COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

December 27, 2019

Basil Bear
Bowie Resources, LLC
P.O. Box 1488
Paonia, CO 81428

Re: Bowie No. 1 Mine, Permit C-1981-038,
Review of 2018 Annual Hydrology Report

Dear Mr. Bear:

The Division received the 2018 AHR for the Bowie No. 1 Mine on May 14, 2019. 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 Bowie No. 1 Mine water monitoring plan, and indicates if the requirement was met with the 2018 AHR.

Table 1 Requirements of the Bowie No. 1 Mine Water Monitoring Plan

Requirement	Source of Requirement (Rule or Page in PAP)	Requirement met for 2018?
Filing frequency of AHR - annually	Rule 4.05.13(4)(c)	Yes
Timely filing of hydrology report – submitted by April 30th each year	Section 2.05.6 of the Bowie No. 1 Mine PAP, page 120	No[1]
Sites sampled and sampling frequency at surface water monitoring sites	Volume 4 of PAP, Tables 1 and 2	**No**
Parameters sampled at surface water monitoring sites	Volume 4 of PAP	Yes
Sites sampled and sampling frequency at groundwater monitoring sites	Volume 4 of PAP, Tables 3 and 4	**No**
Parameters sampled at groundwater monitoring sites	Volume 4 of PAP	Yes

1. The submittal was late, but this had been agreed upon with the Division, and it was only two weeks late.

It is not clear to the Division why there are fewer than four quarters of data for some sites (e.g., S1010 and SP1305), yet the sampling plan indicates that sampling will be done quarterly. Also, it is unclear why no lab data is listed for SW06 in 2018. Please explain.

Key receiving waters at the Bowie No. 1 Mine are Stevens Gulch and East Roatcap Creek. An analysis of data for the downstream sampling locations for these receiving waters were a primary focus of this AHR review.

Analysis of Surface Water Data – Stevens Gulch

At the downstream sampling site, SW05, no data was collected on three dates because the site was dry. On one date (March 29, 2018) only field data was collected, and this is shown in the following table along with standards from Regulation 35 (Segment 6b.).

Table 2. 2018 AHR Data from SW-05 Sampling Site in Stevens Gulch

Parameter	Units	Concentration in 2018 AHR (3/29/2018)	CDPHE Standard	Comments
pH	su	8.35	6.5 - 9.0	Standard includes low limit and high limit.
Temperature	deg C	6.9	28.6	WS-III standard for non-winter months.
Conductivity	umhos/cm	1,184	none	

The Total Dissolved Solids (TDS) guideline of 750 mg/L (Banta, 1988) can be roughly converted to conductivity using a factor of 1.49 (references include Bauder, et al.). This translates to a conductivity guideline of 1,119 umhos/cm. As this is a guideline, and the recorded value is only slightly higher, the Division finds this to be a site that warrants continued scrutiny for this parameter, but it is not considered problematic.

Analysis of Surface Water Data – East Roatcap Creek

At the downstream sampling site, SW06, only field data was collected, and maximum values are shown in the following table along with standards from Regulation 35 (Segment 5b.). Also, the minimum value is shown for pH. **(As noted above, it is unclear why no lab data is listed in the AHR for 2018.)**

Table 3. 2018 AHR Data from SW06 Sampling Site in East Roatcap Creek

Parameter	Units	Maximum Concentration from 2018	Minimum Concentration from 2018	CDPHE Standard	Comments
pH	su	8.56	7.98	6.5 - 9.0	Standard includes low limit and high limit.
Temperature	deg C	12.5	NA	17.0	CS-II standard for non-winter months.
Conductivity	umhos/cm	907	NA	none	

The Division finds that these field data are not problematic.

Analysis of Springs Data

The 2018 AHR contains data for several springs, but there is no lab data for water quality parameters due to dry conditions.

Analysis of Groundwater Data

The 2018 AHR includes groundwater data for three alluvial wells: MW01, MW02, and MW03. MW03 is the primary down-gradient well monitored at the site, and the Division review focused on the data for that well. A comparison to Regulation #41 of the CDPHE Water Quality Standards revealed no exceedances.

References

- Banta, 1988, "A Description of the Material Damage Assessment Process Pertaining to Alluvial Valley Floors, Surface Water, Ground Water and Subsidence at Coal Mines."
- Bauder, T.A., R.M. Waskom, P.L. Sutherland, and J.G. Davis, Colorado State University Cooperative Extension, revised 2014, "Irrigation Water Quality Criteria," Fact Sheet Number 0.506.
- CDPHE, Regulation No. 35 - Classifications and Numeric Standards for Gunnison and Lower Dolores River Basins.
- CDPHE, Regulation No. 41 - The Basic Standards for Groundwater.

Thank you,

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

Cc via email: Tamme Bishop, J.E. Stover & Associates, Inc.