

# WATER QUALITY MEMORANDUM

## Utah Coal Regulatory Program

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March 31, 2016

TO: Internal File

THRU: Daron Haddock, Permit Supervisor

FROM: Steve Christensen Environmental Scientist 

RE: 3<sup>rd</sup> Quarter 2015, Water Monitoring, Consolidation Coal Company, LLC, Emery Deep Mine, C/015/0015, WQ15-3, Task ID #4995

The Emery Deep Mine is currently an in-active coalmine. The coal mining operation previously utilized room and pillar mining techniques with the use of a continuous miner machine. The mine went into temporary cessation in late 2010. The coal reserves were fully extracted (thus falling into the planned subsidence category).

The approved Mining and Reclamation Plan (MRP) outlines the water monitoring requirements beginning on page VI-28. Table VI-17, Emery Mine Hydrologic Monitoring Program contains a comprehensive list of all groundwater (springs/seeps), surface water, groundwater monitoring wells and Utah Pollutant Discharge Elimination System (UPDES) outfalls. Plate VI-4, Ground Water Monitoring Well and Surface Water Monitoring Site Location Map depicts the locations of the various ground and surface water monitoring sites (including the UPDES discharge/outfall points).

As part of the approved water monitoring requirements cited above, the Permittee is required to submit an annual groundwater evaluation of the two Emery Town wells (Emery Town Well #1 and Emery Town Well #2). The Emery town well information is submitted with the Emery Deep Mine's annual report. The information is in addition to the quarterly monitoring/sampling that is required at the wells.

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

### Springs

The MRP outlines the sampling of 5 springs within the permit and adjacent area. Flow and field parameters are sampled quarterly with water quality samples collected in the 2<sup>nd</sup> and 3<sup>rd</sup> quarters.

The Permittee reported a measurable flow only spring monitoring site SP-10. Spring monitoring sites SP-11, SP-13, SP-14 and SP-15 did not produce a measurable flow.

## Streams

The MRP outlines the sampling of 8 surface water monitoring stations within the permit and adjacent area.

All but two of the eight surface water monitoring sites reported a measurable flow and accompanying data. SWMS-8 and SWMS-10 did not produce a measurable flow.

## Wells

The MRP outlines the sampling of 15 ground water monitoring wells within the permit and adjacent area (See Table VI-17). Table VI-17 identifies 13 wells, however; “Emery Town” was completed as two wells (#1 and #2) and “T1” is comprised of monitoring wells T1-B and T1-U. Of the 15 wells, 5 are monitored quarterly for water level only. The remaining 10 wells are sampled for water quality on a quarterly basis with the exception of wells RDA-2, RDA-4, and RDA-6 (sampled annually in the second quarter for both field parameters and water quality).

Data/information was submitted for all of the water monitoring wells.

## UPDES

The Emery Deep Mine’s Utah Pollutant Discharge Elimination system (UPDES) Permit, #UT0022616, identifies 8 outfalls (001, 002, 003, 004, 005, 006, 007, and 009). UPDES Outfall 008 is no longer an active water monitoring site. The discharges from each of the outfalls ultimately report to Quitchupah Creek, a tributary of Muddy Creek. The receiving waters are designated according to Utah Administrative Code (UAC) R317-2-13.1 as 2B, 3C and 4. Historically, only Outfalls 001 and 003 have ever recorded a discharge. UPDES Outfall 008 is no longer active.

The Water Quality Board for the Division of Water Quality (DWQ) approved a rule change that allows for a site specific, in-stream standard for the Emery Deep’s effluent limitations based on its sulfate (SO<sub>4</sub>) concentrations (as opposed to previous total dissolved solids-TDS standard). The new standards are identified in the currently approved UPDES permit (effective July 1<sup>st</sup>, 2012). The modified standard established an allowable TDS concentration of 4,766 ppm (maximum monthly average) and SO<sub>4</sub> concentration of 3,366 ppm (maximum monthly average). The currently approved UPDES permit will expire on June 30<sup>th</sup>, 2017.

UPDES Parameter	Established Limit
TSS	70 ppm (daily maximum)
T-Fe	1.4 ppm
Oil/Grease	10 ppm
pH	6.5-9.0
TDS	4,766 ppm (max. monthly avg)

SO4	3,366 ppm (max. monthly avg)
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The Permittee submitted data for all required UPDES sites. Outfall 003 was the only monitoring point to report a discharge for this quarter.

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

**Spring Monitoring Sites**

All required data was submitted for the spring monitoring sites that produced a flow this quarter (as outlined in Table VI-17). Spring monitoring site SP-10 was the only spring to report a flow.

**Surface Water Monitoring Sites**

The Permittee submitted all required water quality data this quarter for the surface water monitoring sites that produced a measurable flow. Stream monitoring sites SWMS-8 and SWMS-10 did not report a flow.

**Water Monitoring Wells**

The Permittee submitted the required data for all wells that are functioning. Issues with several wells have been identified in previous quarters (see discussion below). Based upon conversations with the Permittee, several of those issues have been addressed by rehabilitation efforts.

**UPDES Monitoring Sites**

The Permittee submitted all required data for UPDES monitoring site Outfall 003. None of the other UPDES outfalls produced a flow during this quarter.

The sulfate concentrations provided for Outfall 003 were well below the UPDES standard of 3,366 mg/L maximum monthly average. The average was 1,476 mg/L. The total dissolved solid concentrations were all well below the UPDES limit of 4,766 mg/L (average for the quarter was 2,861 mg/L). The total iron (T-Fe) concentrations were all below the UPDES limit of 1.4 mg/L (average for the quarter was 0.73 mg/L). The average discharge for the quarter was 102 gpm. All of the concentrations reported for total suspended solids were well below the UPDES limit of 70 ppm (many below the lab detection limit).

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

**UPDES:**

Outfall 003 reported an elevated total suspended solids concentration of 31 ppm the previous quarter. The total suspended solids concentration returned to within historical ranges for the entire quarter. No irregularities were reported for any of the required water quality parameters.

### **Wells:**

Monitoring well RDA-4 reported a drop in water elevation outside of two standard deviations the previous quarter. A depth to water increase was again reported this quarter (23.3' reported, 19.92' average).

Monitoring well H-U reported a significant drop in water level (182.4' reported, 67.76' average).

Emery Well #1 reported an elevated dissolved sodium concentration and a reduced concentration for total alkalinity.

### **Springs:**

A slightly reduced total alkalinity value was reported for spring monitoring site SP-10 the previous quarter. The total alkalinity value reported for this quarter returned to within historic ranges.

Stream monitoring site SWMS-1A reported a slightly elevated total magnesium concentration of 89.48 mg/l in the 4<sup>th</sup> quarter of 2014. The magnesium value reported for this quarter was within established trends.

Surface water monitoring site 3 reported a reduction in bicarbonate concentration (235 mg/l reported versus 290.45 mg/l average) the previous quarter. The bicarbonate concentration reported this quarter was within established ranges.

Surface water monitoring site 4 reported a reduction in bicarbonate (229 mg/l versus 296.08 mg/l average) the previous quarter. The reported concentration for bicarbonate returned to historical concentrations this quarter.

Surface water monitoring site SWMS-9 reported several concentrations outside of two standard deviations from the mean during the 4<sup>th</sup> quarter of 2014. Elevated concentrations for chloride, sulfate, total hardness, total dissolved solids, total magnesium, total sodium, dissolved magnesium and dissolved sodium were reported that quarter. The reported concentrations for these parameters returned to established ranges 1<sup>st</sup> quarter of 2015. An increased chloride concentration was reported the previous quarter. The concentration has returned to historic value this quarter. A reduction in bicarbonate was reported this quarter (137 mg/l reported versus 305.40 mg/l average).

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

There is no commitment in the MRP to resample for baseline parameters.

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

**The Permittee must contact the Division and provide in writing:**

1. The outcome of the rehabilitation/repair efforts of the impacted water monitoring wells (see discussion below).
2. Submit an amendment to the Emery Deep MRP as to how, given the limitations/issues associated with the aforementioned monitoring wells, that the approved monitoring plan is adequate to detect potential groundwater impacts as a result of coal mining activity. Based on the review by the Division, if the absence of the impacted wells renders the water monitoring plan inadequate, additional wells will need to be installed during the 2015 construction season.
3. The Permittee must address the 0' depth to water reported at monitoring well R1-L.
4. The Permittee must address why a depth to water or water elevation was not reported for the Kemmerer-L monitoring well. All of the required water quality parameters were provided.
5. The Permittee must address why a depth to water was reported for several water quality wells however; the water quality data was not provided. The monitoring wells include: USGS 4-1, RDA-6, T1-U and SM1-3.

Data collection issues have been identified at several water quality groundwater monitoring wells in previous quarters. The following monitoring wells Kemmerer-L, USGS 4-1, RDA-6, T1-U and now SM1-3 have been noted as being unable to either produce water quality samples of sufficient volume as to submit for laboratory analysis and/or a water level reading for several quarters. Based on conversations with the Permittee, rehabilitation efforts on the wells have been largely successful. .

- 1) **Kemmerer-L Well:** The Kemmerer-L well is a water quality well to be sampled quarterly. The water quality data has been consistently submitted to the Division; however, water level data had not. The Permittee had indicated that the well is “sealed off” and a water level reading cannot be obtained. This quarter, a water level was provided. The Permittee indicated that the pressure gauge needed to be replaced in order to obtain a water level along with the water quality data.
- 2) **USGS 4-1:** The approved MRP requires in Table VI-17 that monitoring well USGS 4-1 be sampled quarterly for water level, field parameters and water quality. However; based on information provided by the Permittee, the well is dry and is no longer capable of producing water monitoring data. It doesn't appear water quality has ever been obtained from this well dating back to 1979. The well has been intermittently reported as a “dry well” since February of 2009. The Permittee indicated that USGS 4-1 is simply a dry well. The values that have been entered in the database are the depth of the well itself. The Permittee must still provide an evaluation/justification for simply abandoning the well or drilling a replacement well.

- 3) **RDA-6:** Monitoring well RDA-6 is also identified in Table VI-17 of the MRP as a water quality data collection well (in addition to field parameters and water elevation). However; the last water quality data obtained from this well was in June of 2008. RDA-6 was completed to a depth of 40' with a screen interval between 15'-35' below grade. The water level had been reported as 19' below grade for approximately the last 2 years; however, based on discussions with the Permittee, water quality data could not be obtained due to lack of water. A water level was provided for 3<sup>rd</sup> and 4<sup>th</sup> quarter 2014 and the 1<sup>st</sup> quarter of 2015; however, no water quality data was obtained.

The Permittee has indicated that the well has been rehabilitated (April 2015) and is now functioning properly.

- 4) **T1-U:** Monitoring well T1-U is another water quality well identified in Table VI-17. T1-U is another well that is apparently dry. It does not appear that water quality data has ever been obtained from this well. A water level was provided for 3<sup>rd</sup> and 4<sup>th</sup> quarter 2014 and for the 1<sup>st</sup> quarter of 2015; however, no water quality data was obtained. The Permittee has indicated that repeated attempts to extend a probe to the bottom of the well have been unsuccessful. The Permittee will propose to discontinue monitoring of this well and instead re-initiate monitoring at monitoring well TP-U. The Division is awaiting a revision to the Emery Deep MRP.
- 5) **SM1-3:** Monitoring well SM1-3 is identified in Table VI-17 as a water quality data collection well. Water quality data from SM1-3 has been reported to the Division since the mid 1980's. However; water quality data had not been provided since the 2<sup>nd</sup> quarter of 2014. Based upon discussions with the Permittee, the well has been rehabilitated. Water quality data was submitted to the Division this quarter.
- 6) **R1-L:** Monitoring well R1-L is a quarterly water level only monitoring well. Erratic water levels had been reported for this monitoring well. The Permittee has indicated to the Division that the pressure data in the DOGM database needs to be converted to a negative depth to water.

The current ground-water monitoring plan includes 15 monitoring wells completed in the 5 major geologic units at the Emery Deep Mine. Based upon communication with Emery Deep personnel, steps have been taken in an attempt to rehabilitate some of the impacted water monitoring wells. The results of these efforts to rehabilitate the wells must be documented and reported to the Division.

A revision to the current Emery Deep MRP must be submitted in order to modify the approved water monitoring plan. The Permittee has indicated that it will be submitted to the Division in coming weeks.

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

**YES**  **NO**

See Discussion Item 5 above.