WATER QUALITY
M E M O R A N D U M

Utah Coal Regulatory Program

March 24th, 2015

TO: Internal File

THRU: Daron Haddock, Permit Supervisor

FROM: Steve Christensen, Environmental Scientist

RE: 2014 3rd Quarter Water Monitoring, West Ridge Resources, West Ridge Mine, Task ID #4681.

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.

Data was submitted for all 8 of the spring monitoring sites. Road Spring and SP-80 did not produce a measurable 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.

Data was submitted for all but three of the nine stream monitoring sites. ST-3, ST-8, ST-15 and LF-2 did not produce a measurable flow this quarter.

Continuous flow readings on the Left and Right Forks of Whitmore Canyon (LF-1, LF-2, RF-1 and RF-2) were submitted for this quarter. 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).

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)

Monthly samples of the underground, pre-treatment mine water are required. The requirement was established on August 24th, 2010.

The required monthly samples were submitted for this quarter.

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

Outfall 001 did not report a discharge this quarter. Data was submitted for UPDES Outfall 002.

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

Spring Monitoring Sites: All required data was reported for the spring monitoring sites.

Surface Water Monitoring Sites: Of the stream monitoring sites that had a measurable flow, the required data was submitted to the Division.

Well Monitoring Site DH 86-2: The monitoring well was sampled this quarter. The required data was submitted with the exception of water level depth.

UG-1: All required parameters were reported for underground mine-water monitoring site UG-1.

UPDES: Outfall 001 did not report a discharge this quarter. The required water quality data was reported for Outfall 002 was reported.

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

Surface Water Monitoring Sites-

Stream monitoring site RF-1 reported a slight decrease in field dissolved oxygen. RF-2 reported reduced concentrations for D-Ca and T-Hdns. Additionally, stream monitoring site ST-6 reported reductions for several parameters (D-Mg, D-K, D-Na, SO4, T-Alk, bicarbonate and total anions and cations. LF-1 had slightly elevated concentrations for D-K and D-Na.

UPDES Sites- (UPDES Permit #UT0025640)

Site D001- UPDES outfall D001 (primary sediment pond at mine site) did not report a discharge this quarter.

Site D002- UPDES Outfall 002 water quality data was obtained each month this quarter. The average flow value for the quarter was 1,387.75 gpm. All of the reported concentrations were within

the established limits of the UPDES permit. The average total iron concentration for the quarter was 0.76 mg/L. Total dissolved solids concentrations averaged 1,020 mg/L (well below the UPDES limit of 2,000 mg/L).

Spring Monitoring Sites

Spring monitoring sites SP-102 and SP-12 reported parameters outside of two standard deviations from the mean.

Spring SP-102 reported an elevated TDS concentration of 748 ppm (3.56 standard deviations from the mean of 453.22 ppm). Spring SP-12 reported a reduction in concentration for D-Mg, T-Alk, bicarbonate and total anions.

Monitoring Well DH 86-2

Monitoring well DH 86-2 had produced elevated D-K concentrations for the 2nd and 3rd quarter of 2013 quarters. The well was frozen the 4th quarter of 2013 and could not be sampled. The D-K concentration has returned to within normal values the past two quarters.

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

A reduced sulfate concentration was reported in July (390 ppm versus 552.10 ppm average). Elevated concentrations were again reported for total alkalinity, TDS and bicarbonate. The elevated concentrations for these parameters has been reported for three consecutive quarters.

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 ☐

The Permittee must provide a water level depth for DH 86-2.

7. Follow-up from last quarter, if necessary. YES ☐ NO ☒