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WATER QUALITY MEMORANDUM

Utah Coal Regulatory Program

January 25, 2010

TO: Internal File

THRU: Daron Haddock, Permit Supervisor

FROM: James D. Smith, Environmental Scientist III

RE: 2009 Second Quarter Water Monitoring, Canyon Fuel Company, LLC, Skyline Mine, C/007/0005, Task ID #3312

The Skyline Mine is an operating longwall mine. Current operations are in the North Lease area of the mine. Many mined-out areas of the mine have been sealed-off. Water monitoring requirements can be found in Section 2, especially pages 2-36, 2-36a, 2-36b, 2-37, 2-37a, and 2-39aa of the MRP.

1. Were data submitted for all of the MRP required sites? YES ☒ NO ☐

In-mine

The MRP requires sampling of 6 "in-mine, roof drippers" during all four quarters, although all six sites are actually monitored at the surface. CS-12, CS-14, 3, MD-1, and SRD-1 are mine discharge stations; CS-13 is a french drain; and ELD-1 is the combined output of JC-1 and JC-3. The Permittee submitted all required information for the in-mine sites. The Permittee submitted all required information for the in-mine sites for the 2nd quarter.

Springs

No springs are monitored during the 1st quarter, but twenty-six springs are monitored during the 2nd, 3rd, and 4th quarters. The Permittee submitted all required information for the spring sites for the 2nd quarter.

Streams

The MRP requires 1st quarter sampling at 4 only stream-sites: CS-6, VC-6, VC-9, and VC-10, but at 30 sites during the 2nd, 3rd, and 4th quarters. The Permittee submitted all required information for the stream sites for the 2nd quarter.

In addition to the quarterly monitoring, streamflow at sites NL-1 through NL-42 is measured monthly for 12 months before, during, and 12 months after being undermined by the longwall. Data are reported in the Annual Hydrologic Report (Sec. 2.4.4) and submitted to the Division's database. The Permittee commits to measuring the flow

monthly in June through October; flow will be measured during other months if the sites are accessible. Twenty-two NL- sites were monitored during the 2nd quarter 2009.

Wells

For the 1st quarter, only monthly flow measurement is required at JC-1 and JC-3 (the combined flow from these two wells is reported as ELD-1, an in-mine, roof dripper). Seventeen wells are monitored during the 2nd, 3rd, and 4th quarters. The Permittee submitted all required information for the well sites for the 2nd quarter.

UPDES

The UPDES Permit/MRP requires weekly monitoring of 3 outfalls: 001, Sedimentation Pond Discharge to Eccles Creek at the Portal; 002, Sedimentation Pond Discharge to Eccles Creek at the Loadout; and 003, the Sedimentation Discharge at the Waste Rock Disposal Site. DMR parameters (total Fe, TDS, pH, TSS, flow, oil and grease, and specific conductivity, and temperature) are reported to the database as operational parameters. Total Fe is analyzed twice per month rather than weekly. Parameters that are not included in the operational parameter lists in the MRP - such as sanitary wastes, visible foam, and floating solids - are not reported in the electronic submittal to the Division.

Well JC-3 is permitted as a UPDES point by PacifiCorp. For JC-3, Skyline reports only monthly flow during the 1st quarter, and monthly flow and quarterly field parameters, TSD, TSS, and T-P during the 2nd, 3rd, and 4th quarters. (The UPDES permit for JC-3 requires flow, oil & grease, TDS, NH3, N as nitrate + nitrite, plus total and dissolved As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Se, Ag, Zn, and P.) Since July 2004, JC-3 has discharged only once, in October 2007.

The Permittee submitted all required information for the UPDES sites for the 2nd quarter. Outfalls 001 discharged all three months of the quarter, 002 discharged in April but not May or June, and 003 did not discharge during the 2nd Quarter.

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

The following parameters were missing from data sets that were submitted:
JC-1 age dating: tritium, *deuterium, *^{14}C, and *^{18}O.

*Because determinations of isotopic concentrations can require several months, these values are often reported much later than those for field measurements and routine laboratory analyses; however, the Permittee has always been quite prompt at getting the data to the Division as soon as they receive them from the lab.

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

Listed parameters were more than two standard deviations from the mean.

In-mine

CS-13	Bicarbonate as CaCO3

Streams

CS-4	Bicarbonate as CaCO3
CS-16	Flow
F-9	Flow
UPL-10	Field pH and cation-anion balance
NL-11	Flow
NL-14	Flow
NL-20	Flow

Springs

S10-1	Cation-anion balance
S23-4	Flow
S24-1	Field electrical conductivity
2-413	Flow
WQI-39	TDS and Cl
WQ3-6	Nitrate + nitrite
WQ3-26	Flow and cation-anion balance
WQ3-43	TDS, cation-anion balance, SO4, and Cl
WQ4-12	Total alkalinity, nitrate + nitrite, total cations, Ca, Mg, total hardness, TDS, bicarbonate as CaCO3, and SO4

Wells

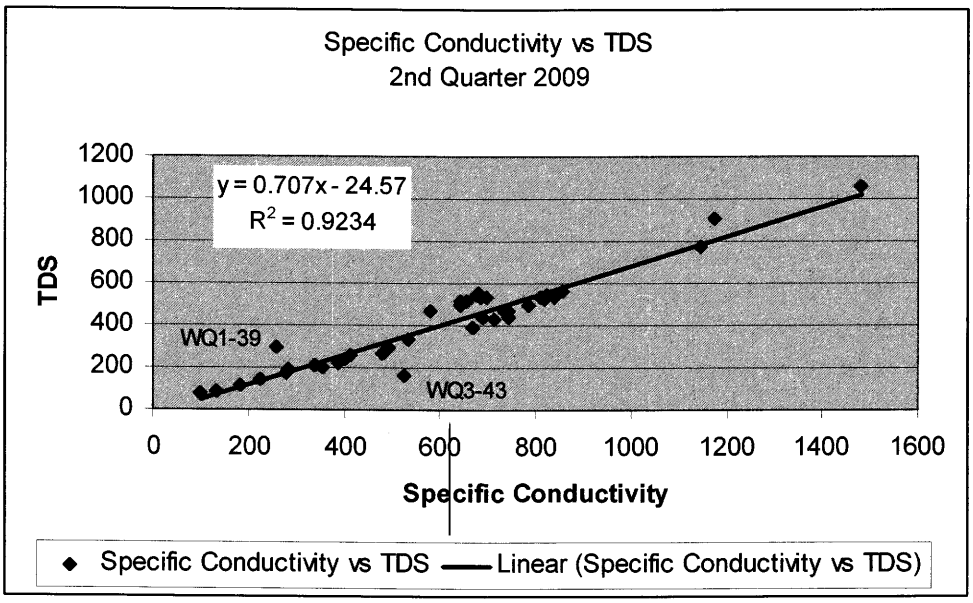
W99-21-1	Level
W20-28-1	Level
91-35-1	Level

Cation/anion balance was > 5% for 8 of the 26 samples that were analyzed for the appropriate ions. It was > 10% at springs S10-1 and WQ3-26.

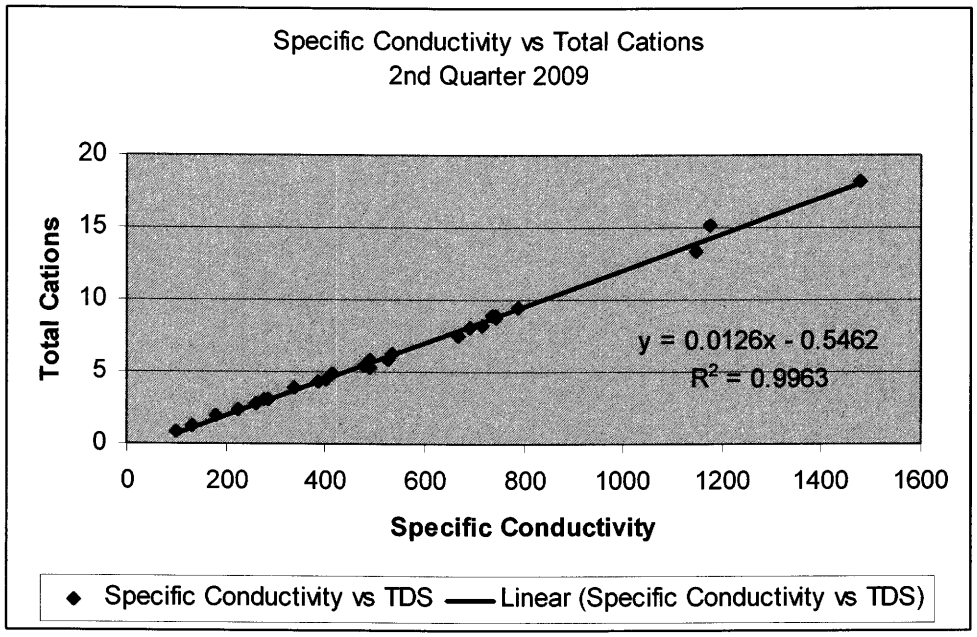
The Division calculated the following Reliability Checks, based on previous Water Quality Reports for the Skyline Mine (for further information on Reliability Checks, see Chapter 4, *Water Quality Data: Analysis and Interpretation* by Arthur W. Hounslow.)

- TDS/Conductivity

- Out of 43 samples for which both field specific conductivity and TDS were determined, WQ3-43 and CS-11 have TDS/Conductivity ratios < 0.55, 12 have a ratio > 0.76, which includes UT0023540-001 with a ratio of 0.81 and WQ1-39 with a ratio of 1.15.
  - The linear trendline has a slope of 0.71 (see chart), indicating that overall the TDS/Conductivity ratios are between 0.55 and 0.76, the typical range for this ratio.
  - UPDES discharges account for 8 of the 12 samples with TDS/Conductivity ratios > 0.76.



- For the 26 samples for which both field specific conductivity and total cations were determined, the Conductivity/Cations ratio ranges from 0.88 to 1.28 %
  - This ratio should be close to 1 %.
  - The linear trendline has a slope of 1.26% (see chart)



- For the 26 samples that had sufficient data, the Division calculated Reliability Checks that involve dissolved Ca, Mg, K, Na, Cl, and SO4..
  - Ideally the Mg/(Ca + Mg) ratio is < 40%.
    - Of the 26 samples, 25 have a ratio < 40%
    - The CS-12 ratio is right at 40%.
    - CS-12 consistently has a high ratio and frequently has the highest ratio.
  - Ideally the Ca/(Ca + SO4) ratio is > 50%
    - For 7 of the 26 samples, the ratio is < 50%
    - Because Mg/(Ca + Mg) values are within the expected range, SO4 values may bear watching.
  - The K/(K+ Na) ratio should be < 20%.
    - For 15 of the 26 samples, the ratio is >20 %.
    - At WQ3-26 the ratio is the greatest, 42%.
    - These results are similar to those from 2nd Quarter 2008.
  - The Na/(Na + Cl) ratio should be > 50%.
    - For the majority of samples, the ratio is < 50%
      - It is only 19% at CS-3
      - At CS-13 it is 36%, compared to 37% 1st Quarter
      - The ratio is 50% to 93% at the remaining sites.
    - These results are similar to those from 2nd Quarter 2008.
  - For Nine samples, both the K/(K+ Na) and Na/(Na + Cl) ratios were outside the ideal range.
    - This possibly indicates a systematic error in Na analysis.
    - These results are similar to those from 2nd Quarter 2008.

When Reliability Checks do not meet the target value, it does not necessarily mean that the analyses are in error; however, it does indicate the collection and analysis procedures might benefit from some extra scrutiny by the Permittee. An analysis and explanation of the inconsistencies by the Permittee would help to increase the Division's confidence in the procedures used for sample collection and analysis. The Permittee should work with the lab to make sure that samples pass all quality checks so that the reliability of the samples does not come into question.

UPDES

The UPDES permit in effect during the 2nd quarter (dated Nov. 23, 2004) allows for a DML for TDS of 1,310 mg/L and a 30-day average of 500 mg/L. There is no tons/day DML unless the 30-day average exceeds 500 mg/l, then a 7.1 tons/day limit is imposed. For the 2nd quarter of 2009, the discharge at UPDES Permit discharge point UT0023540-001 did not exceed the 1,310 mg/L DML for TDS; however, TDS averaged over 500 mg/L (536 mg/L average, ranging from 510 to 563 mg/L) and the load averaged 13 tons/day and ranged from 12.2 to 14.6 tons/day (calculated from the TDS and flow data in the database). Because of such ongoing exceedences, Canyon Fuel Company participates in the Salinity Offset Plan that was approved by DWQ on January 5, 2005 (retroactive to September 2004).

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

Beginning in 2010 and every five years thereafter, baseline analyses are to be done on samples collected during the 3rd quarter (MRP p. 2-44).

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

No further actions are necessary at this time.

6. Does the Mine Operator need to submit more information to fulfill this quarter's monitoring requirements? YES ☒ NO ☐

Second quarter Tritium data for EL-1, EL-2, S15-3, S24-1, 2-413, and 8-253 were submitted to the database in late October 2009. The Permittee is will submit the tritium data for JC-1 along with the other isotope data when the other data are ready.

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

None

8. Did the Mine Operator submit all the missing and/or irregular data?

There were no missing or irregular data.

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