W A T E R Q U A L I T Y
MEMORANDUM
Utah Coal Regulatory Program

February 8th, 2017

TO: Internal File

THRU: Daron Haddock, Permit Supervisor

FROM: Steve Christensen Environmental Scientist

RE: 3rd Quarter 2016, Water Monitoring, Consolidation Coal Company, LLC, Emery Deep Mine, C/015/0015, Task ID #5325

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 2nd and 3rd 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.

Of the eight surface water monitoring sites, all reported a measurable flow with accompanying data with the exception of SWMS-8, SWMS-9 and SWMS-10.

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.

In the first week of September 2016, the Division approved Task #5243. The MRP was revised to reflect revisions to the approved water monitoring program. Monitoring well T1-U had been compromised and could not be rehabilitated. Monitoring well TP-U (quarterly water quality and quantity sampling) was reinstated into the water monitoring program to compensate for the loss of T1-U. Additionally, Pump 3 MW was added to the ground water monitoring program (quarterly water levels).

A total of 16 wells are identified in the MRP. Ten 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). The remaining 6 wells are monitored quarterly for water level only.

Data was not submitted for all of the required monitoring wells (see discussion below).

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 (SO4) concentrations (as opposed to previous total dissolved solids-TDS standard). The new standards are identified in the currently approved UPDES

permit (effective July 1st, 2012). The modified standard established an allowable TDS concentration of 4,766 ppm (maximum monthly average) and SO4 concentration of 3,366 ppm (maximum monthly average). The currently approved UPDES permit will expire on June 30th, 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)

The Permittee submitted data for all required UPDES sites. None of the outfalls reported a discharge this quarter. The Permittee has indicated that the underground pump that had historically produced a discharge at Outfall 003 has been turned off. As a result, the outfall did not produce a discharge 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 and could be accessed.

Water Monitoring Wells

The Permittee did not provide water quality data for monitoring well TP-U. As discussed above, monitoring well TP-U was reinstated in the water monitoring program in early September 2016. The well historically produced water quality data during the period from December 1976 to September 1994. The Permittee provided a depth to water for 3rd quarter 2016; however, the required water quality data was not provided.

UPDES Monitoring Sites

None of the UPDES monitoring sites produced a flow this quarter.

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

Wells:

Monitoring well T1-B reported an elevated carbonate concentration of 48 ppm (3.93 standard deviations from the mean of 4.0 ppm) in 2nd quarter 2016. The carbonate concentration was within the established range for 3rd quarter 2016.

RDA-2 reported a depth to water that was 2.35 standard deviations from the mean. The reported water level was 24.2' with the average depth being 17.93'.

RDA-6 was reported by the Permittee as not having enough water to obtain a sample.

Kemmerer-L reported a field conductivity value 4.91 standard deviations from the mean (2,640 umhos/cm versus 1,034.48 umhos/cm).

SM1-3 reported reductions in concentration for total hardness, dissolved magnesium and dissolved sodium 1st quarter 2016. These concentrations were within normal ranges for 2nd quarter 2016. An increased concentration for D-Fe was reported 3rd quarter 2016 (2.08 standard deviations from the mean of 131.97 ppm with a reported concentration of 421.31 ppm).

Monitoring well H-U had steadily reported declines in water elevation. However; a significant increase in water level occurred with a reported depth to water of 115.4' (a reduction in depth of 132.9'). It's unclear what caused such a dramatic change in water level.

Monitoring well R1-L has reported a depth to water of 462' the last five quarters**.**

Emery Well #1 reported an elevated dissolved sodium concentration and a reduced concentration for total alkalinity during the 3rd quarter of 2015. Both parameters reported concentrations within established historical ranges during the 4th quarter of 2015. An elevated concentration for field conductivity was reported 1st quarter 2016. A value of 2,420 umhos/cm was reported (5.08 standard deviations from the mean of 1248.46 umhos/cm). Dissolved magnesium was reported 2.00 standard deviations below the mean of 17.20 ppm with a value of 11.25 ppm. In the second quarter these concentrations were within normal range; however, an elevated field conductivity concentration was reported for 2nd quarter 2016. In the 3rd quarter the field conductivity value was within normal range while an elevated concentration for D-Na was reported along with a reduction in bicarbonate.

Springs/Streams:

Spring SP-10 elevated concentrations for lab specific conductance and field conductivity during the 2nd quarter of 2016. The concentrations were reported within the historic data range for 3rd quarter 2016.

Surface water monitoring site SWMS-1A reported relative high concentration increases for T-Fe, T-Ca, T-Mg, TSS and D-Ca.

Surface water monitoring site SWMS-3 reported an elevated temperature reading of 25.5 degrees C (average 8.90 degrees C) for the 2nd quarter of 2016. The temperature reading for 3rd quarter returned to within normal range. However; elevated concentrations were reported for T-Fe, T-Ca, T-K and TSS.

Surface water monitoring site SWMS-4 reported an elevated temperature reading of 25.2 degrees C (average 9.28 degrees C) for the 2nd quarter of 2016. The temperature reading for 3rd quarter returned to within normal range. However; elevated concentrations were reported for T-Fe, T-Ca and T-Mg.

Surface water monitoring sites SWMS-5 reported elevated temperature readings for the 2nd quarter of 2016. The temperature reading for 3rd quarter returned to within normal range. Elevated concentrations were reported for T-Ca and D-Ca for 3rd quarter 2016.

Surface water monitoring site SWMS-9 reported several concentrations outside of two standard deviations from the mean during the 4th 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 1st quarter of 2015. An increased chloride concentration was reported the previous quarter. The concentration returned to historic limits during the 4th quarter of 2015. A reduction in bicarbonate was reported 3rd quarter 2015 (137 mg/l reported versus 305.40 mg/l average). The site could not be accessed during the 4th quarter of 2015 due to snow/ice conditions.

Surface water monitoring site SWMS-9 reported several parameters during the 1st quarter of 2016 that were slightly outside of two standard deviations from the mean. Concentrations for chloride, sulfate, TDS, total cations, total anions and total magnesium noted slightly elevated values. SWMS-9 did not report a flow for the 2nd and 3rd quarter of 2016.

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?

NA

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

monitoring requirements?

YES ☒ **NO** ☐