

WATER QUALITY MEMORANDUM

Utah Coal Regulatory Program

February 19th, 2017

TO: Internal File

THRU: Daron Haddock, Permit Supervisor

FROM: Steve Christensen, Environmental Scientist 

RE: 2016 2nd Quarter Water Monitoring, West Ridge Resources, West Ridge Mine, Task ID #5349

The West Ridge Mine is currently operational in the Book Cliff Mountain range of Carbon County, UT. Water monitoring data is submitted quarterly to the Division EDI database. Beginning on page 7-36 of the approved Mining and Reclamation Plan (MRP), water monitoring protocols and sampling requirements are provided for surface water, ground water, monitoring wells and UPDES outfalls in Tables 7-1, 7-2, 7-3 and 7-4 respectively.

1. Was data submitted for all of the MRP required sites? YES NO

Springs

The approved MRP outlines the monitoring of 8 springs (SP-8, SP-12, SP-13, SP-101, SP-0102, Road Spring, Section 5 Spring and SP-80). Two of the monitored springs (SP-12 and SP-13) discharge from the lower slopes of West Ridge in Whitmore Canyon. Spring SP-8 discharges in the upper drainage of C Canyon. Hanging Rock Spring (S-80) is located near the northwest corner of the permit area and discharges from the east slopes of Whitmore Canyon.

All spring sites were accessible this quarter. With the exception of Road Spring and Spring SP-80, all springs produced a measurable flow that could be sampled. Road Spring and SP-80 did not report an observable flow.

Streams

The approved MRP outlines the monitoring of nine stream sites (ST-3, ST-6, ST-8, ST-15, Patterfore, LF-1, LF-2, RF-1 and RF-2). Until the 2nd quarter of 2011, the surface water monitoring plan had included twelve stream monitoring sites; however, an amendment was submitted and approved by the Division (Task ID #3738) in March of 2011 that eliminated five of the sites. The amendment eliminated the monitoring of ST-5, ST-6A, ST-7, ST-11, ST-12 and ST-13. As a result, the monitoring of these stream sites was discontinued the 2nd quarter of 2011.

Grassy Trail Creek is the only intermittent/perennial stream in the permit and adjacent areas.

The upper drainages of Grassy Trail Creek (i.e. the Left and Right Fork) are monitored quarterly. Four monitoring sites have been established on the Left Fork (LF-1, LF-2, ST-3 and ST-15). Monitoring sites LF-1 and LF-2 are flume sites where continuous monitoring data is obtained during mid- to high-flow periods. During the late summer months, the flows of the Left and Right Forks of Whitmore Canyon decrease to a volume that cannot be measured accurately by the flumes. Site ST-15 monitors flow from the Spring Canyon drainage (tributary to the Left Fork).

Three monitoring sites have been established on the Right Fork (RF-1, RF-2 and Patterfore Stream). RF-1 and RF-2 are flume sites where continuous monitoring data is obtained during mid- to high-flow periods. The Patterfore Stream is a tributary to the Right Fork and was established as a monitoring site in the spring of 2011 in order to obtain additional data on the Right Fork drainage.

Continuous flow readings on the Left and Right Forks of Whitmore Canyon (LF-1, LF-2, RF-1 and RF-2) are typically not possible to obtain during the 1st and 4th quarters of the year due to flow volumes below the accuracy of the flumes and/or due to the inability to access the site due to snow conditions. Flows are typically obtained during the high-flow (late spring/early summer months i.e. 2nd quarter) and during the summer (3rd quarter) when flows are of sufficient volume to produce an accurate measurement (given the limitations of the flume).

Data was provided for Patterfore Stream, RF-1, RF-2, ST-3, ST-8, LF-1 and LF-2. ST-15 and ST-6 did not report a measurable flow.

Wells

Quarterly operational sampling is required for one groundwater-monitoring well (Site DH 86-2). Monitoring well DH 86-2 was sampled during this quarter.

Underground Mine-Water Sample (UG-1)

The underground mine-water sampling point was not accessible during March the 1st quarter of 2016. Zero flow was reported for 2nd and 3rd quarter 2016. As mining has ceased, the pumps and water treatment are no longer operational.

UPDES

Operational sampling is required monthly for two active UPDES sites (Permit # UT0025640). Site D001 is the mine sites primary sediment pond discharge to the ephemeral 'C' Canyon drainage. Site D002 is the mine-water discharge to the ephemeral 'C' Canyon drainage.

Specific limitations and self-monitoring requirements as outlined in the UPDES permit are presented in the table below:

Effluent Characteristics	Effluent Limitations
Flow, MGD (million gallons per day)	1.0
Total Suspended Solids (TSS), ppm	70
Total Iron, ppm	1.0
Oil & Grease, ppm	10
Total Dissolved Solids (TDS), ppm	2,000
pH	9

None of the outfalls reported a discharge this quarter. As mining has ceased at the mine, the Permittee is no longer pumping water from the mine.

2. **Were all required parameters reported for each site?** YES NO

3. **Were any irregularities found in the data?** YES NO

Surface Water Monitoring Sites-

Stream monitoring site RF-1 had reported a reduced field dissolved the 2nd and 3rd quarters. A reduced field dissolved oxygen reading was again reported for the 4th quarter of 2015. RF-1 could not be accessed this quarter the 1st quarter of 2016.

LF-1 could not be accessed the 1st quarter of 2016 due to snow conditions. Reduced concentrations for D-Mg, D-Na, SO₄, and T-Cations were reported the 2nd quarter of 2016. LF-2 reported an elevated TSS concentration for the 2nd quarter of 2016 (65 ppm versus the mean of 18.60 ppm).

Monitoring site ST-8 reported several elevated concentrations during the 3rd quarter of 2015 (dissolved magnesium, sulfate, total hardness, total dissolved solids and total cations). Flow at site ST-8 was insufficient to collect a sample during the 4th quarter of 2015 and the site was inaccessible this quarter..

Stream monitoring site LF-2 reported elevated concentrations for water temperature, field conductivity, total suspended solids and dissolved calcium during the 3rd quarter of 2015. No observable flow was noted at LF-2 during the 4th quarter of 2015. The site could not be accessed for sampling this quarter.

UPDES Sites- (UPDES Permit #UT0025640)

Neither of the two UPDES sites reported a flow each month of this quarter.

Spring Monitoring Sites

None of the spring monitoring sites could be accessed this quarter due to snow and ice conditions during the 1st quarter of 2016.

The Section 5 spring has reported a higher than normal flow value for the first three quarters of 2015. A reported flow of 14 gpm was reported (3.69 standard deviations from the average of 2.35 gpm) during the 4th quarter of 2015. The site could not be accessed during the 1st quarter of 2016. Section 5 spring reported reduced concentrations for D-Mg, D-K, D-Na, Cl and TDS. A flow of 200 gpm was reported which is 10 standard deviations from the mean of 2.35 gpm.

Spring SP-101 reported an elevated temperature reading the 2nd quarter of 2016.

Spring monitoring site SP-102 recorded an elevated temperature reading the 2nd quarter of 2016.

Spring monitoring site SP-8 reported a reduced concentration for dissolved calcium (46.31 ppm versus the average of 75.40 ppm) during the 3rd quarter of 2015. SP-8 could not be accessed during the 3rd or 4th quarter of 2015 and the 1st quarter of 2016. A slightly elevated concentration for D-K was reported the 2nd quarter of 2016.

Spring monitoring site SP-12 reported reduced concentrations for numerous parameters for the 3rd quarter of 2015 (dissolved magnesium, dissolved sodium, total alkalinity, bicarbonate and total anions). The site could not be accessed during the 4th quarter of 2015 or the 1st quarter of 2016 due to snow and ice conditions. During the 2nd quarter of 2016, SP-12 reported a significant increase in flow (250 gpm versus the average of 0.86 gpm). Additionally, reduced concentrations were reported for D-Mg, D-Na, SO₄, total alkalinity, total hardness, TDS, bicarbonate and total cations/anions.

Monitoring Well DH 86-2

Monitoring well DH 86-2 did not report any water quality parameters outside two standard deviations from the mean the 2nd quarter of 2016.

Underground pre-treatment mine water sample (UG-1)

The reported field dissolved oxygen reading was slightly elevated for the month of November 2015. An elevated field dissolved oxygen reading was again reported the 1st quarter of 2016. The reported value of 6.7 mg/L is 2.82 standard deviations from the mean of 2.92 mg/L. No observable flow was reported for all of 1st quarter 2016.

4. On what date does the MRP require a five-year re-sampling of baseline water data.

On page 7-36 of the approved MRP, the Permittee commits to collecting baseline samples “from each spring in the monitoring program during the low flow (fall) sampling and from each stream monitoring sites during low flow every five years beginning with the first mid-term review.”

Baseline sampling of ground and surface water sites will be required during the 3rd quarter of 2016.

5. Based on your review, what further actions, if any, do you recommend?

Continue to monitor the data irregularities cited above for any trends.

6. Does the Mine Operator need to submit more information to fulfill this quarter's monitoring requirements?

YES

NO

7. Follow-up from last quarter, if necessary.

YES

NO