



TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION, INC.

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

October 24, 2018

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: September 2018 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 September 2018. Tri-State Generation and Transmission Association, Inc. (Tri-State) is the parent to Elk Ridge Mining and Reclamation. The enclosed September 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: Thursday, October 25, 2018 5:30:15 PM

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

CDX Transaction ID: _d784d9a6-9894-4812-bbe2-136de79f45db
User ID: BARBARAWALZ1
Timestamp: 10/25/2018 18:40:04

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: 09/30/18

Permitted Facility Name: NEW HORIZON MINE
Permit ID: CO0000213
Permitted Feature: 012
Discharge: Q - Quarterly Monitoring for 012A
Monitoring Period End Date: 09/30/18

Permitted Facility Name: NEW HORIZON MINE
Permit ID: CO0000213
Permitted Feature: 013
Discharge: A - SR & Mine Drainage to Tuttle Draw
Monitoring Period End Date: 09/30/18

Permitted Facility Name: NEW HORIZON MINE
Permit ID: CO0000213
Permitted Feature: 013
Discharge: Q - Quarterly Monitoring for 013A
Monitoring Period End Date: 09/30/18

Permitted Facility Name: NEW HORIZON MINE
Permit ID: CO0000213
Permitted Feature: 013
Discharge: X - CHRONIC WET TESTING FOR 013A
Monitoring Period End Date: 09/30/18

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: 09/30/18

Permitted Facility Name: NEW HORIZON MINE
Permit ID: CO0000213
Permitted Feature: 016
Discharge: Q - Quarterly Monitoring for 016A
Monitoring Period End Date: 09/30/18

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 09/01/18 to 09/30/18

DMR Due Date:

10/28/18

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:

2018-10-22 14:01 (Time Zone: -06:00)

Report Last Signed By

User:

BARBARAWALZ1

Name:

Barbara Walz

E-Mail:

bwalz@tristategt.org

Date/Time:

2018-10-25 16:40 (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 07/01/18 to 09/30/18

DMR Due Date:

10/28/18

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:

2018-10-22 14:01 (Time Zone: -06:00)

Report Last Signed By

User:

BARBARAWALZ1

Name:

Barbara Walz

E-Mail:

bwalz@tristategt.org

Date/Time:

2018-10-25 16:40 (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 09/01/18 to 09/30/18

DMR Due Date:

10/28/18

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

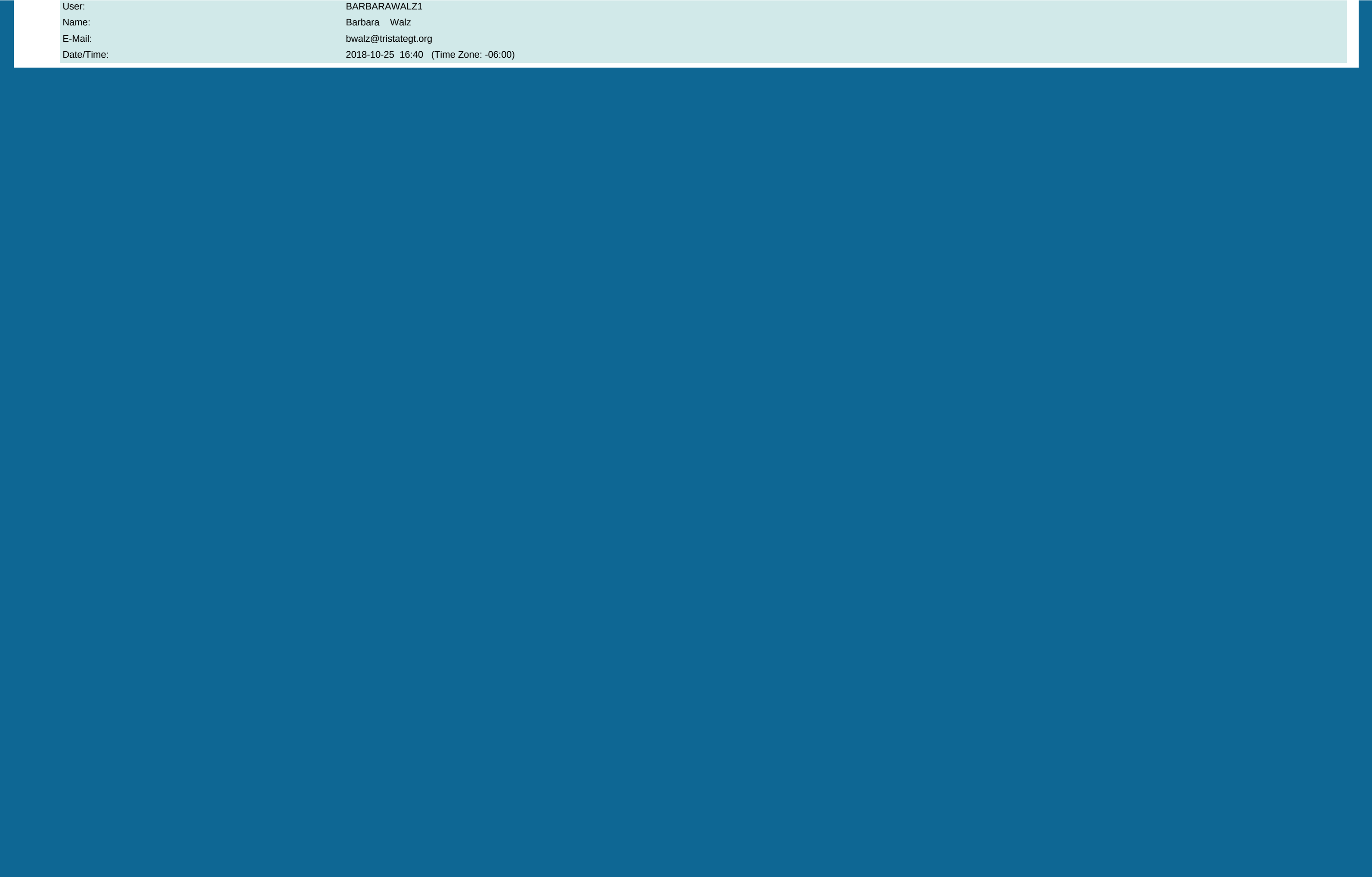
E-Mail:

dcrosby@tristategt.org

Date/Time:

2018-10-22 14:01 (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 07/01/18 to 09/30/18

DMR Due Date:

10/28/18

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:

2018-10-22 14:01 (Time Zone: -06:00)

Report Last Signed By

User:

BARBARAWALZ1

Name:

Barbara Walz

E-Mail:

bwalz@tristategt.org

Date/Time:

2018-10-25 16:40 (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 07/01/18 to 09/30/18

DMR Due Date:

10/28/18

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:

--

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

Parameter		Monitoring Location	Field	Type	Description	Acknowledge
Code	Name					
TKP3B	Static Renewal 7 Day Chronic Ceriodaphnia dubia	T - See Comments	Quality or Concentration Sample Value 1	Soft	The provided sample value is outside the permit limit. (Error Code: 1)	Yes

Comments

In lieu of accelerated testing, we moved directly to a Toxicity Identification Evaluation (TIE) and the results will be reported to WQCD when available. Notification of the results was provided to WQCD on 10/3/2018 and is attached to this report.

Attachments

Name	Type	Size
181003_NHM_Notification_of_Chronic_WET_Results_for_Outfall_013_Commencement_of_a_TIE_Walz_to_Mink.pdf	pdf	11971488
NH2_CDPS_CO0000213_Outfall013_WETresults_September2018_COC.pdf	pdf	1969218

Report Last Saved By

Elk Ridge Mining and Reclamation LLC

User:

Chantell75

Name:

Chantell Johnson

E-Mail:

cjohnson@tristategt.org

Date/Time:

2018-10-22 14:12 (Time Zone: -06:00)

Report Last Signed By

User:

BARBARAWALZ1

Name:

Barbara Walz



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
1430	09-05-2018	1453	09-11-2018

Test Results	Lethality	Reproduction
NOEC	100%	60%
	PASS	FAIL
IC ₂₅	>100%	72.2%
	PASS	FAIL

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	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	90
% Survival for day 6	90	100	100	100	90	90
Mean 3 Brood Total	23.7	21.8	20.9	19.3	16.8	12.1

Hardness (mg/L) – Receiving Water: N/A Effluent: 1110/945/1430 Recon Water: 89

Alkalinity (mg/L) – Receiving Water: N/A Effluent: 384/294/309 Recon Water: 64

Chlorine (mg/L) – Effluent: <0.01 pH (initial/final) – Control: 8.0/8.2 100%: 6.7/8.2

Total Ammonia as NH₃ (mg/L) - Effluent: 1.05/1.14/1.66

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, Corey Sutton, and Daniel Hillenburg

Signature 

Date 9/20/18

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
13010	09-05-2018	1250	09-12-2018

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

Dilution(s) - % Effluent

Measurements	Control (0%)	20%	40%	60%	80%	100%
% Survival for day 1	100	100	100	98	100	100
% Survival for day 2	100	98	100	95	100	98
% Survival for day 3	98	98	100	95	100	90
% Survival for day 4	98	98	95	93	100	90
% Survival for day 5	98	98	95	93	100	90
% Survival for day 6	98	98	95	93	100	90
% Survival for day 7	98	98	95	93	100	88
Mean Dry Wt. (mg)	0.470	0.492	0.470	0.523	0.534	0.524

Hardness (mg/L) – Receiving Water: N/A Effluent: 1110/945/1430 Recon Water: 87

Alkalinity (mg/L) – Receiving Water: N/A Effluent: 384/294/309 Recon Water: 60

Chlorine (mg/L) – Effluent: <0.01 pH (initial/final) – Control: 8.1/7.6 100%: 6.8/7.9

Total Ammonia as NH₃ (mg/L) – Effluent: 1.05/1.14/1.66

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

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

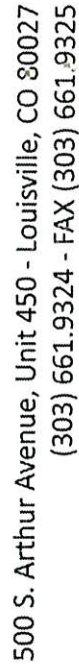
Laboratory: SeaCrest Group

Comments:

Analyst's Name: Nicole Denkinger, Tessa Hunt-Woodland, and Daniel Hillenburg

Signature 

Date 9/20/18



7/25/20

2017/10/10

2

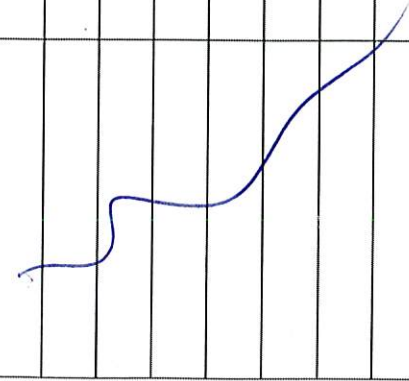
10

0930



CHAIN OF CUSTODY

500 S. Arthur Avenue, Unit 450 - Louisville, CO 80027
(303) 661.9324 - FAX (303) 661.9325

Client/Project Name: <u>FLK RIDGE MENDING & RICE</u>								
P. O./Project Number: <u>NEW HORIZON</u>								
Contact: <u>Tom Frey</u>								
Address: <u>27646 W. 5TH AVE CO 81424</u>								
Phone # <u>970 864 1073</u>	E-Mail: <u>TFrey@TRISTAR6T.COM</u>							
Fax # _____	Sampler: <u>TFrey</u>							
Report By: ☐ Mail ☒ PDF ☐ FAX								
Sample Location or ID	Date	Time	Grab/Comp	Lab ID (LAB Use Only)				
<u>NPDRS 013</u>	<u>09.05.18</u>	<u>1155</u>	<u>6</u>	<u>416-542-542</u>				
								
Analysis (Check all applicable)								
WET: Acute (Indicate Below)								
WET: Chronic (Indicate Below)								
WET: Accelerated (Indicate Below)								
WET: PTL/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								
Test Species: ☒ Fathead Minnow ☒ Cerio daphnia ☐ Daphnia magna ☐ Daphnia pulex ☐ Other (List Below)								
Turnaround Requirements (Analytical Testing Only)								
Standard (10 days) _____ 6-9 Day _____								
3-5 Day _____ 1-2 Day _____								
Requested Report Date:								
Special Instructions/Comments:								
Relinquished By (1)								
Received By (1)								
Relinquished By (2)								
Received By (2)								

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

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

October 3, 2018

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 Chronic WET Results for Outfall 013 and Commencement of a TIE

Dear Mr. Mink:

On September 20, 2018, the third party laboratory, The Seacrest Group, provided the enclosed analytical report to Tri-State Generation and Transmission Association (Tri-State) containing the third quarter 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>	60%	72.2%	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.

In accordance with the automatic compliance response requirements of the permit, the facility is planning to commence a Toxicity Identification Evaluation (TIE) per the standard U.S. Environmental Protection Agency procedures for *Ceriodaphnia dubia* for this outfall location. Based on our discussion earlier today, this TIE will be a focused effort in light of first quarter TIE results. 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 September 2018 Discharge Monitoring Report (DMR) by October 28, 2018.





Mr. Eric Mink, WQCD
October 3, 2018
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



September 20, 2018

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 toxicity effects to the *Ceriodaphnia dubia* species resulting in sub-lethal endpoints: IC₂₅ of 72.2% and NOEC of 60%.

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

Best regards,

Kyra Brisson

Laboratory Director

Enclosure(s): Invoice
Report



500 S Arthur Ave. Suite 450
Louisville, CO 80027-3065
(303) 661-9324 Phone
(303) 661-9325 Fax

Invoice

Invoice Number:
418595.B

Invoice Date:
September 20, 2018

BILL TO:

Elk Ridge Mining and Rec.
27646 W. 5th Ave.
Nucla, CO 81424

Customer Contact	Customer PO#	Terms	Customer ID
Mr. Thomas Fry	NHM 013	Payable Upon Receipt	Elk Ridge

QTY	Description	Unit Price	Extended Price
1	Chronic biomonitoring tests conducted on effluent from the New Horizon Mine 013 discharge using <i>Ceriodaphnia dubia</i> and Fathead Minnow	\$1,905.00	\$1,905.00

Total: \$1,905.00

*All invoices are due and payable upon receipt.
Outstanding balances over 30-days are subject to a finance charge of 1.5% per month.*

THANK YOU FOR YOUR BUSINESS!

**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

September 20, 2018

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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: 418595.B

Sample	Time of Collection	Date of Collection	Time of Receipt	Date of Receipt
Effluent 1	1238	09-04-2018	0930	09-05-2018
Effluent 2	1155	09-05-2018	0941	09-06-2018
Effluent 3	1029	09-07-2018	1010	09-08-2018

	<i>Ceriodaphnia dubia</i>	Fathead minnow
Test Initiation Time	1430	1310
Test Initiation Date	09-05-2018	09-05-2018
Test Completion Time	1453	1250
Test Completion Date	09-11-2018	09-12-2018

Dilution Water:

- Moderately hard laboratory reconstituted water

Test Organism Source:

- *Ceriodaphnia dubia*
SeaCrest Group
- Fathead minnow
Aquatic Biosystems, Inc.

Reference Toxicant:

- Sodium Chloride/ Potassium Chloride

Abstract of Results

Test Concentrations: Control (0%), 20%, 40%, 60%, 80%, 100%

Number of Organisms/Concentration: 10 for *Ceriodaphnia dubia*
 40 for Fathead minnow

Replicates at each Concentration: 10 for *Ceriodaphnia dubia*
 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 – 25.8
Dissolved Oxygen Range (mg/L)	6.1 – 7.6	4.1 – 7.2
pH Range	6.7 – 8.2	6.6 – 8.1
	CONTROL (<i>Cerio</i>/FHM)	100%
Alkalinity (mg/L as CaCO ₃)	64/60	384/294/309
Hardness (mg/L as CaCO ₃)	89/87	1110/945/1430
Total residual chlorine (mg/L)	<0.01	<0.01
Total ammonia (mg/L as NH ₃)	<0.03	1.05/1.14/1.66

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 September 2018.

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 Aquatic BioSystems, Inc., were also used in the test. 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	Dunnett's 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 90% - 100% in the remaining effluent concentrations. Control survival was 90%. No statistically significant mortality was measured in the 100% 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	
					Lethality	Reprod.
Control (0%)	9	23.7	17	32		
20%	10	21.8	12	32		
40%	10	20.9	14	28		
60%	10	19.3	10	31		
80%	9	16.8	11	23		*
100%	9	12.1	6	22		*

Average numbers of neonates was 12.1 in the 100% effluent concentration and ranged from 16.8 - 21.8 in the remaining effluent concentrations. Average number of neonates in the control was 23.7 for statistical analyses and 24.4 for test acceptability criteria. A statistically significant difference in the number of neonates was found between the control and the 80% and 100% effluent concentrations. The NOEC for reproduction was 60%. The IC₂₅ for reproduction was 72.2%.

Fathead minnow Test Results

Fathead minnow results are summarized in Table 3 and are provided on data sheets in Appendix 3. Survival was 88% in the 100% effluent concentration and ranged from 93% - 100% in the remaining effluent concentrations. Control survival was 98%. No statistically significant mortality was measured in any concentration when compared to the control. The NOEC for lethality was 100%. The IC₂₅ for lethality was >100%.

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.	Significant Difference	
					Lethality	Growth
Control (0%)	39	0.470	0.332	0.557		
20%	39	0.492	0.421	0.595		
40%	38	0.470	0.421	0.503		
60%	37	0.523	0.462	0.577		
80%	40	0.534	0.496	0.569		
100%	35	0.524	0.463	0.561		

Average weight in the 100% effluent concentration was 0.524mg per individual and ranged from 0.470mg - 0.534mg per individual in the remaining effluent concentrations. Average weight for the control fish was 0.470mg for statistical analyses and 0.486mg 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 (Table 4).

Table 4. PMSD for chronic test parameters.

PMSD (% Minimum significant difference)	Survival		Growth		Reproduction		Result Test parameters deemed to be acceptable if numbers fall within limits for the test.
	<i>Ceriodaphnia dubia</i>	Fathead Minnow	Lower bound	Upper bound	Lower bound	Upper bound	
			12	30	13	47	
	N/A	N/A	22.1		21.1		

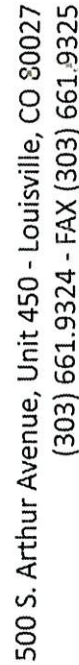
DISCUSSION

A test is a violation of a permit limitation for this discharge when both the NOEC and the IC₂₅ are at any effluent concentration less than the IWC. A test is a failure when one of the two statistical endpoints, either the NOEC or the IC₂₅, is at any effluent concentration less than the IWC. The IWC for this permit has been determined to be **100%**. The discharge meets the defined criteria for a violation or two consecutive failures for the *C. dubia* species.

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

[illegible]

Sample Receipt Form

Project #: 418 595.0
Date: 090518

Sample #: 1
Initials: DH

Samples Were:

1. ☒ Shipped ☐ Hand Delivered ☐ Messengered (circle one)

Notes: UPS

3. Chilled to Ship

Notes:

Ambient ☒ Chilled (circle one)

Wet Ice ☒ Blue Ice (circle one)

4. Cooler Received Broken or Leaking

Notes:

Y ☒ N NA

5. Sample Received Broken or Leaking

Notes:

Y ☒ N NA

6. Received Within Holding Times

Notes:

☒ Y N

7. Aeration necessary

Notes:

Y ☒ N NA

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

Notes:

☒ Y N NA

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

eff: Clear, no pm

rec'g

	Temp	DO (mg/L)	DO (%Sat)	pH	Cond	Aeration			
						Time	DO (mg/L)	DO (%Sat)	pH
	5.6	6.1	88.2	6.8	1998				

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

Lab Manager

From: Fry, Thomas (New Horizon) <tfry@tristategt.org>
Sent: Wednesday, September 05, 2018 9:52 AM
To: Lab Manager
Subject: RE: [EXTERNAL] Elk Ridge NHM013 Sample Info

Well Kyra, I was in a hurry since I almost forgot to start the test! Sorry for the inconvenience.

Location; Pond013

Date; 09-04-18

Time; 1238

Grab or Comp; Grab

From: Lab Manager [<mailto:labmanager@seacrestgroup.com>]
Sent: Wednesday, September 05, 2018 9:47 AM
To: Fry, Thomas (New Horizon)
Cc: qc@seacrestgroup.com
Subject: [EXTERNAL] Elk Ridge NHM013 Sample Info

Good morning Tom,

We just received the Elk Ridge NHM 013 sample. The COC was missing the following information:

1. Sample location
2. Date of sample
3. Time of sample
4. Grab or comp

Please fill in the above material at your convenience and we will amend the COC accordingly.

Thank you for your time,

Kyra H. Brisson

Laboratory Director

Main: 303.661.9324 | FAX: 303.661.9325 |

labmanager@seacrestgroup.com

SeaCrest Group - Environmental Services
500 South Arthur Ave. Unit 450
Louisville, CO 80027





--	--

1

1

1

1

--	--

[illegible]

312060
Date/Time

Sample Receipt Form

Project #: 418592-B
Date: 090608

Sample #: 2
Initials: CS

Samples Were:

1. Shipped Hand Delivered Messengered (circle one)

Notes: UPS

3. Chilled to Ship

Notes:

Ambient Chilled (circle one)

Wet Ice Blue Ice (circle one)

4. Cooler Received Broken or Leaking

Notes:

Y N NA

5. Sample Received Broken or Leaking

Notes:

Y N NA

6. Received Within Holding Times

Notes:

Y N

7. Aeration necessary

Notes:

Y N NA

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

Notes:

Y N NA

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

eff: SLIGHT SEDIMENT, BROWN (LIGHT) HUE

rec'g

	Temp	DO (mg/L)	DO (%Sat)	pH	Cond	Time	Aeration		
							DO (mg/L)	DO (%Sat)	pH
572.872	5.0	5.4	76.4	6.5	1941				

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



500 S. Arthur Avenue, Unit 450 - Louisville, CO 80027
(303) 661.9324 - FAX (303) 661.9325

Analysis (Check all applicable)

Sample Location or ID	Date	Time	Grab/ Comp	Lab ID (LAB Use Only)
-----------------------	------	------	---------------	--------------------------

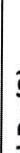
[illegible]

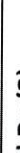
Turnaround Requirements (Analytical Testing Only)	Test Species: ☒ Fathead Minnow

Special Instructions/Comments	
Standard (10 days)	6-9 Day
3-5 Day	1-2 Day

Requested Report Date:

Relinquished By (1)		Received By (1)	
Signature	Date/Time	Signature	Date/Time
	9.07.18	VPS	

Relinquished By (2)		Received By (2)	
Signature	Date/Time	Signature	Date/Time
VPS			090818 1010

Relinquished By (2)		Received By (2)	
Signature	Date/Time	Signature	Date/Time
VPS			090818 1010

Sample Receipt Form

Project #: **418** S95.B
Date: 09/08/17

Sample #: 3
Initials: THW

Samples Were:

1. Shipped Hand Delivered Messengered (circle one)

Notes:

CPS

3. Chilled to Ship

Notes:

Ambient Chilled (circle one)

Wet Ice Blue Ice (circle one)

4. Cooler Received Broken or Leaking

Notes:

Y N NA

5. Sample Received Broken or Leaking

Notes:

Y N NA

6. Received Within Holding Times

Notes:

Y N

7. Aeration necessary

Notes:

Y N NA

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

Notes:

Y N NA

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

eff: clear, yellowish, some PM.

rec'g

	Temp	DO (mg/L)	DO (%Sat)	pH	Cond	Aeration			
						Time	DO (mg/L)	DO (%Sat)	pH
	<u>5.4</u>	<u>6.1</u>	<u>90.7</u>	<u>6.7</u>	<u>1938</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

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
1430	09-05-2018	1453	09-11-2018

Test Results	Lethality	Reproduction
NOEC	100%	60%
	PASS	FAIL
IC ₂₅	>100%	72.2%
	PASS	FAIL

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	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	90
% Survival for day 6	90	100	100	100	90	90
Mean 3 Brood Total	23.7	21.8	20.9	19.3	16.8	12.1

Hardness (mg/L) – Receiving Water: N/A Effluent: 1110/945/1430 Recon Water: 89

Alkalinity (mg/L) – Receiving Water: N/A Effluent: 384/294/309 Recon Water: 64

Chlorine (mg/L) – Effluent: <0.01 pH (initial/final) – Control: 8.0/8.2 100%: 6.7/8.2

Total Ammonia as NH₃ (mg/L) - Effluent: 1.05/1.14/1.66

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, Corey Sutton, and Daniel Hillenburg

Signature 

Date 9/20/18

Permittee: EIK RIDGE Lab #: 418 595 Site: Pond 013
IWC %: 100 Template #: 5 Dilution Water: MTW - C17 Sample Date: 090418
Age & Source: cerio 2018 090518 Test Start: 090518 1430 Test End: 091118 1453
Test Conditions: 83 Re-sample

	0	1	2	3	4	5	6	7	8	Total
(C)	0	0	0	0	5	10	11			26
	0	0	0	0	10	10	12			32
	0	0	0	0	11	11	0			22
	0	0	0	6	7	0	12			25
	0	0	0	3 +1	0	7	9			20
	0	0	0	0	7	9 +1	0 D			17
	0	0	0	5 +1	0	9	11			26
	0	0	0	6	9	0	8			23
	0	0	0	4	10	0	7			21
	0	0	0	0	8	7	10			25
DO	7.1	7.0	7.1	7.0	7.1	6.5	6.7			
Temp	24.9	24.5	24.1	24.9	24.1	25.0	24.9			
pH	8.0	8.0	8.1	8.1	8.1	8.0	8.0			
Cond	312	309	307	300	297	310				
(1)	0	0	0	5	8	4	15			32
	0	0	0	0	10	12	10			32
	0	0	0	0	9	10	0			19
	0	0	0	5	10	0	11			26
	0	0	0	5	0	5	6			16
	0	0	0	0	4	8	0			12
	0	0	0	0	5	7	9			21
	0	0	0	4	8 +2	0	10			24
	0	0	0	5	10	0	10			25
	0	0	0	0	8	11	7			26
DO	7.0	7.0	7.0	7.0	7.1	6.3	6.7			
Temp	25.2	24.5	24.1	24.9	24.1	25.0	24.9			
pH	7.0	7.9	7.1	8.1	7.1	8.0	7.1			
Cond	802	762	748	744	727	748				
(2)	0	0	0	5	5	0	EEB 9			19
	0	0	0	0	9	8	11			28
	0	0	0	2	12	9	0 0			23
	0	0	0	3	8	0	11 8			19
	0	0	0	5	0	7	7 8			20
	0	0	0	0	6	8	8 0			14
	0	0	0	5	0	8	7 6			19
	0	0	0	6	6	0	9 7			19
	0	0	0	5	6	0	8 9			20
	0	0	0	1	9 9	9	6 9			28
DO	6.9	7.0	6.8	7.1	7.0	6.6	6.6			
Temp	25.4	24.5	24.1	24.9	24.1	25.0	24.8			
pH	6.8	7.9	6.9	8.1	6.9	8.0	7.0			
Cond	1106	1129	1104	1097	1112	1132				
(3)	0	0	0	0	9	7	3			19
	0	0	0	0	12	11	8			31
	0	0	0	3	8	10	0			17
	0	0	0	5	8	0	11			24
	0	0	0	0	3	0	7			10
	0	0	0	0	5	6	8			19
	0	0	0	3	0	9	7			19
	0	0	0	3	7 +1	0	9			20
	0	0	0	5	10	0	8			23
	0	0	0	0	5	0	6			11
DO	6.8	7.1	6.6	7.1	7.0	6.5	6.7			
Temp	25.6	24.6	24.1	24.8	24.2	25.0	24.8			
pH	6.8	7.8	6.8	8.0	6.8	8.0	6.7			
Cond	1514	1487	1455	1453	1408	1502				

	0	1	2	3	4	5	6	7	8	Total
(4)	0	0	0	2	8 + 2	0	11			23
80	0	0	0	0	7	8 + 2	00			17
	0	0	0	5	6	5	0			16
	0	0	0	4	0	4	9			17
	0	0	0	4	0	6	5			15
	0	0	0	0	4	9 + 1	0			14
	0	0	0	3	0	6	8			17
	0	0	0	5	6	0	6			17
	0	0	0	4	7	0	0			11
	0	0	0	0	8	6	7			21
DO	6.7	7.1	6.5	7.2	6.9	7.5	6.2	6.4	6.8	6.9
Temp	25.8	24.6	24.1	24.8	24.2	24.7	24.5	25.0	24.7	25.3
pH	6.7	7.7	6.8	8.0	6.7	8.0	6.8	8.0	6.7	8.2
Cond	1781	1774	1746	1728	1734	1773				
(5)	0	0	0	4	5	0	0			9
100	0	0	0	0	10	7	5			22
	0	0	0	0	0	6	0			6
	0	0	0	3	5	0	7			15
	0	0	0	3	0	7	4			14
	0	0	0	0	4	0	4			8
	0	0	0	0	6	5	6			11
	0	0	0	4	6	0	5			19
	0	0	0	3	0	0	7			10
	0	0	0	0	5	7	5			17
DO	6.4	7.1	6.4	7.2	6.8	7.5	6.1	6.7	6.8	6.6
Temp	25.9	24.6	24.1	24.8	24.2	24.7	24.5	25.0	24.7	25.3
pH	6.7	7.7	6.7	8.0	6.7	8.0	6.8	8.0	6.6	8.2
Cond	1907	1994	1982	1938	1944	1982				
Algae	ABS/ABO	ABS/ABO	ABS/ABO	ABS/ABO	ABS/ABO	ABS/ABO	ABS/ABO			
YCT	1805	1805	1806	1806	1806	1806	1806			
H ₂ O	1	1	2	3	2	3				
Initials	CS	DH	DH	THW	CS	CS	CS			
	Eff #1	Eff #2	Eff #3	Recg #1	Recg #2	Recg #3	Recon #1	Recon #2	Recon #3	
Hardness	110	945	1430				69			
Alkalinity	384	294	309				64			
Chlorine	40.01	40.01	40.01				40.01			
Ammonia	1.05	1.14	1.66				40.03			

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.):

6. Comments: Active & Mobile

1	2	3	4	5	6	7	8	9	10
A4	B1	B5	B6	P4	D5	D10	E2	F5	E8

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

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 9/5/2018 Test ID: 418595cd Sample ID:
 End Date: 9/11/2018 Lab ID: Sample Type:
 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
DN-CONTROL	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
SN-Control	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
20	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
40	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
60	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
80	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100	0.0000	1.0000	1.0000	1.0000	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
DN-CONTROL	1.0000	1.1111	0	10	10	10	0.5619	
SN-Control	0.9000	1.0000	1	9	10	10	*	
20	1.0000	1.1111	0	10	10	10	0.5000	0.0500
40	1.0000	1.1111	0	10	10	10	0.5000	0.0500
60	1.0000	1.1111	0	10	10	10	0.5000	0.0500
80	0.9000	1.0000	1	9	10	10	0.7632	0.0500
100	0.9000	1.0000	1	9	10	10	0.7632	0.0500

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

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 9/5/2018 Test ID: 418595cd Sample ID:
End Date: 9/11/2018 Lab ID: Sample Type:
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
DN-CONTROL	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
SN-Control	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
20	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
40	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
60	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
80	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100	0.0000	1.0000	1.0000	1.0000	1.0000	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
DN-CONTROL	1.0000	1.1111	1.0472	1.0472	1.0472	0.000	10		
SN-Control	0.9000	1.0000	0.9948	0.5236	1.0472	16.644	10	0.9750	1.0000
20	1.0000	1.1111	1.0472	1.0472	1.0472	0.000	10	0.9750	1.0000
40	1.0000	1.1111	1.0472	1.0472	1.0472	0.000	10	0.9750	1.0000
60	1.0000	1.1111	1.0472	1.0472	1.0472	0.000	10	0.9750	1.0000
80	0.9000	1.0000	0.9948	0.5236	1.0472	16.644	10	0.9000	0.9231
100	0.9000	1.0000	0.9948	0.5236	1.0472	16.644	10	0.9000	0.9231

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution ($p \leq 0.05$)	3.53057	0.895	-3.8686	14.5011
Equality of variance cannot be confirmed				
The control means are not significantly different ($p = 0.33$)	1	2.10092		

Linear Interpolation (200 Resamples)				
Point	%	SD	95% CL	Skew
IC05	73.000			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 9/5/2018 Test ID: 418595cd Sample ID:
 End Date: 9/11/2018 Lab ID: Sample Type:
 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
ON-CONTROL	26.000	32.000	22.000	25.000	20.000	17.000	26.000	23.000	21.000	25.000
SN-Control	26.000	32.000	22.000	25.000	20.000	26.000	23.000	21.000	25.000	
20	17.000	32.000	19.000	26.000	16.000	12.000	21.000	24.000	25.000	26.000
40	19.000	28.000	23.000	19.000	20.000	14.000	19.000	19.000	20.000	28.000
60	19.000	31.000	17.000	24.000	10.000	19.000	19.000	20.000	23.000	11.000
80	23.000	17.000	16.000	17.000	15.000	14.000	17.000	17.000	11.000	21.000
100	9.000	22.000	6.000	15.000	14.000	8.000	11.000	9.000	10.000	17.000

Conc-%	Mean	N-Mean	Transform: Untransformed					t-Stat	1-Tailed	
			Mean	Min	Max	CV%	N		Critical	MSD
ON-CONTROL	23.700	0.9695	23.700	17.000	32.000	17.346	10	*		
SN-Control	24.444	1.0000	24.444	20.000	32.000	14.623	9			
20	21.800	0.8918	21.800	12.000	32.000	27.164	10	0.871	2.287	4.989
40	20.900	0.8550	20.900	14.000	28.000	20.728	10	1.283	2.287	4.989
60	19.300	0.7895	19.300	10.000	31.000	31.569	10	2.017	2.287	4.989
*80	16.800	0.6873	16.800	11.000	23.000	19.999	10	3.163	2.287	4.989
*100	12.100	0.4950	12.100	6.000	22.000	40.196	10	5.317	2.287	4.989

Auxiliary Tests					Statistic		Critical		Skew	Kurt	
Kolmogorov D Test indicates normal distribution (p > 0.05)					0.78125		0.895		0.30793	0.15573	
Bartlett's Test indicates equal variances (p = 0.51)					4.31218		15.0863				
The control means are not significantly different (p = 0.68)					0.4189		2.10982				
Hypothesis Test (1-tail, 0.05)		NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test		60	80	69.282	1.66667	4.98892	0.2105	172.04	23.8	3.0E-05	5, 54
Treatments vs ON-CONTROL											

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 9/5/2018 Test ID: 418595cd Sample ID:
 End Date: 9/11/2018 Lab ID: Sample Type:
 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
ON-CONTROL	26.000	32.000	22.000	25.000	20.000	17.000	26.000	23.000	21.000	25.000
SN-Control	26.000	32.000	22.000	25.000	20.000	26.000	23.000	21.000	25.000	
20	17.000	32.000	19.000	26.000	16.000	12.000	21.000	24.000	25.000	26.000
40	19.000	28.000	23.000	19.000	20.000	14.000	19.000	19.000	20.000	28.000
60	19.000	31.000	17.000	24.000	10.000	19.000	19.000	20.000	23.000	11.000
80	23.000	17.000	16.000	17.000	15.000	14.000	17.000	17.000	11.000	21.000
100	9.000	22.000	6.000	15.000	14.000	8.000	11.000	9.000	10.000	17.000

Conc-%	Mean	N-Mean	Transform: Untransformed					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
ON-CONTROL	23.700	0.9695	23.700	17.000	32.000	17.346	10	23.700	1.0000
SN-Control	24.444	1.0000	24.444	20.000	32.000	14.623	9		
20	21.800	0.8918	21.800	12.000	32.000	27.164	10	21.800	0.9198
40	20.900	0.8550	20.900	14.000	28.000	20.728	10	20.900	0.8819
60	19.300	0.7895	19.300	10.000	31.000	31.569	10	19.300	0.8143
80	16.800	0.6873	16.800	11.000	23.000	19.999	10	16.800	0.7089
100	12.100	0.4950	12.100	6.000	22.000	40.196	10	12.100	0.5105

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution ($p > 0.05$)	0.78125	0.895	0.30793	0.15573
Bartlett's Test indicates equal variances ($p = 0.51$)	4.31218	15.0863		
The control means are not significantly different ($p = 0.68$)	0.4189	2.10982		

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL		Skew
IC05*	12.474	12.908	4.871	45.324	0.9382
IC10	30.444	16.631	9.742	62.660	0.3901
IC15	49.438	16.908	14.613	70.466	-0.2962
IC20	62.720	14.550	19.484	78.849	-0.7874
IC25	72.200	11.384	46.993	83.371	-0.7204
IC40	90.979				
IC50	>100				

* 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
13010	09-05-2018	1250	09-12-2018

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

Dilution(s) - % Effluent

Measurements	Control (0%)	20%	40%	60%	80%	100%
% Survival for day 1	100	100	100	98	100	100
% Survival for day 2	100	98	100	95	100	98
% Survival for day 3	98	98	100	95	100	90
% Survival for day 4	98	98	95	93	100	90
% Survival for day 5	98	98	95	93	100	90
% Survival for day 6	98	98	95	93	100	90
% Survival for day 7	98	98	95	93	100	88
Mean Dry Wt. (mg)	0.470	0.492	0.470	0.523	0.534	0.524

Hardness (mg/L) – Receiving Water: N/A Effluent: 1110/945/1430 Recon Water: 87

Alkalinity (mg/L) – Receiving Water: N/A Effluent: 384/294/309 Recon Water: 60

Chlorine (mg/L) – Effluent: <0.01 pH (initial/final) – Control: 8.1/7.6 100%: 6.8/7.9

Total Ammonia as NH₃ (mg/L) – Effluent: 1.05/1.14/1.66

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: Nicole Denking, Tessa Hunt-Woodland, and Daniel Hillenburg

Signature 

Date 9/20/18

Larval Fish Growth and Survival Test-7 Day Survival

Start Date: 9/5/2018 Test ID: 418595fhn Sample ID:
 End Date: 9/12/2018 Lab ID: Sample Type: EFF1-POTW
 Sample Date: Protocol: EPAF 94-EPA/600/4-91/002 Test Species: PP-Pimephales promelas
 Comments:

Conc-%	1	2	3	4
DN-CONTROL	1.0000	1.0000	1.0000	1.0000
SN-Control	1.0000	0.9000	1.0000	1.0000
20	1.0000	1.0000	1.0000	0.9000
40	1.0000	0.9000	1.0000	0.9000
60	1.0000	0.9000	0.8000	1.0000
80	1.0000	1.0000	1.0000	1.0000
100	0.8000	0.9000	0.9000	0.9000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%	N		
DN-CONTROL	1.0000	1.0256	1.4120	1.4120	1.4120	0.000	4		
SN-Control	0.9750	1.0000	1.3713	1.2490	1.4120	5.942	4	*	
20	0.9750	1.0000	1.3713	1.2490	1.4120	5.942	4	18.00	10.00
40	0.9500	0.9744	1.3305	1.2490	1.4120	7.072	4	16.00	10.00
60	0.9250	0.9487	1.2951	1.1071	1.4120	11.347	4	15.50	10.00
80	1.0000	1.0256	1.4120	1.4120	1.4120	0.000	4	20.00	10.00
100	0.8750	0.8974	1.2136	1.1071	1.2490	5.846	4	11.50	10.00

Auxiliary Tests		Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.05$)		0.91217	0.916	-0.7341	-0.0881
Equality of variance cannot be confirmed					
The control means are not significantly different ($p = 0.36$)		1	2.44691		
Hypothesis Test (1-tail, 0.05)		NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test		100	>100	1	
Treatments vs SN-Control					

Larval Fish Growth and Survival Test-7 Day Survival

Start Date: 9/5/2018	Test ID: 418595fhm	Sample ID:
End Date: 9/12/2018	Lab ID:	Sample Type: EFF1-POTW
Sample Date:	Protocol: EPAF 94-EPA/600/4-91/002	Test Species: PP-Pimephales promelas
Comments:		

Conc-%	1	2	3	4
DN-CONTROL	1.0000	1.0000	1.0000	1.0000
SN-Control	1.0000	0.9000	1.0000	1.0000
20	1.0000	1.0000	1.0000	0.9000
40	1.0000	0.9000	1.0000	0.9000
60	1.0000	0.9000	0.8000	1.0000
80	1.0000	1.0000	1.0000	1.0000
100	0.8000	0.9000	0.9000	0.9000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					Isotonic	
			Mean	Min	Max	CV%	N	Mean	N-Mean
DN-CONTROL	1.0000	1.0256	1.4120	1.4120	1.4120	0.000	4		
SN-Control	0.9750	1.0000	1.3713	1.2490	1.4120	5.942	4	0.9750	1.0000
20	0.9750	1.0000	1.3713	1.2490	1.4120	5.942	4	0.9750	1.0000
40	0.9500	0.9744	1.3305	1.2490	1.4120	7.072	4	0.9583	0.9829
60	0.9250	0.9487	1.2951	1.1071	1.4120	11.347	4	0.9583	0.9829
80	1.0000	1.0256	1.4120	1.4120	1.4120	0.000	4	0.9583	0.9829
100	0.8750	0.8974	1.2136	1.1071	1.2490	5.846	4	0.8750	0.8974

Auxiliary Tests

	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.05$)	0.91217	0.916	-0.7341	-0.0881
Equality of variance cannot be confirmed				
The control means are not significantly different ($p = 0.36$)	1	2.44691		

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC05	87.700	18.335	0.580	99.515
IC10	99.400			-1.8842
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

Larval Fish Growth and Survival Test-7 Day Growth

Start Date: 9/5/2018 Test ID: 418595fhm Sample ID:
 End Date: 9/12/2018 Lab ID: Sample Type: EFF1-POTW
 Sample Date: Protocol: EPAF 94-EPA/600/4-91/002 Test Species: PP-Pimephales promelas
 Comments:

Conc-%	1	2	3	4
ON-CONTROL	0.5390	0.5570	0.4530	0.3320
SN-Control	0.5390	0.6189	0.4530	0.3320
20	0.5950	0.4600	0.4930	0.4210
40	0.4840	0.4210	0.4700	0.5030
60	0.5190	0.5770	0.4620	0.5350
80	0.4960	0.5280	0.5410	0.5690
100	0.5470	0.5240	0.5610	0.4630

Conc-%	Mean	N-Mean	Transform: Untransformed					t-Stat	1-Tailed	
			Mean	Min	Max	CV%	N		Critical	MSD
ON-CONTROL	0.4703	0.9681	0.4703	0.3320	0.5570	21.847	4	*		
SN-Control	0.4857	1.0000	0.4857	0.3320	0.6189	25.291	4			
20	0.4923	1.0134	0.4923	0.4210	0.5950	15.145	4	-0.509	2.410	0.1041
40	0.4695	0.9666	0.4695	0.4210	0.5030	7.465	4	0.017	2.410	0.1041
60	0.5232	1.0773	0.5232	0.4620	0.5770	9.097	4	-1.227	2.410	0.1041
80	0.5335	1.0984	0.5335	0.4960	0.5690	5.678	4	-1.464	2.410	0.1041
100	0.5237	1.0783	0.5237	0.4630	0.5610	8.263	4	-1.238	2.410	0.1041

Auxiliary Tests					Statistic		Critical		Skew	Kurt				
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)					0.97822		0.916		-0.3888	0.74228				
Bartlett's Test indicates equal variances (p = 0.30)					6.01824		15.0863							
The control means are not significantly different (p = 0.85)					0.19323		2.44691							
Hypothesis Test (1-tail, 0.05)					NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test					100	>100		1	0.10412	0.22141	0.00326	0.00373	0.51808	5, 18
Treatments vs ON-CONTROL														

Larval Fish Growth and Survival Test-7 Day Growth

Start Date: 9/5/2018 Test ID: 418595fhm Sample ID:
 End Date: 9/12/2018 Lab ID: Sample Type: EFF1-POTW
 Sample Date: Protocol: EPAF 94-EPA/600/4-91/002 Test Species: PP-Pimephales promelas
 Comments:

Conc-%	1	2	3	4
DN-CONTROL	0.5390	0.5570	0.4530	0.3320
SN-Control	0.5390	0.6189	0.4530	0.3320
20	0.5950	0.4600	0.4930	0.4210
40	0.4840	0.4210	0.4700	0.5030
60	0.5190	0.5770	0.4620	0.5350
80	0.4960	0.5280	0.5410	0.5690
100	0.5470	0.5240	0.5610	0.4630

Conc-%	Transform: Untransformed							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
DN-CONTROL	0.4703	0.9681	0.4703	0.3320	0.5570	21.847	4	0.5021	1.0000
SN-Control	0.4857	1.0000	0.4857	0.3320	0.6189	25.291	4		
20	0.4923	1.0134	0.4923	0.4210	0.5950	15.145	4	0.5021	1.0000
40	0.4695	0.9666	0.4695	0.4210	0.5030	7.465	4	0.5021	1.0000
60	0.5232	1.0773	0.5232	0.4620	0.5770	9.097	4	0.5021	1.0000
80	0.5335	1.0984	0.5335	0.4960	0.5690	5.678	4	0.5021	1.0000
100	0.5237	1.0783	0.5237	0.4630	0.5610	8.263	4	0.5021	1.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.97822	0.916	-0.3888	0.74228
Bartlett's Test indicates equal variances ($p = 0.30$)	6.01824	15.0863		
The control means are not significantly different ($p = 0.85$)	0.19323	2.44691		

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.: 418595.B

Species Tested: *Ceriodaphnia dubia* and Fathead minnow

Start Date of Test (<i>Ceriodaphnia dubia</i>)	Start Date of Test (Fathead minnow)
09-05-2018	09-05-2018

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 Director

Date

09/20/18

Method	Analyte	Date	LCS (rec)	%REC	%RPD	QC LIMITS
2320 B	Alkalinity - Total	8/2/2018	104.80%	99.59%	-0.74%	± 5.00%
2320 B	Alkalinity - Total	8/9/2018	103.60%	104.27%	0.85%	± 5.00%
2320 B	Alkalinity - Total	8/16/2018	102.40%	104.27%	-4.65%	± 5.00%
2320 B	Alkalinity - Total	8/27/2018	101.60%	100.89%	1.02%	± 5.00%
4500 NH ₃ D	Ammonia	8/2/2017	101.40%	99.54%	2.09%	± 10.00%
4500 NH ₃ D	Ammonia	8/9/2017	101.40%	99.02%	0.00%	± 10.00%
4500 NH ₃ D	Ammonia	8/16/2018	98.00%	101.74%	-4.44%	± 10.00%
4500 NH ₃ D	Ammonia	8/27/2018	103.80%	98.29%	4.40%	± 10.00%
4500 Cl D	Chlorine	8/30/2018	103.03%	96.97%	0.00%	± 5.00, ± 20.00%
2340 B	Hardness - Total	8/9/2018	101.75%	95.96%	2.99%	± 5.00%
2340 B	Hardness - Total	8/17/2018	101.75%	98.50%	3.64%	± 5.00%
2340 B	Hardness - Total	8/25/2018	98.25%	100.05%	4.28%	± 5.00%
2340 B	Hardness - Total	8/30/2018	105.26%	102.32%	-3.28%	± 5.00%

Method	Analyte	Date	LCS (rec)	%REC M1	%REC M2	QC Limits
4500 O	DO - Winkler	8/2/2018	N/A	96.97%	100.00%	± 5.00%
4500 O	DO - Winkler	8/9/2018	N/A	97.06%	100.00%	± 5.00%
4500 O	DO - Winkler	8/16/2018	N/A	98.51%	101.54%	± 5.00%
4500 O	DO - Winkler	8/24/2018	N/A	101.56%	98.48%	± 5.00%
4500 O	DO - Winkler	8/30/2018	N/A	100.00%	103.03%	± 5.00%

Method	Analyte	Date	Blank	%RPD	%REC MRS	QC Limits
2540 C	Dissolved Solids (TTL)	8/29/2018	99.9964%	0.38%	103.90%	±20%, ± 15%
2540 D	Suspended Solids (TTL)	8/24/2018	100.00022%	0.00%	90.77%	±20%, ± 15%

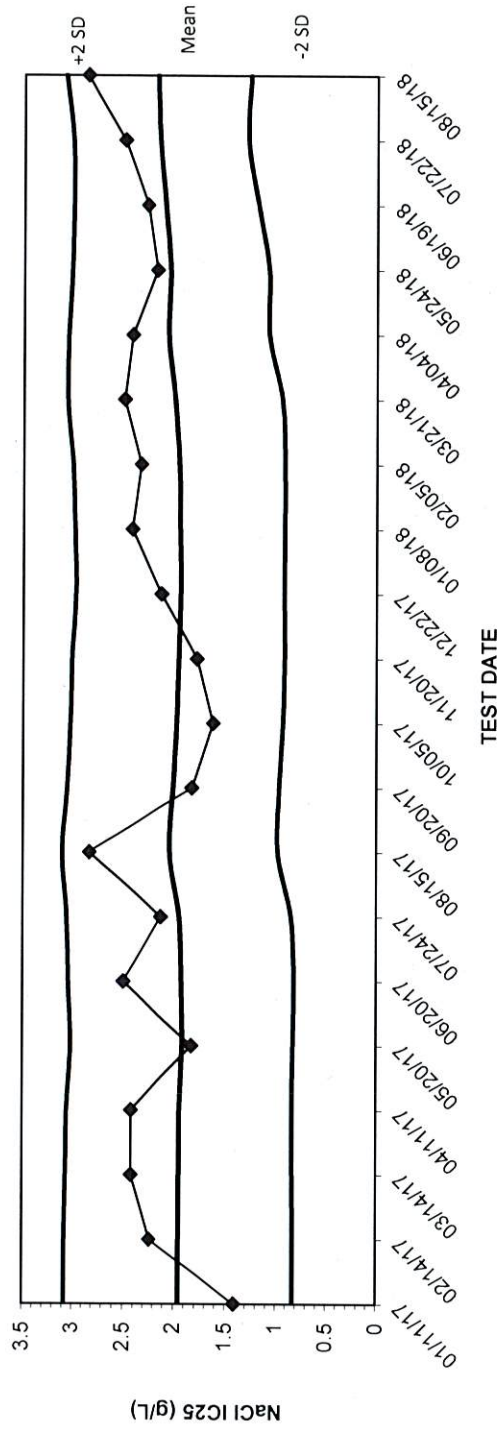
Signature: MPel

Date: 09/05/18

Signature: [Signature]

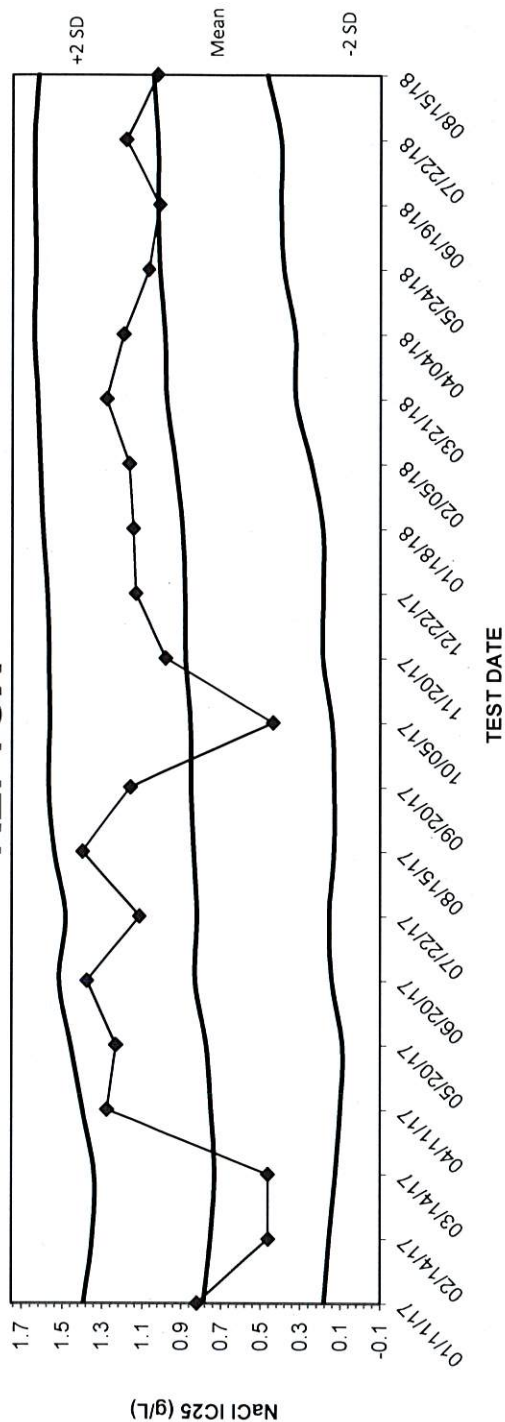
Date: 09/05/18

CERIODAPHNIA SURVIVAL IC25 NaCl REFTOX



Date	IC25	Mean	-2 SD	+2 SD
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
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

CERIODAPHNIA REPRODUCTION IC25 NaCl REFTOX



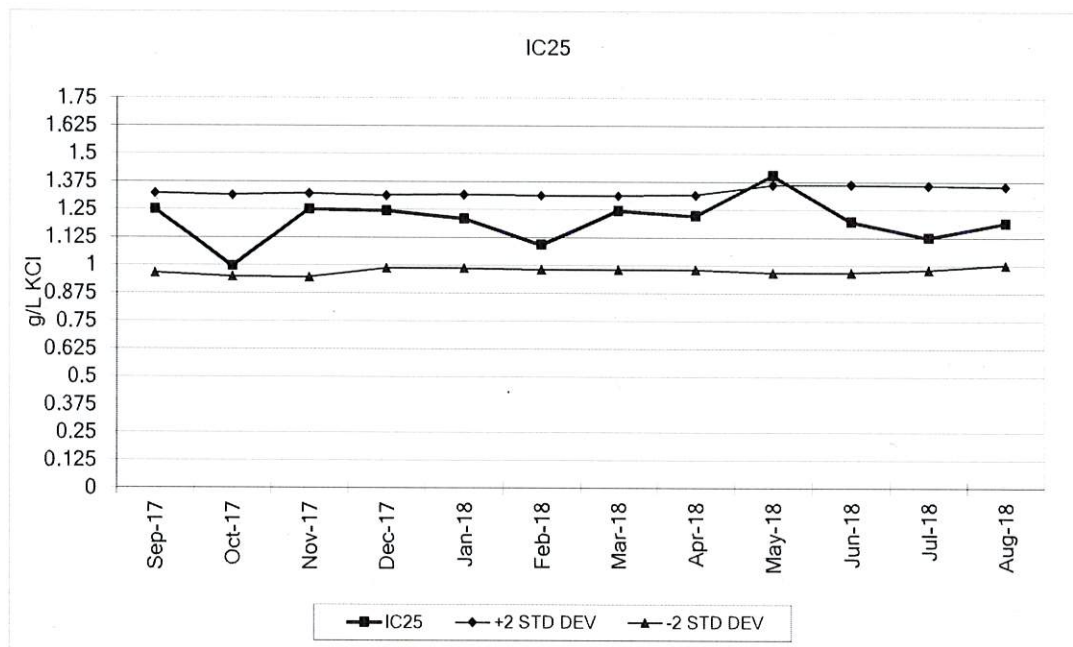
Date	IC25	Mean	-2 SD	+2 SD
01/11/17	0.8196	0.7868	0.1816	1.3920
02/14/17	0.4621	0.7522	0.1564	1.3480
03/14/17	0.4637	0.7320	0.1254	1.3387
04/11/17	1.2762	0.7495	0.1006	1.3985
05/20/17	1.2328	0.7742	0.0902	1.4581
06/20/17	1.3758	0.8305	0.1432	1.5178
07/22/17	1.1166	0.8209	0.1569	1.4848
08/15/17	1.3990	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
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

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



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

Pimephales promelas



Chronic 7 Day Survival Test Data

Date	NOEC (g/L KCl)	LOEC (g/L KCl)
Mar-18	0.50	1.0
Apr-18	0.50	1.0
May-18	0.50	1.0
Jun-18	0.50	1.0
Jul-18	0.50	1.0
Aug-18	0.50	1.0

IC 25 for Growth Test

Date	IC25 g/L KCl	95% Confidence (upper)	(lower)	Avg. IC25 g/L KCl	+2 STD DEV	-2 STD DEV
Mar-18	1.245	1.253	0.639	1.146	1.311	0.981
Apr-18	1.222	1.267	1.086	1.148	1.316	0.980
May-18	1.403	1.487	1.114	1.163	1.360	0.967
Jun-18	1.196	1.282	0.961	1.165	1.362	0.967
Jul-18	1.124	1.294	0.028	1.169	1.358	0.979
Aug-18	1.189	1.341	1.054	1.177	1.353	1.001

**Current Test Dates: 8/2-9/2018

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 09/01/18 to 09/30/18

DMR Due Date:

10/28/18

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:

2018-10-22 14:01 (Time Zone: -06:00)

Report Last Signed By

BARBARAWALZ1

User:

BARBARAWALZ1

Name:

Barbara Walz

E-Mail:

bwalz@tristategt.org

Date/Time:

2018-10-25 16:40 (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 07/01/18 to 09/30/18

DMR Due Date:

10/28/18

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:

2018-10-22 14:01 (Time Zone: -06:00)

Report Last Signed By

User:

BARBARAWALZ1

Name:

Barbara Walz

E-Mail:

bwalz@tristategt.org

Date/Time:

2018-10-25 16:40 (Time Zone: -06:00)