STATE OF COLORADO

Eschberger - DNR, Amy <amy.eschberger@state.co.us>

FW: Cross/Caribou Potential for Violation

DPollock@nedmining.com <DPollock@nedmining.com> Thu, Oct 7, 2021 at 1:36 PM
To: "Eschberger - DNR, Amy" <amy.eschberger@state.co.us>

Amy,

Please find attached GIR's letter and supporting documents to WQCD to address the Potential for Violation for CO-0032751.

Please let me know if you have questions.

Thank you,

Daniel Pollock

From: DPollock@nedmining.com <DPollock@nedmining.com>
Sent: Thursday, October 7, 2021 1:34 PM
To: 'Jacob Dyste - CDPHE' <jacob.dyste@state.co.us>
Cc: 'Daniel Takami' <danieltakami@gmail.com>
Subject: Cross/Caribou Potential for Violation

Jacob,

Per our conversation 10/5/2021, I submit the following letter and supporting documents to address the Potential for Violation for CO-0032751.

I look forward to working with the State to correct this situation.

Thank you,

Daniel Pollock

Regulations and Permitting

Grand Island Resources

Nederland Mining Consultants

720.207.5154 – Office

312.342.6145 – Cell

6 attachments

CO-0032751 PNOV 10-7-2021.pdf
196K

Attachment 1.pdf
64K

Attachment 2.pdf
130K

Attachment 3.pdf
123K

Attachment 4.pdf
229K

Attachment 5.pdf
183K

GRAND ISLAND RESOURCES

P.O. Box 3395
Nederland, CO 80466
October 7, 2021

October 7, 2021

CDPHE
WQCD – Permits and Enforcement Division
WQCD-PE-2 Attn Mr. Jacob Dyste
4300 Cherry Creek Drive South
Denver, CO 80246-1530
Reference: CDPS Permit Number CO-0032751

Mr. Dyste,

The interest in operating the Cross Caribou mine by the Grand Island Resources, LLC, is based solely on our ability to comply with all environmental standards especially the elimination of any toxins migrating into streams or headwaters. The personal interests of our stockholders require a significant improvement in any past remediation practices in order to achieve a high degree of environmental performance with private capital only.

Consequently, we are very concerned with the discharge of any heavy metals into any water body and specifically the heavy metals detected in our water quality samples.

Unfortunately, we have found that the good intentions of companies that provide promises of mitigation are simply not enough. There are no compromises with certain heavy metals such as zinc or lead. We greatly appreciate working with you to ensure all possible actions will be installed to proceed in a safe a secure manner.

Per our conversation on October 5, 2021, we have compiled an information package of past, current and planned activities at the Cross/Caribou, as they relate to water treatment and Grand Island Resources' (GIR) discharge permit CO-0032751. As discussed with you, activities at both GIR mine sites have increased over the past two years as the project is being advanced. These activities have resulted in stresses to the on-site treatment system permitted exclusively via Lime (Calcium Hydroxide) addition. This antiquated system has been the sole treatment technology for the past thirty plus years. Throughout this time, effluent discharge has been made through the permitted passive detention ponds as our only other treatment tool. GIR has monitored influent and effluent water quality aimed at identifying alternative water treatment solutions to enhance our ability to remain compliant.

P.O. Box 3395
Nederland, CO 80466
October 7, 2021

Over the years, the water treatment system at the Cross/Caribou has a long history of treating dissolved solids at the Cross mine tunnel discharge. The operator before us initially tried, in 1995, a novel gravity-flow system using a natural zeolite tray for adsorption. While removal was observed, it did not reach compliance limits.

The operator at that time then switched to lime treatment and detention ponds (the permitted treatment system) and found that treatment to be sporadically effective for Zn and Cd removal. GIR has experienced the same sporadic removal ineffectiveness on Cd and Zn at the trace levels required for compliance. Additionally, based on an internal comprehensive particulate sampling study (Attachment 1), we believe that the implementation of a filtration system will eliminate exceedances, except for dissolved Cd and Zn. Only with this newfound data, can an effective water treatment technology be selected and employed. This filtration approach had never been considered by previous operators.

As you are aware, our discharge limits are stringent due to the location at the head waters of a sensitive basin. Headwaters treatment systems that add counter-ions, alter pH with chemical addition, or increase dissolved content with flocculant treatment of suspended solids, may create more water quality impacts than are fixed. Headwaters treatment systems are therefore expected to be chemically passive, increasing the technical treatment challenges.

Based on the above conditions, GIR is piloting new treatment technologies for our mine tunnel discharges. Multiple treatment technology providers were considered for the initial pilot system, including such reputable companies as Rain for Rent, OPEL, Evoqua and FiltraSystems. Based on multiple factors, including a comprehensive Performance Warranty, the OPEL system was selected for the pilot program which began operations in July.

OPEL

The OPEL company provided GIR with a comprehensive Performance Warranty which reads in part "the OPEL system will discharge water that will be in complete compliance with GIR discharge permit. The OPEL treatment system will feed from Pond 1 at a rate consistent with the inflow to the pond and discharge to Outfall 001. The OPEL system will treat suspended solids and dissolved metals" (Attachments 2 & 3).

Because the OPEL system treats water by physical processes and chemical adsorption onto a proprietary media, pH adjustment is not required, and counter-ions are not released into the

discharge. After several manufacturing delays and installation challenges, the OPEL system is currently in place and being tested at the site.

The water treatment trailer was put into operation several weeks behind schedule on July 28, which resulted in only 48 hours of testing the system to meet compliance standards. Although the unit came with a Performance Warranty and was sold as a treatment technology that could easily handle all conditions at Cross/Caribou, that objective has not yet been achieved and therefore compliance standards have not been met. During this pilot testing period, GIR continued to explore alternative treatment solutions, and is currently advancing a new system with Clear Water and Graver.

Clear Water/Graver

Since the OPEL system was not meeting compliance standards from the onset and its contracted Performance Warranty, GIR immediately began pursuing alternative treatment solutions. Clear Water and Graver are proven mine water treatment providers with a successful track record for mine operations like the Cross/Caribou.

Graver technologies has developed a proprietary granular media, MetSorb (Attachment 4), that has polymetallic adsorption capabilities. It is commonly used to treat water from construction dewatering. Consultation with Graver resulted in a sampling study of the mine tunnel discharges (Attachment 1).

The sampling round has identified that much of the “probable dissolved” analytical detections are related to turbidity and suspended solids. The dissolved constituents of concern are limited to Cd and Zn when particulate matter is filtered out prior to acidification. This indicates that 5-micron filtration followed by heavy-metal polishing through adsorption is a viable treatment technology.

Site water is being shipped to Graver to test media adsorption properties and quantify operational parameters for a full-scale system. Clear Water Technologies is currently sourcing equipment for immediate use at the mine to bring Cross/Caribou discharge water into compliance. We plan to conduct an immediate second pilot test during our winter low discharge period using bag filtration and a temporary filtration tank using Graver MetSorb. Environmental Site Solutions, LLC (ESS) is coordinating the efforts between Clear Water and Graver and has provided a statement of support for the pilot and full-scale systems (Attachment 5).

GRAND ISLAND
RESOURCES

P.O. Box 3395
Nederland, CO 80466
October 7, 2021

GIR's recent violations are not consistent with our commitment to environmental responsibility and compliance on all regulatory levels. The parent company for Grand Island Resources, Sustainable Metal Solutions (SMS) is positioning itself to be a global leader in the production of carbon neutral rare earth minerals and metals with an emphasis on cleaning up historic tailings piles across the West. In order to accomplish these objectives, both SMS and GIR are committed to environmental responsibility, continuing education and compliance at every level. We look forward to working with the State to correct these violations and ensure success for our future.

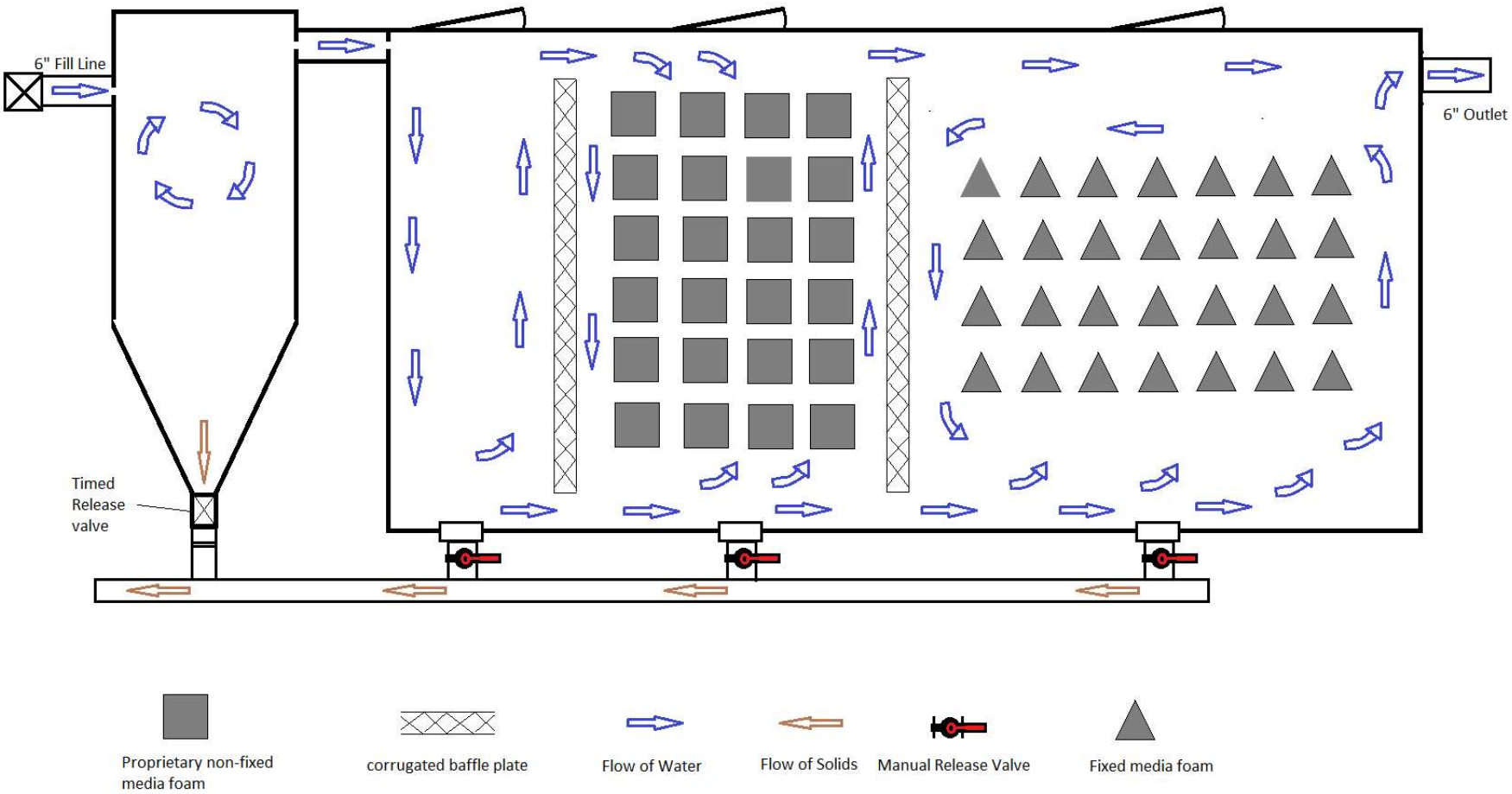
If you have questions or concerns, please do not hesitate to contact me directly.

Sincerely,
Daniel Pollock

Grand Island Resources, LLC
720.207.5154

Filtration Study

	Caribou Tunnel Source Water PASS - FAIL Filtration size in microns				Cross Tunnel Source Water PASS - FAIL Filtration size in microns						
COMPLIANCE COMPOUND	Caribou UF	Caribou 5.0	Caribou 0.45	Caribou 0.10	Cross UF	Cross 5.0	Cross 0.45	Cross 0.10	**30-Day Average**	**7-Day Average**	**Daily Maximum**
Total Alkalinity	122.5	118.5	122.2	119.1	77.6	78.5	75.6	76.5			
Bicarbonate	122.5	118.5	122.2	119.1	77.6	78.5	75.6	76.5			
Carbonate											
Chloride	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6			
Fluoride	0.1			0.2							
Silica (as Si)	5.5	5.4	5.5	5.5	6.0	6.1	5.9	6.2			
Nitrate Nitrogen	0.5	0.3	0.3	0.3	0.2	0.2	0.2	0.2			
pH	**8.0**	**8.1**	**8.1**	**8.1**	**7.8**	**7.8**	**7.8**	**7.8**	6.5-9	6.5-9	6.5-9
Sulfate	12.0	11.9	12.0	11.9	11.1	11.2	11.1	11.2			
Total Suspended Solids	**108.0**				**10.0**				30	45	
Turbidity	43.00	0.03	0.04	0.02	5.98	0.08	0.10	0.17			
Total Hardness	132.5	117.2	117.6	118.5	77.3	78.1	77.5	77.2			
Aluminum (ug/L here down)	2,782	2	4	3	148	8	6	9			
Antimony	2	0	0	0	0	0	0	0			
Arsenic	4	0	1	1	0	0	0	0			
Barium	111	53	53	51	58	55	55	55			
Beryllium	0	0	0	0	0	0	0	0			
Boron	30	30	20	90	0	0	0	0			
Cadmium	**1.30**	**0.10**	**0.00**	**0.00**	**2.90**	**2.80**	**2.70**	**2.70**	0.60 to 0.89		2.2 to 3.7
Calcium	28,800	25,800	26,000	26,100	19,100	19,500	19,200	19,000			
Chromium	20	0	0	0	0	0	0	0			
Cobalt	5	0	0	0	1	0	0	0			
Copper	**26**	**0**	**0**	**0**	**8**	**4**	**4**	**4**	13 to 19		18 to 28
Iron	5,894	0	0	0	349	0	0	8			
Lead	**156**	**0**	**0**	**0**	**20**	**2**	**2**	**2**	3.6 to 5.4		85 to 135
Magnesium	14,720	12,850	12,790	12,960	7,200	7,140	7,180	7,220			
Manganese	909	25	25	25	62	45	44	44			
Mercury	**NA**				**NA**				1		2
Molybdenum	6	6	6	6	7	6	6	6			
Nickel	11	0	0	0	1	1	1	1			
Potassium	2,800	1,400	1,400	1,400	1,300	1,200	1,200	1,200			
Silver	**5.30**	0.00	0.00	0.00	**0.60**	0.00	0.00	0.00	0.11 to 0.17		
Sodium	2,400	2,300	2,300	2,300	1,800	1,800	1,800	1,800			
Strontium	417	380	382	370	143	137	135	135			
Uranium	7	6	6	6	1	1	1	1			
Vanadium	11	0	0	0	2	0	0	0			
Zinc	**251**	**18**	**21**	**16**	**343**	**325**	**319**	**316**	176 to 262		182 to 301


6" Fill Line
6" Outlet
Timed
Release
valve
Proprietary non-fixed
media foam
corrugated baffle plate
Flow of Water
Flow of Solids
Manual Release Valve
Fixed media foam

Operation Procedure design for ™AmberKleen 1250 mine waste Final Polishing

Step 1: Mine wastewater flows from Weir system into a 6” inlet utilizing proprietary digital flow meter to monitor and capture volume being processed and recorded.

Step 2: Water flows into proprietary cyclone chamber allowing larger total suspended solid particulates to fall to bottom and into 2” return utilizing timed open valve to re-direct and to be pumped back into weir system for re-processing to eliminate all TSS and heavy metals by design.

Step 3: Mine wastewater then travels into and through chamber 2 optimizing agitation of flow across weir panel underflow/overflow design to create specific flow patterns to separate smaller total suspended solids particulates to settle out and into bottom of tank and utilizing timed 2” return line to re-direct and to be pumped back into weir system for re-processing to eliminate all TSS and heavy metals by design.

Step 4: Mine wastewater then travels into and through chamber 3 optimizing agitation of flow across weir panel underflow/overflow design to create specific flow patterns as in chamber 2 and introduces proprietary media designed (foam blocks)to capture all low gravity and microfine total suspended solids and utilizing a Bi-weekly maintenance procedure removed and cleaned to remove all TSS and heavy metals to ensure effectiveness and visual inspection for wear, then re-installed and put back into operation, any additional solids particulates to settle out and into bottom of tank and utilizing timed 2” return line to re-direct and to be pumped back into weir system for re-processing to eliminate all TSS and heavy metals by design.

Step 5: Mine wastewater then travels into chamber 4 again utilizing dynamic flow agitation caused by proprietary design in weir wall maximizing whirl pattern agitation and introducing final proprietary media allowing an remaining low gravity and microfine total suspended solids to settle out and into bottom of tank to be captured and settled into bottom of tank and utilizing timed 2” return line to re-direct and to be pumped back into weir system for re-processing to eliminate all TSS and heavy metals by design.

Step 6: Final stage, all clean mine wastewater now free of contaminants flows into 6” discharge line and returned to natural existing flowing creek.

This is a proprietary design and designated as such by the designer to protect against any duplication or copy of certain elements.

Any questions can and will be directed to: Mr. Jerry Reamer
Owner/Operator of Global Clean Water upon request.

Graver Technologies

Filtration | Separation | Purification

MetSorb® ADSORPTION MEDIA

Multiple Heavy Metals Removal for Construction Dewatering

Dewatering is a very common necessity prior to discharge into surface waters or storm sewers leading to surface waters. These waters are protected by the EPA's National Pollution Discharge Elimination System (NPDES) and commonly specific state regulations. In certain locations, these regulations can get extremely tough to achieve. Specific to heavy metals removal, even naturally occurring ones can lead to potential permit violations.

It is common for the water initially tested for to change as pumping commences and this can lead to other metal being discharged out of compliance. MetSorb® can help eliminate that unknown. MetSorb® can maintain compliance on multiple metals at the same time. This reduces the headaches associated with permit violations.

Contaminants

- Arsenic III
- Arsenic V
- Cadmium
- Copper
- Antimony
- Mercury
- Lead
- Vanadium
- Uranium
- Zinc
- Nickel

- Remove multiple metals at once
- Not preferential (won't bleed off)
- Not impacted by TDS
- pH adjustment not necessary.
- Polishing to parts per billion (micrograms/liter, µg/L) *or* parts per trillion (nanograms/liter, ng/L) levels
- Smaller Vessels and less media used because of extremely fast kinetics
- Non-hazardous ALWAYS when disposing

For more information on MetSorb® arsenic adsorbent media contact Bennett Buchsieb at **302-383-9310**, or by email at **bbuchsieb@gravertech.com**

Graver Technologies

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e-mail: info@gravertech.com • **www.gravertech.com**

Member of:

NSF/ANSI 61 D040211

American Water Works Association
The Authoritative Resource on Safe Water℠

Water Quality Association

Rural Water Association

Environmental Site Solutions, LLC

To whom it may concern,

Grand Island Resources (GIR) reached out to Environmental Site Solutions (ESS) and Graver Technologies in late July of this year seeking assistance. Graver is a Berkshire Hathaway company that sells filtration media globally. Environmental Site Solutions is a Washington State-based environmental services firm with over 20 years experience providing custom water treatment programs and systems. ESS has operations in WA, OR, CA & HI.

On July 21 we proposed a series of steps to GIR to address their treatment issues. The first was to create a comprehensive data set that address the role of particulate matter in the effluent. GIR completed that sampling and laboratory analysis project in August of this year (Step 1) and after executing NDA's, two meeting on the findings were held in September. GIR expressed the need to move quickly during the most recent meeting, and a program was selected to do a full-scale pilot treatment this winter during low flow (Step 2), to be followed by design and installation of a permanent treatment system to treat the full range and flows of mine water (Step 3). Clear Water Services of Everett, WA has also been tasked to assist with equipment procurement, design, transport and assembly and commissioning, responding to the clients accelerating schedule

GIR notified us yesterday, October 5, that the treatment situation had become more dire. There wasn't an accident of spill, but they had run out of time to bring the water into compliance and had received a notice of Notice of Violation, involving a future public hearing. GIR has asked us to design, build, and deliver a temporary treatment package that will immediately bring the discharge water into compliance without altering their permit conditions. We have been tasked to bring treatment on-line, this month.

Currently, the technical team is:

- Conducting system design based on effluent properties as determined by the filtration sampling event and flow rated measured by the mine.
- Procuring equipment, new or used, that can be delivered to the mine in days to a week that will allow for use of the Graver MetSorb media.
- Procuring equipment, new or used, that will pre-filter the effluent to 5-micron,
- Scheduling delivery of Graver Metsorb media, or pre-packed filtration vessels to the mine.
- Assisting the mine with set-up and start-up.
- Provide ongoing consultation and effort needed to proceed to Step 3, a permanent treatment system.

14450 Austin Place ▪ Anacortes, WA 98221 ▪ Phone: 360-503-7299 ▪ mike.tallering@envirositesolutions.com

Please let me know if you have any questions or need further documentation.

Best regards,

Mike Tallering
Environmental Site Solutions
mike.tallering@envirositesolutions.com
www.envirositesolutions.com
360-503-7299

CC: Ben Buchsieb Graver Technologies

CC: Nathan Holloway Clear Water Services