

# WATER QUALITY MEMORANDUM

Utah Coal Regulatory Program

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June 22, 2016

TO: Internal File

THRU: Daron Haddock, Permit Supervisor

FROM: Steve Christensen, Environmental Scientist 

RE: 2015 4<sup>th</sup> Quarter Water Monitoring, West Ridge Resources, West Ridge Mine, Task ID #5053

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 that were accessible and produced a flow. Road Spring did not produce a measurable flow. Spring monitoring sites SP-80, SP-101, SP-102, SP-12, SP-13 and SP-8 could not be accessed due to snow and ice. The only spring monitoring site to produce data this quarter was the Section 5 Spring.

## 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 2<sup>nd</sup> 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 2<sup>nd</sup> 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 1<sup>st</sup> and 4<sup>th</sup> 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. 2<sup>nd</sup> quarter) and during the summer (3<sup>rd</sup> quarter) when flows are of sufficient volume to produce an accurate measurement (given the limitations of the flume).

No observable flow was noted at stream monitoring site ST-3, ST-8 and ST-15. The remaining stream monitoring sites were accessible and were sampled with the exception of LF-1.

## **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 24<sup>th</sup>, 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:

<b>Effluent Characteristics</b>	<b>Effluent Limitations</b>
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 that were accessible and produced a flow.

**Surface Water Monitoring Sites:** Of the stream monitoring sites that had a measurable flow and were accessible, 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.

**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 and flow 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 had reported a reduced field dissolved the 2<sup>nd</sup> and 3<sup>rd</sup> quarters. A reduced field dissolved oxygen reading was again reported this quarter. The average field dissolved oxygen concentration is 11.68 ppm.

Monitoring site ST-8 reported several elevated concentrations the previous quarter (dissolved magnesium, sulfate, total hardness, total dissolved solids and total cations). Flow at site ST-8 was insufficient to collect a sample this quarter.

Stream monitoring site LF-2 reported elevated concentrations for water temperature, field conductivity, total suspended solids and dissolved calcium the previous quarter. No observable flow was noted at LF-2 this quarter.

#### **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 1,031 gpm. All of the reported concentrations were within the established limits of the UPDES permit. The average total iron concentration for the quarter was 0.94 mg/L. Total dissolved solids concentrations averaged 1,183 mg/L (well below the UPDES limit of 2,000 mg/L). The average flow for the quarter was 1,752 mg/L.

#### **Spring Monitoring Sites**

The Section 5 spring has reported a higher than normal flow value for the last three quarters. A reported flow of 14 gpm was reported (3.69 standard deviations from the average of 2.35 gpm). A reduced concentration for total dissolved solids was reported (374 ppm versus the average of 578.71 ppm) the previous quarter. The TDS concentration reported this quarter for the Section 5 Spring was within historical levels.

Spring monitoring site SP-8 reported a reduced concentration for dissolved calcium (46.31 ppm versus the average of 75.40 ppm) the previous quarter. SP-8 could not be accessed this quarter.

Spring monitoring site SP-12 reported reduced concentrations for numerous parameters for the 3<sup>rd</sup> quarter of 2015 (dissolved magnesium, dissolved sodium, total alkalinity, bicarbonate and total anions). The site could not be accessed this quarter.

#### **Monitoring Well DH 86-2**

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

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

The reported field dissolved oxygen reading was slightly elevated for the month of November. A reported concentration of 6.4 mg/L is 2.88 standard deviations from the average of 291 mg/L.

#### **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 3<sup>rd</sup> 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