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Emery Deep Water Quality Wells

Steve Christensen <stevechristensen@utah.gov> Thu, Apr 16, 2015 at 5:58 PM
To: Russel Jensen <russeljensen@consolenergy.com>, "Gefferth, John" <jgefferth@cecinc.com>, "Goodballet, Kerry (Kampfer)" <KerryGoodballet@consolenergy.com>, OGMCOAL DNR <ogmcoal@utah.gov>

Good afternoon,

I've attached the most recent Emery Deep water quality review for the 3rd quarter of 2014. As has been identified previously, several monitoring wells are no longer able to be monitored. There are several explanations for why this is the case. However; we need to address the well issues now.

Take a look at the attached report and give me a call and we can discuss a way forward.

Regard,
Steve

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

March 31, 2015

TO: Internal File

THRU: Daron Haddock, Permit Supervisor

FROM: Steve Christensen Environmental Scientist

RE: 3rd Quarter 2014, Water Monitoring, Consolidation Coal Company, LLC, Emery Deep Mine, C/015/0015, WQ14-3, Task ID #4667

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.

All but one of the eight surface water monitoring sites reported a measurable flow and accompanying data. SWMS-8 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 (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. 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).

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.

Water Monitoring Wells

The Permittee did not submit the required data for all wells. Issues with several wells must be addressed. (See discussion below Item #5)

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 1472.5 mg/L. The total dissolved solid concentrations were all well below the UPDES limit of 4,766 mg/L (average for the quarter was 2,800.8 mg/L). The total iron (T-Fe) concentrations were all below the UPDES limit of 1.4 mg/L (average for the quarter was 0.75 mg/L). The average discharge for the quarter was 129.8 gpm.

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

Stream monitoring point SWMS-2 produced slightly elevated concentrations for Cl, SO4, TDS, T-Mg, T-K, T-Na, D-K and D-Na. Historically, this water monitoring site has produced elevated concentrations for these parameters during the late 2nd quarter and 3rd quarter. It's likely that the increases are a result of flood irrigation practices increasing the sediment transport/deposition into area drainages.

The stream monitoring data provided fell within the established historical ranges of the data-set (i.e. within two standard deviations) for the rest of the surface water monitoring points.

The depth to water data for water monitoring well H-U has produced significant variations. Water levels were fairly consistent from the early 1980's to approximately mid-2005 (50-60' depth to water). In the summer months of 2005, the water level rose to the 30-40' range before exhibiting a significant drop that continues to the present. The current depth to water at monitoring well H-U is 106.4' based on the most recent data provided by the Permittee (See chart below).

Monitoring well RDA-4 had produced a slight increase in depth to water with a reported depth of 23'. The average depth to water for the well is 19.74 (standard deviation of 2.14).

The Kemmerer-L monitoring well had reported elevated bicarbonate concentration 1st and 2nd quarter of 2014. The bicarbonate concentration was within established historical limits this quarter.

Monitoring well RDA-2 produced slightly reduced concentrations for total hardness, dissolved calcium and dissolved magnesium for the 2nd quarter of 2014 as well as an increase in depth to water to 22.7' (mean depth to water is 17.56'). All required parameters returned to historical trends this quarter.

Emery Town well #1 reported elevated values for chloride and field conductivity in the 2nd quarter of 2014. The chloride levels and field conductivity returned to normal concentrations this quarter.

Other issues associated with several water monitoring wells are discussed in more detail below (See Item 5).

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?

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 unable to either produce water quality samples of sufficient volume as to submit for laboratory analysis and/or a water level reading.

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 has not. The Permittee has indicated that the well is "sealed off" and a water level reading cannot be obtained. Upon review of the historical data, water levels were obtained from the Kemmerer-L well from 1973 to mid-2010. It's unclear as to why water level readings cannot be obtained from this

well. Water quality data continues to be provided by the Permittee.

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. It's unclear what has occurred to impact this monitoring 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 3rd quarter 2014; however, no water quality data was obtained

4) **T1-U:** Monitoring 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 3rd quarter 2014; however, no water quality data was obtained.

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 was not provided for 3rd quarter 2014. Based upon discussions with Emery Deep personnel, it would appear that the monitoring well was flooded during heavy precipitation events during the late summer of 2014. The well may have been inundated with sediment laden water.

The current ground-water monitoring plan includes 15 monitoring wells completed in the 5 major geologic units at the Emery Deep Mine. The RDA-6 well and SM1-3 well are completed in the Quaternary Alluvium. Monitoring well USGS 4-1 is completed in the Bluegate Shale. Monitoring well T1-U is completed in the Upper Ferron Sandstone, while the Kemmerer-L is completed in the Lower Ferron Sandstone.

It's likely that many of these wells have filled with sediment to varying degrees. One possible explanation is that the sediment was deposited during heavy rainfall/flooding events and the resulting sediment laden water entered the well either from breaching the top of the casing above grade or by infiltrating through the ground at the well site and entering into the well from a cracked/damaged well casing.

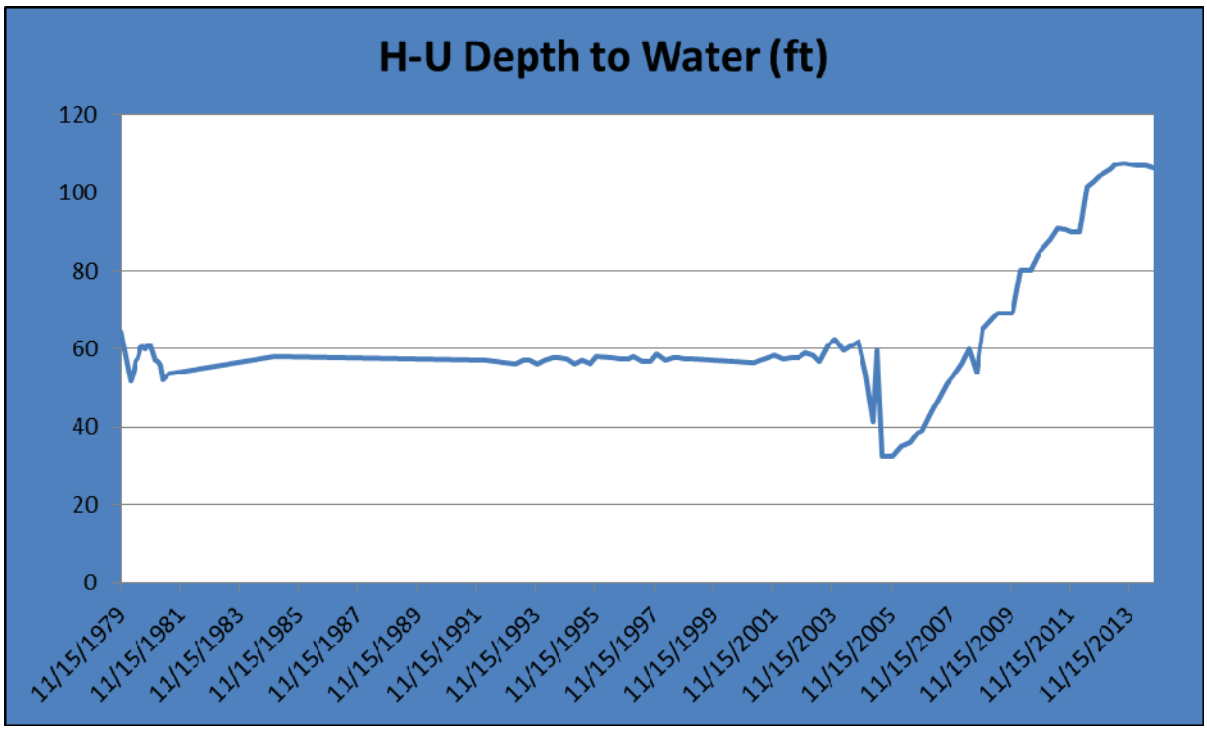
The Permittee must immediately contact the Division and either 1) Outline how rehabilitation/repair of the wells will take place and in what time-frame or 2) Submit an

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.

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

YES ☒ **NO** ☐

See Discussion Item 5 above.


H-U Depth to Water (ft)
120
100
80
60
40
20
0
11/15/1979
11/15/1981
11/15/1983
11/15/1985
11/15/1987
11/15/1989
11/15/1991
11/15/1993
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