± 15%
Signature: Kara Oliver		Signature: <i>[Signature]</i>				
Date: 3/1/2019		Date: 3/1/2019				

CERIODAPHNIA SURVIVAL IC25 NaCl REFTOX



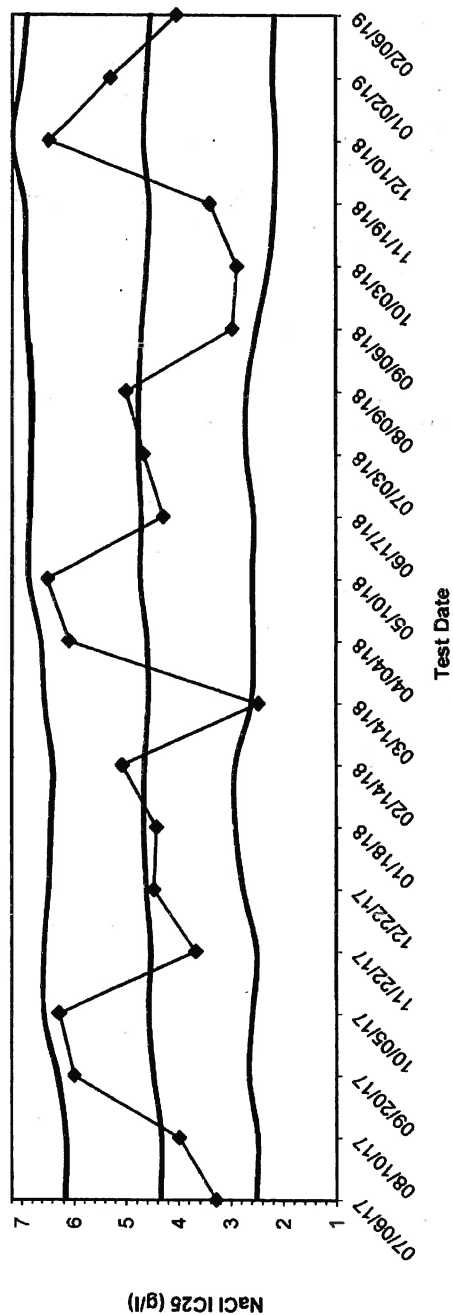
Date	IC25	Mean	-2 SD	+2 SD
07/24/17	2.1250	1.9528	0.8480	3.0576
08/15/17	2.8284	2.0438	0.9834	3.1042
09/20/17	1.8333	2.0121	0.9693	3.0548
10/05/17	1.6250	1.9783	0.9334	3.0233
11/20/17	1.7857	1.9622	0.9162	3.0081
12/22/17	2.1250	1.9462	0.9223	2.9700
01/08/18	2.4211	1.9503	0.9191	2.9815
02/05/18	2.3333	1.9609	0.9183	3.0035
03/21/18	2.5000	2.0023	0.9459	3.0587
04/04/18	2.4211	2.0652	1.0795	3.0510
05/24/18	2.1719	2.0499	1.0827	3.0171
06/19/18	2.2692	2.0957	1.1883	3.0032
07/22/18	2.5000	2.1497	1.2907	3.0086
08/15/18	2.8571	2.1726	1.2640	3.0812
09/04/18	2.1250	2.2258	1.4889	2.9627
10/18/18	2.1250	2.2599	1.6218	2.8979
11/15/18	2.5000	2.2725	1.6261	2.9188
12/15/18	1.9924	2.2520	1.5983	2.9057
01/02/19	2.3745	2.2498	1.5982	2.9014
02/04/19	2.2423	2.2693	1.6462	2.8924

CERIODAPHNIA REPRODUCTION IC25 NaCl REFTOX



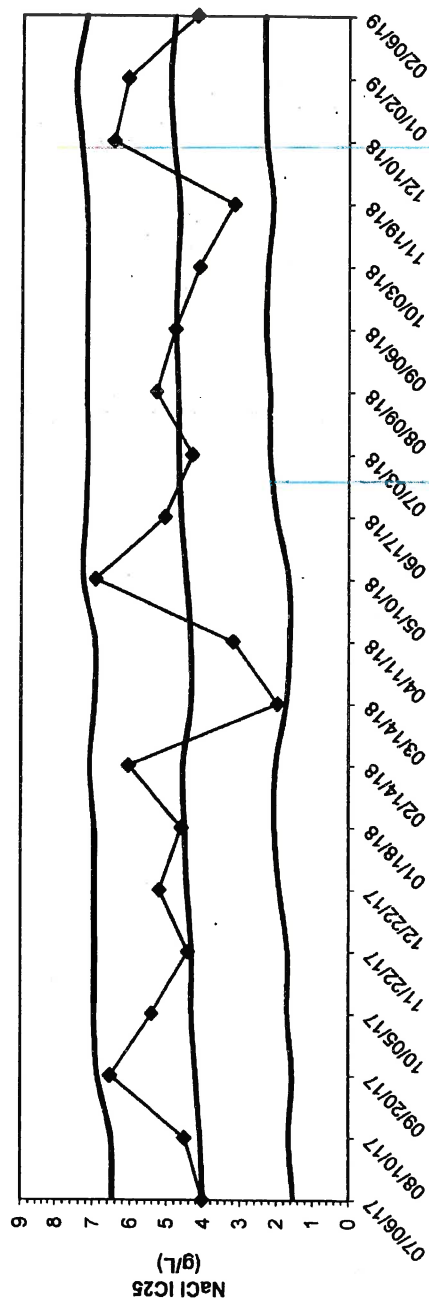
Date	IC25	Mean	-2 SD	+2 SD
07/22/17	1.1166	0.8209	0.1569	1.4848
08/15/17	1.3990	0.8376	0.1322	1.5430
09/20/17	1.1638	0.8516	0.1313	1.5718
10/05/17	0.4375	0.8546	0.1423	1.5669
11/20/17	0.9798	0.8800	0.1893	1.5707
12/22/17	1.1379	0.8836	0.1881	1.5791
01/18/18	1.1509	0.8962	0.1904	1.6019
02/05/18	1.1717	0.9318	0.2475	1.6161
03/21/18	1.2810	0.9761	0.3242	1.6281
04/04/18	1.1996	0.9861	0.3266	1.6456
05/24/18	1.0705	1.0122	0.3852	1.6393
06/19/18	1.0137	1.0217	0.4008	1.6425
07/22/18	1.1886	1.0234	0.4008	1.6460
08/15/18	1.0246	1.0483	0.4711	1.6255
09/04/18	0.6078	1.0377	0.4366	1.6398
10/18/18	0.9733	1.0632	0.5239	1.6026
11/15/18	1.1578	1.0979	0.6375	1.5584
12/15/18	1.3741	1.1028	0.6324	1.5733
01/02/19	1.1897	1.1007	0.6324	1.5690
02/04/19	0.9971	1.0817	0.6299	1.5335

FHM SURVIVAL IC25 NaCl REFTOX



Date	IC25	Mean	-2 SD	+2 SD
07/06/17	3.2857	4.3406	2.5107	6.1706
08/10/17	3.9800	4.3206	2.4843	6.1570
09/20/17	6.0000	4.4759	2.6496	6.3022
10/05/17	6.2734	4.5686	2.5834	6.5538
11/22/17	3.6667	4.5289	2.5050	6.5528
12/22/17	4.4688	4.6114	2.7605	6.4623
01/18/18	4.4167	4.6637	2.9066	6.4209
02/14/18	5.0714	4.6498	2.9114	6.3882
03/14/18	2.4722	4.5766	2.6104	6.5428
04/04/18	6.1019	4.5984	2.5731	6.6237
05/10/18	6.4886	4.7312	2.5909	6.8715
06/17/18	4.2857	4.7120	2.5628	6.8611
07/03/18	4.6667	4.7709	2.7030	6.8387
08/09/18	5.0040	4.7651	2.7007	6.8294
09/06/18	2.9714	4.7066	2.5096	6.9036
10/03/18	2.8846	4.6130	2.2785	6.9475
11/19/18	3.4074	4.5641	2.1716	6.9566
12/10/18	6.4714	4.6726	2.1478	7.1974
01/02/19	5.3000	4.6168	2.2099	7.0237
02/06/19	4.0378	4.5386	2.1704	6.9069

FHM GROWTH IC25 NaCl REFTOX



Date	IC25	Mean	-2 SD	+2 SD
07/06/17	4.0228	4.0004	1.5212	6.4797
08/10/17	4.5100	4.0804	1.6519	6.5089
09/20/17	6.5329	4.2108	1.5627	6.8590
10/05/17	5.4131	4.3282	1.6967	6.9598
11/22/17	4.4208	4.3223	1.6923	6.9524
12/22/17	5.1940	4.4483	1.9238	6.9728
01/18/18	4.6026	4.5178	2.0648	6.9708
02/14/18	6.0526	4.5642	2.0311	7.0973
03/14/18	1.9741	4.3487	1.7382	6.9592
04/11/18	3.1946	4.3561	1.6297	6.9441
05/10/18	6.9363	4.4790	1.6637	7.2943
06/17/18	5.0573	4.6170	2.0023	7.2317
07/03/18	4.3186	4.6879	2.1990	7.1768
08/09/18	5.3043	4.7061	2.2045	7.2078
09/06/18	4.7865	4.7629	2.3137	7.2122
10/03/18	4.1318	4.7278	2.2638	7.1917
11/19/18	3.1832	4.6770	2.1291	7.2249
12/10/18	6.4714	4.8436	2.3063	7.3809
01/02/19	6.0965	4.9313	2.3525	7.5101
02/06/19	4.2083	4.8042	2.3693	7.2390

WET TEST REPORT FORM – CHRONIC

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

Permit No.: CO-0000213

Test Type: Routine ☒ Accelerated ☐

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

**Test Start
Time**

Test Start Date

**Test End
Time**

Test End Date

1245

03-13-2019

1340

03-19-2019

Test Results	Lethality	Reproduction
NOEC	100%	20%
	PASS	FAIL
IC ₂₅	>100%	18.5%*
	PASS	FAIL

*indicates IC estimate less than lowest concentration

Dilution(s) - % Effluent

Measurements	Control (0%)	20%	40%	60%	80%	100%
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	100	90	100	100
% Survival for day 3	100	100	80	90	100	90
% Survival for day 4	100	100	80	90	100	90
% Survival for day 5	100	90	80	90	100	90
% Survival for day 6	100	90	80	90	90	90
Mean 3 Brood Total	31.4	22.9	18.8	17.8	16.6	9.1

Hardness (mg/L) – Receiving Water: N/A Effluent: 2260/2120/1780 Recon Water: 84
Alkalinity (mg/L) – Receiving Water: N/A Effluent: 407/263/347 Recon Water: 58
Chlorine (mg/L) – Effluent: pH (initial/final) – Control: 8.0/8.1 100%: 7.7/8.0
<0.01/<0.01/0.01

Total Ammonia as NH₃ (mg/L) - Effluent: 1.67/0.88/2.05

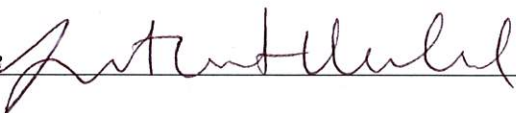
Were all Test Conditions in Conformance with Division Guidelines? YES ☒ NO ☐

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

Laboratory: SeaCrest Group

Comments:

Analyst's Name: Jacquelyn Weaver, Taylor Couillard-Rodak, and Lauren Rettig

Signature  Date 03/29/19

WET TEST REPORT FORM – CHRONIC

Permittee: Elk Ridge Mining and Reclamation

Outfall: 013

Permit No.: CO-0000213

Test Type: Routine ☒ Accelerated ☐

Test Species: Fathead minnow

IWC: 100%

**Test Start
Time**

Test Start Date

**Test End
Time**

Test End Date

1145

03-13-2019

1130

03-20-2019

Test Results	Lethality	Growth
NOEC	100%	100%
	PASS	PASS
IC ₂₅	93.3%	>100%
	FAIL	PASS

Dilution(s) - % Effluent

Measurements	Control (0%)	20%	40%	60%	80%	100%
% Survival for day 1	100	100	100	100	100	100
% Survival for day 2	100	100	98	100	100	100
% Survival for day 3	100	95	98	98	98	98
% Survival for day 4	100	80	95	73	95	88
% Survival for day 5	100	80	95	70	90	78
% Survival for day 6	100	78	95	70	90	73
% Survival for day 7	100	75	93	70	90	73
Mean Dry Wt. (mg)	0.411	0.345	0.441	0.357	0.422	0.398

Hardness (mg/L) – Receiving Water: N/A

Effluent: 2260/2120/1780 Recon Water: 86

Alkalinity (mg/L) – Receiving Water: N/A

Effluent: 407/263/347 Recon Water: 58

Chlorine (mg/L) – Effluent:

pH (initial/final) – Control: 8.0/7.3 100%: 7.9/7.5

<0.01/<0.01/0.01

Total Ammonia as NH₃ (mg/L) – Effluent: 1.67/0.88/2.05

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: Daniel Hillenburg and Nicholas Cipoletti

Signature

[Signature]

Date

03/29/19



(303) 661.9324 - FAX (303) 661.9325

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(303) 661.9324 - FAX (303) 661.9325

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Signature	Date/Time	Signature	Date/Time
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