STATE OF COLORADO

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Bowie No. 2 AHR review

1 message

Zuber - DNR, Rob <rob.zuber@state.co.us> Mon, Aug 3, 2020 at 2:53 PM
To: Basil Bear <basilbear@wolverinefuels.com>, Tamme Bishop <tamme.jestover@bresnan.net>

Hello, Basil and Tamme

Please see attached letter.

Regards,
Rob

Rob Zuber, P.E.
Environmental Protection Specialist II
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COLORADO
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COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

August 3, 2020

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

Re: Bowie No. 2 Mine, Permit C-1996-083,
Review of 2019 AHR

Dear Mr. Bear:

The Division received the 2019 AHR for the Bowie No. 2 Mine on May 11, 2020. 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. 2 Mine water monitoring plan, and indicates if the requirement was met with the 2019 AHR.

Table 1 Requirements of the Bowie No. 2 Mine Water Monitoring Plan

Requirement	Source of Requirement (Rule or Page in PAP)	Requirement met for 2019?
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 of the Bowie No. 2 Mine PAP, page 136	No[1]
Sites sampled and sampling frequency at surface water monitoring sites	Section 2.05 of PAP, pages 124 - 131	Yes
Parameters sampled at surface water monitoring sites	**Section 2.05 of PAP, page 135**	**No**
Sites sampled and sampling frequency at groundwater monitoring sites	Section 2.05 of PAP, pages 124 - 131	Yes
Parameters sampled at groundwater monitoring sites	Section 2.05 of PAP, page 134	Yes

1. The submittal was late, but this had been agreed upon with the Division.

Names of some sites are unclear. On the page for S-2 (Table 15), the name is Freeman Gulch rather than J&M Spring as in the PAP (page 2.05-128). Similar issues are apparent with other springs as well (e.g., S-4, S-5b, and S-16). Please explain.

It is not clear to me why some parameters in the surface water list in the Hydrologic Monitoring Plan of the PAP are not included in the 2019 AHR data.

- In the data for SP-20 (Table 8), laboratory analysis was conducted for the May sample but not the August sample when flow was greater than 5 gpm. Please explain.

- Dissolved Oxygen was not analyzed for the Deer Trail, Fire Mountain Canal, or North Fork sites. Please explain or perform these analyses for these sites later this year.
- Oil and Grease and Phosphate were not analyzed for Deer Trail sites. Please explain or perform these analyses for these sites later this year.
- Dissolved iron and other parameters are missing from the dataset for SW-01. Please explain or perform these analyses for these sites later this year.

Key receiving waters at the Bowie No. 2 Mine are the North Fork of the Gunnison River, Deer Trail Ditch, and Hubbard Creek. These receiving waters are key because they contain significant flows (they are not ephemeral) and they are potentially impacted by the mine (CDPS outfalls drain to them). An analysis of water quality data for the downstream sampling locations for these receiving waters were a primary focus of this AHR review. The Division has made the assessment that flow data does not need to be reviewed for the purposes of this AHR, because the operation at the Bowie No. 2 Mine are highly unlikely to have a significant impact on water quantity in the tributaries, and certainly not on the river itself.

Analysis of Surface Water Data – North Fork of the Gunnison River

Data for the downstream sampling site, NFG-low, was reviewed to identify any potential water quality issues by comparing the data to CDPHE standards. The following table includes a comparison of 2019 AHR data and standards from Regulation #35 (Segment 2.) of the CDPHE Water Quality Standards. For the sake of brevity, the table includes only parameters with data above the detection limit in 2019 that also have CDPHE standards.

Table 2. 2019 AHR Data from NFG-low Sampling Site in the River

Parameter	Units	Maximum Concentration in 2019 AHR	CDPHE Standard	Comments
pH	su	8.8	6.5 - 9.0	Standard includes low limit and high limit. No values below 6.5 in 2019.
Temperature	deg C	18.5	28.6	Standard for non-winter months.
Chloride	mg/L	1.6	250	
Nitrate	mg/L	0.047	10	
Sulfate	mg/L	13.5	250	
Iron, TREC	mg/L	0.795	1.0	
Iron, dissolved	mg/L	0.062	0.3	
Manganese, dissolved	mg/L	0.0069	0.05	

Table 2. does not indicate any water quality problems in the North Fork of the Gunnison River in 2019.

Analysis of Surface Water Data – Deer Trail Ditch

Data for the downstream sampling site, Deer-low, was reviewed to identify any potential water quality issues. The data for this site was compared to CDPHE standards. Because Deer Trail is an irrigation ditch, rather than a natural receiving water, the emphasis is on agricultural standards rather than standards for fish, other aquatic life, recreation, or domestic water.

The following table includes a comparison of 2019 AHR data and standards from Regulation #31 of the CDPHE Water Quality Standards.

Table 3. 2019 AHR Data from Deer-low Sampling Site in Deer Trail Ditch

Parameter	Units	Maximum Concentration in 2019 AHR	CDPHE Agricultural Standard	Comments
Cyanide	mg/L	< DL	0.2	
Nitrate	mg/L	0.1	100	
Nitrite	mg/L	< DL	10	
Boron	mg/L	< DL	0.75	
Arsenic, TREC	mg/L	< DL	0.1	
Cadmium, TREC	mg/L	< DL	0.01	
Chromium III, TREC	mg/L	< DL	0.1	
Chromium VI, TREC	mg/L	< DL	0.1	
Copper, TREC	mg/L	< DL	0.2	
Lead, TREC	mg/L	< DL	0.1	
Manganese, TREC	mg/L	0.166	0.2	
Molybdenum, TREC	mg/L	< DL	0.3	
Nickel, TREC	mg/L	< DL	0.2	
Selenium, TREC	mg/L	< DL	0.02	
Zinc, TREC	mg/L	0.0337	2.0	

1. "DL" equals detection limit.
2. "TREC" equals total recoverable.

Table 3. does not indicate any water quality problems in Deer Trail Ditch in 2019.

The Total Dissolved Solids (TDS) values for Deer-low in 2019 are 146 mg/L and 156 mg/L. These values are well below the commonly-used guideline of 750 mg/L (Banta, 1988).

Analysis of Surface Water Data – Hubbard Creek

Data for the downstream sampling site, HUB-low, was reviewed to identify any potential water quality issues by comparing the data to CDPHE standards. The following table includes a comparison of 2019 AHR data and standards from Regulation #35 (Segment 5a.) of the CDPHE Water Quality Standards. The table for Hubbard Creek includes only parameters with data above the detection limit in 2019 that also have CDPHE standards. This is for the sake of brevity, since Hubbard Creek data is compared to all standards, not just Agriculture standards as in Deer Trail.

Table 4. 2019 AHR Data from HUB-low Sampling Site in Hubbard Creek

Parameter	Units	Maximum Concentration in 2019 AHR	CDPHE Standard	Comments
pH	su	8.4	6.5 - 9.0	Standard includes low limit and high limit. No values below 6.5 in 2019.
Temperature	deg C	15.7	28.6	Standard for non-winter months.
Chloride	mg/L	0.63	250	
Sulfate	mg/L	3.6	250	
Iron, TREC	mg/L	0.87	1.0	
Iron, dissolved	mg/L	0.16	0.3	

For the parameters in the table, the concentrations for sampling point HUB-low indicate no problems related to standards from Regulation 35 (Segment 5a.).

The TDS value for the HUB-low sample from June 5, 2019 was 85 mg/L, well below the guideline of 750 mg/L.

Analysis of Groundwater Data

The Division review of alluvial groundwater data focused on three down-gradient sites: AW-1, AW-11, and AW-14. The data were compared to water quality standards in Regulation #41 of the CDPHE Water Quality Standards. For the sake of brevity, the following table includes only parameters with data above the detection limit in 2019 that also have CDPHE standards.

Table 5. 2019 AHR Data from Key Down-Gradient Alluvial Wells

Parameter	Units	AW-1[1]	AW-11[1]	AW-14[1]	CDPHE Standard	Comments
pH	su	7.8	7.9	7.7	6.5 - 8.5	Standard includes low limit and high limit. No values below 6.5 in 2019.
Chloride	mg/L	178	No data	91.6	250	
Sulfate	mg/L	**1,620**	No data	**505**	250	
Arsenic	mg/L	**0.05**	No data	< DL	0.01	
Iron, dissolved	mg/L	< DL	No data	0.05	5	

1. Maximum concentrations from 2019 data in AHR.
2. For AW-11, only pH data was available (from field measurement). BRL reported that there was too little water in well for a sample to send to the laboratory.

Dissolved Manganese values were not assessed because the standard is only applicable when irrigation water is applied to soils with pH values lower than 6.0, and it has been determined that soils adjacent to the North Fork of the Gunnison River typically have higher pH values, often over 7.0. This was based on an assessment of the Natural Resources Conservation Service (NRCS) Web Soil Survey.

High sulfate values (above the standard of 250 mg/L) were detected for AW-1 and AW-14. However, the baseline data for AW-1 indicates extremely high sulfate values (average of 5,220 mg/L), indicating that these high values in recent data are not the result of mining.

A dissolved arsenic value for AW-1, 0.05 mg/L, is above the standard of 0.01 mg/L. Per the AW-1 data in Table 107 of the 2019 AHR, this is a common occurrence, as the average concentration during the period of operation of the mine is 0.09 mg/L. The baseline data in Table 107 shows much lower concentrations, with an average and maximum of 0.001 mg/L. Therefore, this is a potential water quality issue caused by operations at the Bowie No. 2 Mine. **Please provide a discussion of this parameter in the context of the data and the CDPHE standard.**

For TDS, Regulation 41 states that concentrations should not exceed 1.25 times the background. The following list discusses baseline averages and 2019 sample values for the three key wells, and I conclude that TDS is not an issue with these wells.

- For AW-1, the baseline average is 8,200 mg/L, and the one 2019 concentration is well below baseline at 3,240 mg/L.
- For AW-11, the baseline average is 553 mg/L. For 2019, no values were recorded due to lack of water.
- For AW-14, no baseline data is available because the area was disturbed by mining prior to establishment of the sampling location. It is worth noting, however, that the one concentration from 2019 for this well, 1,230 mg/L, is very close to the operational average for this well, which is 1,195 mg/L.

Based on past experience, bedrock wells were not analyzed due to a lack of potential mining impacts.

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."
- 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.