



November 12, 2021

Ben Moline, PE
Senior Manager, Water Resources & Environmental Compliance
Coors Energy Company
P.O. Box 4030
Golden, CO 80402

**Re: Keenesburg Strip Mine, Permit C-1981-028
Adequacy Review of 2020 Annual Hydrology Report (AHR)**

Dear Mr. Moline:

The Division received the 2020 AHR for the Keenesburg Strip Mine on March 5, 2021. The Division reviewed this AHR in the context of Rules 4.05.1, 4.05.6, 4.05.11, and 4.05.13 (Regulations of the Colorado Mined Land Reclamation Board for Coal Mining). Table 1 lists important logistical requirements of the Keenesburg Strip Mine water monitoring plan, and indicates no issues with the 2020 AHR.

Table 1. Requirements of the Keenesburg Strip Mine Water Monitoring Plan

| Requirement | Source of Requirement (Rule or Page in PAP) | Requirement met for 2020? |
|---|--|--|
| Filing frequency of AHR - annually | Rule 4.05.13(4)(c) | Yes |
| Timely filing of AHR – submitted by end of February each year | Page 117 of PAP | No, but an extension was granted by DRMS |
| <u>Surface water</u> monitoring | Not required | NA |
| <u>Groundwater</u> monitoring - sites sampled and sampling frequency | Page 56 of PAP | Yes |
| <u>Groundwater</u> monitoring - parameters sampled | Page 57 of PAP | Yes |

Two down gradient wells were assessed for mining impacts:

- AMW-1, which is just north and down gradient of the B Pit area
- DH-96, which is approximately 0.7 mile north of the facilities area.

Regarding Total Dissolved Solids (TDS), the 2020 data did not reveal that the Keenesburg Strip Mine is causing negative impacts on groundwater quality. Upgradient concentrations at well PC-2 are much higher than downgradient concentrations at wells DH-96 and AMW-1.

To determine possible issues with mining impacts on groundwater quality (for parameters other than TDS), data in the 2020 AHR for the Keenesburg Strip Mine were compared to water quality standards.



The groundwater regulations used for this AHR review are Regulation 41 (Colorado Department of Public Health and Environment (CDPHE), revised June 2020). These regulations include domestic supply and agricultural standards. The following table lists parameters and concentrations from these wells that are exceedances of Regulation 41 standards.

Table 2. Exceedances in 2020 Data at Down Gradient Wells (concentrations in mg/L)

| | | Manganese, dissolved | Selenium, dissolved | Sulfate |
|--------------------------------|------------------------------|---------------------------------|--------------------------------|----------------|
| <i>Regulation 41 Standard:</i> | | <i>0.05</i> | <i>0.020</i> | <i>250</i> |
| Sample Location | Month of Sampling | | | |
| AMW-1 | April | NA | 0.021 | 710 |
| AMW-1 | September | NA | 0.029 | 824 |
| DH-96 | April | 0.32 | NA | 736 |
| DH-96 | September | 0.52 | NA | 729 |

The data from the two down gradient wells was compared to data from three upgradient wells: AMW-2, PC-1, and DH-122.

For dissolved manganese, the 2020 values at AMW-2 are greater than at the down gradient wells (3.4 mg/L in April and 3.48 mg/L in September). Concentrations at DH-122 (0.337 mg/L in April 2020 and 0.473 mg/L in September 2020) are not as high as at AMW-2, but they are still over the standard and are comparable to the DH-96 concentrations. Mining impacts from the Keenesburg Strip Mine do not appear to be causing an issue with dissolved manganese in groundwater at or near the site.

For dissolved selenium, the exceedances at AMW-1 are barely over the standard of 0.02 mg/L (agricultural standard). Also, the data at DH-96 do not indicate a problem with this parameter. Furthermore, the data for upgradient well PC-1 indicates higher concentrations (0.076 mg/l and 0.091 mg/l) than the downgradient data. Mining impacts from the Keenesburg Strip Mine do not appear to be causing an issue with dissolved selenium in groundwater at or near the site.

For sulfate, the concentrations from AMW-2 (3,490 mg/l and 3,710 mg/L) are much higher than the concentrations in Table 2. Concentrations at DH-122 (908 mg/l and 953 mg/L) are also higher than in the down gradient wells. For sulfate, baseline concentrations for groundwater at Keenesburg can be found in Appendix I-1 of the PAP (report by D.B. McWhorter and N. Ortiz of Colorado State University, 1978). These concentrations are very high (seven sites had concentrations ranging from 440 to 3,600 mg/L when converted from milliequivalents per liter), and this data further supports the idea that high sulfate concentrations are not caused by mining.

If you have any questions, please do not hesitate to contact me at Rob.Zuber@state.co.us or 720.601.2276. I look forward to your response.

Regards,

A handwritten signature in blue ink that reads "Robert D. Zuber". The signature is written in a cursive style with a large initial "R" and "Z".

Robert D. Zuber, P.E.
Environmental Protection Specialist