

# WATER QUALITY MEMORANDUM

Utah Coal Regulatory Program

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September 24<sup>th</sup>, 2015

TO: Internal File

THRU: Daron Haddock, Permit Supervisor

FROM: Steve Christensen, Environmental Scientist 

RE: 2015 1<sup>st</sup> Quarter Water Monitoring, West Ridge Resources, West Ridge Mine, Task ID #4848

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. Road Spring, SP-80 and the Section 5 spring did not produce a measurable flow. Due to the snow pack, springs SP-101, SP-102, SP-12 and SP-8 could not be accessed. Spring SP-13 was the only spring that produced 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 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) were submitted for this quarter. 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 sites ST-3, ST-8 and ST-15. Flow and water quality measurements were obtained from RF-1, ST-6 and LF-1. Access wasn't possible due to snow conditions for Patterfore Stream, RF-2 and LF-2.

## **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 LF-1 reported a slight increase in TDS this quarter. The reported concentration of 507 mg/L was 2.18 standard deviations from the mean of 396.81 mg/L. Stream monitoring site RF-1 reported a slightly elevated increase in TDS. The reported concentration was 609 mg/L. The value was 2.5 standard deviations from the mean of 514 mg/L.

During the 3<sup>rd</sup> quarter of 2014, ST-6 reported reductions for several parameters (D-Mg, D-K, D-Na, SO<sub>4</sub>, T-Alk, bicarbonate and total anions and cations. The reported concentrations for these parameters returned to normal concentrations during the 4<sup>th</sup> quarter of 2014. No irregularities were

reported for 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 1,004.8 gpm (down from 1,208.2 gpm the previous quarter). All of the reported concentrations were within the established limits of the UPDES permit. The average total iron concentration for the quarter was 0.574 mg/L. Total dissolved solids concentrations averaged 1,123.67 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 during the 3<sup>rd</sup> quarter of 2014. SP-12 did not report an observable flow during the last two quarters. SP-102 reported a TDS concentration within established range during the 4<sup>th</sup> quarter of 2014, but did not report an observable flow for this quarter. Spring monitoring site SP-13 reported a slightly elevated pH concentration. The concentration of 8.93 was 3.39 standard deviations from the mean of 8.04.

### **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)**

A reduced sulfate concentration was reported in July (390 ppm versus 552.10 ppm average). Elevated concentrations were reported for total alkalinity, TDS and bicarbonate during the 3<sup>rd</sup> quarter of 2014. During the 4<sup>th</sup> quarter of 2014, the total alkalinity, TDS and bicarbonate concentrations returned to established ranges. Slightly reduced concentrations were reported for SO<sub>4</sub> during the 4<sup>th</sup> quarter of 2014 and again during the February sampling this quarter. All reported concentrations for January and March's sampling were within established historical trends.

#### **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

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

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

YES  NO

# UPDES 002

