TRI-STATE

February 25, 2021

Mrs. Janet Binns
Environmental Protection Specialist
Colorado Division of Reclamation, Mining & Safety
Department of Natural Resources
1313 Sherman Street, Room 215
Denver, CO 80203

RE: New Horizon Mine
Permit No. C-1981-008
Technical Revision No. 101
Adequacy Response

Dear Mrs. Binns,

Tri-State Generation and Transmission Association Inc. (Tri-State), is the parent company to Elk Ridge Mining and Reclamation, LCC (ERMR), which owns and operates New Horizon Mine. The New Horizon Mine operates under the Division of Reclamation, Mining and Safety (DRMS) Permit No. C-1981-008.

Tri-State received your adequacy letter dated February 25, 2021, and has the following response:

1. *It appears that the first submitted page for Section 2.04.7 does not fit with the currently approved page. At the top of page 2.04.7-27 in the approved PAP, the initial text (an extension of the sentence from the previous page) reads "standards from the San Miguel River." However, the proposed page (also an extension from previous page) reads "two sample sets collected at each surface water site." It appears two lines from the approved permit pages (Revised March 2020-TR97) need to be included on the TR101 page 2.04.7-27. Please address this apparent problem.*

   Response: The pagination issue identified has been corrected.

2. *Some wells on the proposed version of Map 2.04.7-1A are indicated with a mustard color, which (according to the map legend) is used for surface water sites. The color the legend shows for ground water wells that are not monitored appear as a peach color. Please revise the map to fix this inconsistency.*

   Response: The color issued on Map 2.04.7-1A has been corrected.

If you should have any additional questions or concerns, please feel free to contact Tony Tennyson at (970) 326-3560 at your convenience.

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Sincerely,

DocuSigned by:
Daniel Casiraro
B70D69F114324DE...

Daniel J. Casiraro
Senior Manager
Environmental Services

DJC:TT:der

Enclosure

cc: Chris Gilbreath (via email)
Frank Ferris (via email)
File: G474-11.3(21)b-4

CHANGE SHEET FOR PERMIT REVISIONS, TECHNICAL REVISION, AND MINOR REVISIONS

Mine Company Name: **New Horizon Mine**

Permit Number: **C-1981-008**

Date: **February 25, 2021**

Revision Description: **TR-101 Water Monitoring Program**

Volume Number	Page, Map or other Permit Entry to be REMOVED		Page, Map or other Permit Entry to be ADDED		Description of Change
1					No changes
2	Section 2.04.7, Pages 2.04.7-27 through 2.04.7-33 (7 pages)		Section 2.04.7, Pages 2.04.7-27 through 2.04.7-33 (7 pages)		Pagination has been corrected.
2	Map 2.04.7-1A		Map 2.04.7-1A		Map 2.04.7-1A has been updated.
3					No changes
4					No changes
5					No changes
6					No changes
7					No changes
8					No changes
9					No changes
10					No changes

standards for the San Miguel River. During 1987, Peabody had its contract laboratory (ACZ Laboratories, Steamboat Springs, Colorado) perform total recoverable analyses for silver and hexavalent chromium on two sample sets collected at each surface water site. In addition, Peabody collected water quality samples in April and October of 1987 at two points on the San Miguel River; 1) upstream of the confluence with Calamity Draw (San Miguel #2); and 2) downstream of the confluence with Tuttle Draw (San Miguel #1). The results of each silver and chromium analyses performed at each surface water monitoring site can be found in Attachment 2.04.7-11 (Peabody Appendix 7-9). The results of the additional analyses for silver and chromium showed that total recoverable chromium never exceeded 10 ug/l; and that silver exceeded 10 ug/l once each (20 ug/l at sites SW-N3 and SW-N7). Compared to standards adopted for the nearest applicable reach of the San Miguel River (Segment 5), all analyses for chromium (total recoverable) were well below the standard (25 ug/l). Unfortunately, the detection limit used by the laboratory for silver (total recoverable) was 10 ug/l, significantly higher than the standard (.1 ug/l).

With respect to Colorado Department of Health (CDOH) receiving stream standards (CDOH, 1983, revised 1986), Tuttle and Calamity Draws lie within the Stream Segment 12 of Region 10 of the San Miguel River. Because the listed parameters (physical and biological, only) are not applicable to both Tuttle and Calamity Draws, the nearest segment (downstream) in which applicable standards have been promulgated (Segment 5) are used to compare surface water quality of Calamity (SW-N103) and Tuttle Draws (SW-N3, NPDES 001 and NPDES 006).

Exceedences were observed at three sites: 1) iron at San Miguel #1 (downstream of Turtle Draw); 2) zinc and manganese at SW-N103; and 3) nickel at NPDES 006.

Based on the rigorous comparisons made, it is evident that water delivered by the West Lateral Irrigation Ditch is of sufficient quality for drinking water, agricultural use and livestock drinking water. This water originates from the San Miguel River upstream of Naturita, and is currently the primary source of water in the vicinity for the previously mentioned uses. Surface water in Calamity and Tuttle Draws, as well as the monitored tributaries, is not suitable for use as a source of drinking water. New Horizon has knowledge of irrigation being conducted using water from Calamity (Mr. Mel Statts, south of New Horizon Permit Boundary and bordering Calamity Draw). However, all surface water monitored at sites established in the New Horizon 2 area fall into suitability criteria for livestock drinking water and irrigation. Livestock and wildlife commonly use Calamity and Tuttle Draws as sources of drinking water. As long as the Colorado Co-operative Company continues to operate the ditch system, there will remain a sufficient supply of water well suited for domestic (drinking), agricultural and livestock use.

Hydrological Monitoring Program

New Horizon will report discharges associated with its CDPS permit (sediment pond discharges) in accordance with the Clean Water Act of 1977 on a quarterly basis to the Colorado Department of Public Health and Environment. Surface water and groundwater monitoring data (monitoring locations listed in the tables below) is reported to the Division in an annual hydrology report. Annual hydrologic reports for the period of October through

September of the following year will be submitted to the Division by December 31 of each year.

New Horizon monitors the following sites:

Sedimentation Ponds – Discharges associated with the sediment ponds will be monitored as required under New Horizon's CDPS Permit which is issued by the Colorado Department of Public Health and Environment. New Horizon will measure the quantity and quality of discharges from the permit area in compliance with the CDPS permit requirements. A copy of New Horizon's CDPS permit is available onsite for review as necessary.

Surface Water - Surface water sites will be monitored for the New Horizon mine at locations along Calamity Draw and Tuttle Draw.

Monitoring Type	Monitoring Location	Monitoring Frequency	Quarterly Field Parameters	Quarterly Laboratory Parameters
Surface Water	SW-N103	Quarterly	See List Below.	See List Below.
Surface Water	SW-N108	Quarterly	See List Below	See List Below.
Surface Water	SW-N1	Quarterly	See List Below	See List Below.
Surface Water	SW-N3	Quarterly	See List Below	See List Below.

1. SW-N103 is located on Calamity Draw and represents the downstream condition.
2. SW-N108 is located on Calamity Draw and represents the upstream condition.
3. SW-N1 is located on Tuttle Draw and represents the upstream condition above mining.
4. SW-N3 is located on Tuttle Draw and represents the downstream condition below mining.

Quarterly Surface Water Field Parameters

Temperature	Flow	pH	Conductivity

Quarterly Surface Water Laboratory Parameters

pH	Conductivity @ 25ºC	Total Dissolved Solids	Total Suspended Solids
Calcium (Ca^{+2})^{D}	Magnesium (Mg^{+2})^{D}	Ammonia (NH_3)	Nitrate-Nitrite^{D}
Sodium (Na^{+})^{D}	Sulfate (SO_4^{-})^{D}	Arsenic (As)^{TR}	Iron (Fe)^{TR}
Mercury (Hg)^{T}	Manganese (Mn)^{D}	Selenium (Se)^{D}	Zinc (Zn)^{TR}
Phosphorus (PO_4 as P)^{T}	Lead (Pb)^{TR}	Bicarbonate (HCO_3)	Sodium Absorption Ratio (SAR)
Chloride (Cl^{-})^{D}	Aluminum (Al)^{TR}	Cadmium (Cd)^{TR}	Copper (Cu)^{D}
D = Dissolved T = Total TR = Total Recoverable			

Groundwater –Groundwater sites will be monitored, including locations to monitor the coal, underburden, overburden, and alluvial aquifers at or adjacent to the mine.

Monitoring Type	Monitoring Location	Monitoring Frequency	Quarterly Field Parameters	Quarterly Laboratory Parameters
Groundwater	GW-N36	Quarterly	Water level, Temperature, pH, Conductivity	See Below
Groundwater	GW-N37	Quarterly	Water level, Temperature, pH, Conductivity	See Below
Groundwater	GW-N38	Quarterly	Water level, Temperature, pH, Conductivity	See Below
Groundwater	GW-N39	Quarterly	Water level, Temperature, pH, Conductivity	See Below
Groundwater	GW-N40	Quarterly	Water level, Temperature, pH, Conductivity	See Below
Groundwater	GW-N44	Quarterly	Water level, Temperature, pH, Conductivity	See Below
Groundwater	GW-N45	Quarterly	Water level, Temperature, pH, Conductivity	See Below
Groundwater	GW-N46	Quarterly	Water level, Temperature, pH, Conductivity	See Below

1. GW-N36 monitors the overburden aquifer and represents the up gradient condition.
2. GW-N37 monitors the Dakota coal aquifer and represents the up gradient condition.
3. GW-N38 monitors the underburden aquifer and represents the up gradient condition.
4. GW-N39 monitors the alluvial aquifer which represents the up gradient condition.
5. GW-N40 monitors the alluvial aquifer which represents the adjacent condition.
6. GW-N44 monitors the overburden aquifer and represents the down gradient condition.
7. GW-N45 monitors the Dakota coal aquifer and represents the down gradient condition.
8. GW-N46 monitors the underburden aquifer and represents the down gradient condition.

For the groundwater sites, water levels, field parameters, and laboratory analyses will be collected quarterly with the parameters listed below.

Quarterly Groundwater Laboratory Parameters

pH	Conductivity at 25°C	Total Dissolved Solids	Bicarbonate (HCO_3^-)^D	Calcium (Ca^{+2})^D
Magnesium (Mg^{+2})^D	Ammonia (NH_3)^D	Nitrate^D	Phosphate (PO_4^{-3} as P)^D	Sodium (Na^+)^D
Sulfate (SO_4^{-2})^D	Arsenic (As)^D	Iron (Fe)^D	Lead (Pb)^D	Manganese (Mn)^D
Mercury (Hg)^D	Selenium (Se)^D	Zinc (Zn)^D	Alkalinity	Alumium^D
Carbonate^D	Chloride^D	Nitrogen as Nitrate^D	Nitrogen as Nitrite^D	Iron^D
Lead^D	Molybdenum^D	Potassium	Sodium	Cation/Anion Balance
D = Dissolved				

Probable Hydrological Consequences

A discussion of the probable hydrologic consequences and reclamation plan are contained in Section 2.05.6(3) and Section 2.05.6(3)(b)(v) of the permit application document. The following discussion is intended to supplement the description of potential impacts of mining and mitigation of these potential effects. The determination of significance has been made considering the impact on the quality of the human environment, existing water uses, and the intended post mining land use of the area.

Interruption of Groundwater Flow and Drawdown

In order to develop the impact assessment for groundwater quantity, two different analyses techniques were utilized. First, pit inflow volumes were determined on an annual basis using an analytical approach developed by McWhorter, 1982. The second analysis involved the determination of annual pit inflow rates and annual drawdowns in the adjacent overburden and coal aquifers as a result of the pit inflows. This analysis utilized the USGS 3-dimensional finite-difference groundwater flow model MODFLOW.

Transient simulations were performed for a five-year period, using the maximum drawdown estimates for the overburden and coal. These drawdown results are expressed as a maximum at the pit and are expressed as a conical depression which results in decreased drawdown at further distance from the mine. For the overburden, the pit drawdown was 5 feet for years 1 and 2, 8 feet during year 3, 15 feet during year 4, and 30 feet during year 5. The drawdown for the coal simulation was 8 feet during year 1, 5.8 feet during year 2, 6 feet during year 3, 7.3 feet during year 4, and 8 feet during year 5. The zero impact contour for the overburden and coal after five years of mining is approximately 4,000 feet. The overburden and coal drawdown contours do not intersect any of the boundaries, therefore, no impact of the San Miguel River from drawdown in the deeper part of the overburden or coal is predicted. Shallow aquifer flow into Tuttle and Calamity Draws in the vicinity of the pit will be decreased, but will be offset by pumpage from the pit. Simulated average daily pit inflow for the coal and overburden aquifers varied from 1,255 cubic feet per day in year 1 to 5,604 cubic feet per day in year 5. New Horizon's approach to these potential impacts is to monitor the aquifers and discharge from the pit to determine the extent of drawdown. The hydrological monitoring program should provide reasonably accurate measurements of effects of mining. Should the monitoring show that impacts to the groundwater aquifers are precluding its use, New Horizon will provide alternate water sources of comparable quantity and quality. As described in the water augmentation plan, New Horizon has a 114 acre foot consumptive use right on the Highline Canal which would be used to mitigate the potential 26 acre foot impact on surface water right users from pit inflow drawdown.

Impact on Groundwater Rights

No surface or groundwater rights have been identified within the New Horizon 2 mine area. Therefore, there will be no direct impact from the approved mining plan on any local water rights.

Impact of Spoil Material on Groundwater Flow and Recharge

The mine pit will remain open only until the coal has been removed. Following the short-term water level decline on the groundwater system as a result of pumpage of groundwater inflow to the pit, a potential long-term impact to the local groundwater flow is the period of time necessary for resaturation of the spoil material and reestablishment of a flow gradient. Spoil material at the New Horizon 2 mine will be replaced using techniques which will restore permeabilities of the material. Thus, the mining operation will not diminish vertical or horizontal permeabilities but may increase these permeabilities. As a result, there should be no significant impacts from the mining operation on groundwater flow and recharge rates. The time period required for the spoil material to resaturate should be greatly reduced because of the irrigation recharge as the mined area will be revegetated for an irrigation type of post mining land use.

Containment of Pit Inflow and Impacts on Water Quality

All runoff and pit pumpage from disturbed areas will be routed through sedimentation pond 007. The pond is designed and constructed to impound runoff and pit pumpage from areas disturbed by mining and provide sufficient residence time to insure that the pond discharge water chemistry meets the effluent requirements specified in the NPDES Permit. A review of the chemical and flow data indicates that the potential for any discharge from Pond 007 to exceed receiving stream or federal standards is minimal. Past history of mine operations at the Nucla Mine indicate very few exceedances of the standards over the years of operations. As previously discussed, highest pit inflow is predicted to occur in year 5 at approximately 5,600 cubic feet per day. To assess the impact of this inflow on Calamity Draw and the San Miguel water quality, it was assumed that the entire flow was discharged and that the TDS level for the overburden aquifer was representative of the chemical load. The duration of the water quality impacts is relatively short term (5 years) and the significance of the impact is negligible as TDS increases in the range of 0.08 to 1.5 percent are projected on the San Miguel River and Calamity Draw, respectively. These increases in TDS will be additional magnesium/sodium-sulfate type water which may result in a slight increase in salinity. These projected changes in TDS levels will in no way affect the present and potential uses of the surface water and are so small that they may not be measurable.

Impact of Spoil Water Quality on the Ground and Surface Water Quality

The available data indicate that a small proportion of the overburden may produce acid through the oxidation of pyrite. Based on laboratory tests on overburden cores, calcite is almost ubiquitous. Calcite serves two functions. First, it buffers the pH of the water, which overall tends to slow the oxidation of pyrite, slowing the production of acid. Second, it will neutralize the acid that is produced. The core samples that exhibited low paste pH's are surrounded by non-acid producing, calcite-bearing rocks. The water that contacts the low-paste pH materials will have first reacted with calcite, and therefore developed a pH-buffer capacity of its own. The groundwater monitoring data indicate that mixed overburden and interburden waters have near neutral pH's.

Sample pH's less than 6 are associated only with the lower Dakota coal. Where the coal's permeability is high enough to produce about 5 gpm during sampling, the acid-producing reactions do not appear to be fast enough to maintain the pH of the water less than 5. Oxidation rates may increase because of the mining process. However, the supply of oxidation is only one of the constraints on the production of acid. Other constraints are imposed by the quantity of calcite present, and the reactivity of the pyrite. The paste-pH test, conducted under oxidizing conditions, indicates that a very small proportion of the overburden is likely to produce acid. The acid that is produced will be quickly neutralized. During the mining process, New Horizon will test the overburden and if acidic layers are encountered, they will be mixed with non-acidic layers to neutralize any acid forming effects.

Potential Impacts of Replaced Spoil on Groundwater Quality

The analysis of geochemical controls on groundwater quality suggests that the water chemistry and concentrations of most elements of concern are controlled by mineralogic reactions that will resist changes in water chemistry. Production of acid may occur in very local settings and is probably most prevalent in the coal, which will be mined. Calculations indicate that neutralization of the acid will occur rapidly with mixing of water, or with movement of acidic water into calcite-bearing rocks. Also, the analysis conducted indicates that chemical changes are not likely to occur.

Effects of Mining on the Local Geomorphology

Impacts from mining on the local geomorphology will be long term, but appear to be of minimal significance. The reestablished reach of the drainage which will be mined will result in a shorter, slightly steeper stream channel. The potential for increased sediment loads in the drainage (once pond 007 is removed) should be offset by the stable banksides and the relatively small change in overall gradient. The increased runoff and consequent erosion potential on disturbed basins in the mining area due to the temporary loss of topsoil stricture should be of minimal significance. Contour ripping, mulching and revegetation have been demonstrated to minimize soil erosion and will be used to mitigate the increased runoff potential until the topsoil structure is developed.

Effects of Sediment Ponds on Channel Characteristics and Downstream Users

Potential impacts of sediment pond 007 on downstream users will involve possible reductions in flow due to impounded water. The water augmentation plan discusses the available water which will be used should impacts be identified. New Horizon currently has rights to a sufficient quantity of water to supply all users associated with the mining activities, plus an additional quantity of water that can be used to mitigate any impact to downstream users.

Effects of Sediment Pond Discharge on Surface Water Quality

The effects of sediment pond diversions on surface water quality will be negligible because the

structure has been designed to minimize impacts to the hydrologic balance. The diversion involves such minor areas of disturbance that chemical and sediment changes in the flows will be unmeasurable.

Effects of Runoff from Reclaimed Areas on the Quality of Streamflow

Due to the relatively small area of disturbance in the New Horizon 2 mining area, any reductions in runoff will have only a minimal impact on streamflow quantity, as flow in Calamity Draw is dominated by irrigation return flow. Decreased sediment loads predicated by SEDCAD+ indicate that reclamation efforts conducted in the mining area will ensure that additional contributions of suspended sediment in runoff from reclaimed areas will not occur. Effects of runoff from reclaimed areas on the quality of streamflow. Based on past operating history at the Nucla Mine, no significant trend toward higher concentrations of the selected parameters have been detected. In addition, the pond discharge will be monitored in accordance with NPDES discharge limitations and any potential impact will be identified. Therefore, runoff from the reclaimed area should have no significant impact over time on the quality of receiving stream water quality. As a result, post mining land uses which currently occur in the area should not be affected due to the mine plan which has been approved.

Summary

The discussion presented herein of the probable hydrologic consequences of the revised mine plan approved by New Horizon identifies the potential effects of mining. Table 2.05.6(3)-1 summarizes the discussion by listing the probable hydrologic consequences and the results of the analysis of each. As can be seen, all of the probable impacts have been determined to be of a short term nature, of minimal significance, or a plan has been presented to mitigate those determined to have some significance. As a result, mining and post mining affects to current land uses should be negligible.

Map 2.04.7-1A has been updated to differentiate between active and non-active wells. They are also marked with their current status. They have been distinguished by both color and symbol. Attachment 2.04.7-2 has the lithologic logs for wells GW-N41 through GW-N46. A new attachment titled Attachment 2.04.7-4 to display the current status and baseline data of all ground water wells of both New Horizon #1 and #2 Mines has been created to include data for all wells. Since the N41 through 46 hole logs were slightly different, it was decided to keep this attachment.