

WATER QUALITY MEMORANDUM

Utah Coal Regulatory Program

#3387

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March 2, 2010

TO: Internal File

THRU: Daron Haddock, Permit Supervisor

FROM: James D. Smith, Environmental Scientist III *DS 03/02/10*

RE: 2009 Third Quarter Water Monitoring, Canyon Fuel Company, LLC, Skyline Mine, C/007/0005, Task ID #3387

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

Note: Samples are analyzed for tritium at several sites, plus deuterium, carbon¹⁴, and oxygen¹⁸ at JC-1. Because determinations of isotopic concentrations can require several months, these values are often reported later than those from field measurements and routine laboratory analyses. The Permittee has always been prompt at getting the isotopic data to the Division as soon as they are received from the lab.

In-mine

The MRP requires Third Quarter monitoring of 6 "in-mine, roof drippers", although all six 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.

Springs

The MRP requires Third Quarter sampling for 26 springs (*S10-1, S12-1, S13-2, S13-7, S14-4, S15-3, S17-2, S22-5, S22-11, S23-4, S24-1, S24-12, S26-13, S34-12, S35-8, S36-12, 2-413, 3-290, 8-253, WQ1-1, WQ1-39, WQ3-6, WQ3-26, WQ3-41, WQ3-43, and WQ4-12*). Except for isotopic data at S15-3, S24-1, 2-413, and 8-253 (See Note above), the Permittee submitted all required information for the springs.

Streams

The MRP requires Third Quarter sampling at 30 stream sites (*CS-3, CS-4, CS-6,*

CS-7, CS-8, CS-9, CS-10, CS-11, CS-16, CS-17, CS-18, CS-19, CS-20, CS-21, CS-22, CS-23, F-9, F-10, UPL-10, VC-6, VC-9, VC-10, VC-11, VC-12, WRDS-1, WRDS-2, WRDS-3, WRDS-4, EL-1, and EL-2.).. Except for isotopic data at EL-1 and EL-2 (See Note above), the Permittee submitted all required information for these stream sites.

Flow at sites NL-1 through NL-42 is measured monthly for 12 months before, during, and 12 months after being undermined by the longwall. Monitoring results are reported in the Annual Hydrologic Report (Sec. 2.4.4) and submitted to the database. The Permittee commits to measuring the flow monthly in June through October, and flow will be measured during other months if the sites are accessible. Twenty-two NL sites were monitored during the Third Quarter 2009.

Wells

Water levels are measured at 14 wells during the Second, Third, and Fourth Quarters (*W79-10-1-B, W79-14-2A, W79-26-1, W79-35-1A, W79-35-1B, W2-1, W20-4-1, W20-4-2, W99-4-1, W99-21-1, W99-28-1, W20-28-1, 91-26-1, W91-35-1, and 92-91-03*). Operational parameters are measured at 92-91-03. None of these wells are monitored during the First Quarter.

Monthly flow measurements are required at JC-1 and JC-3. During the Second, Third, and Fourth Quarters, the Permittee measures field parameters, TDS, TSS, and Total Phosphorous at both sites, plus isotopes C¹⁴, Tritium, Deuterium, and O¹⁸ at JC-1. (Well JC-3 is permitted as a UPDES point by PacifiCorp. That permit requires PacifiCorp to report 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.)

Except for isotopic data at JC-1 (See Note above), the Permittee submitted all required information for the well sites.

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, 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.

The Permittee submitted all required information for the UPDES sites for the Third Quarter. Only outfall 001 discharged during the Third Quarter.

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

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

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

Stream:

CS-3: TDS, field electrical conductivity, Cl

CS-17: field pH

VC-6: cation-anion percent difference

VC-9: cation-anion percent difference

UPDES:

UT0023540-001 July 28: cation-anion percent difference

Springs:

S10-1: TSS

S13-7: water temperature

S35-8: field electrical conductivity

WQ3-43: field electrical conductivity

Wells:

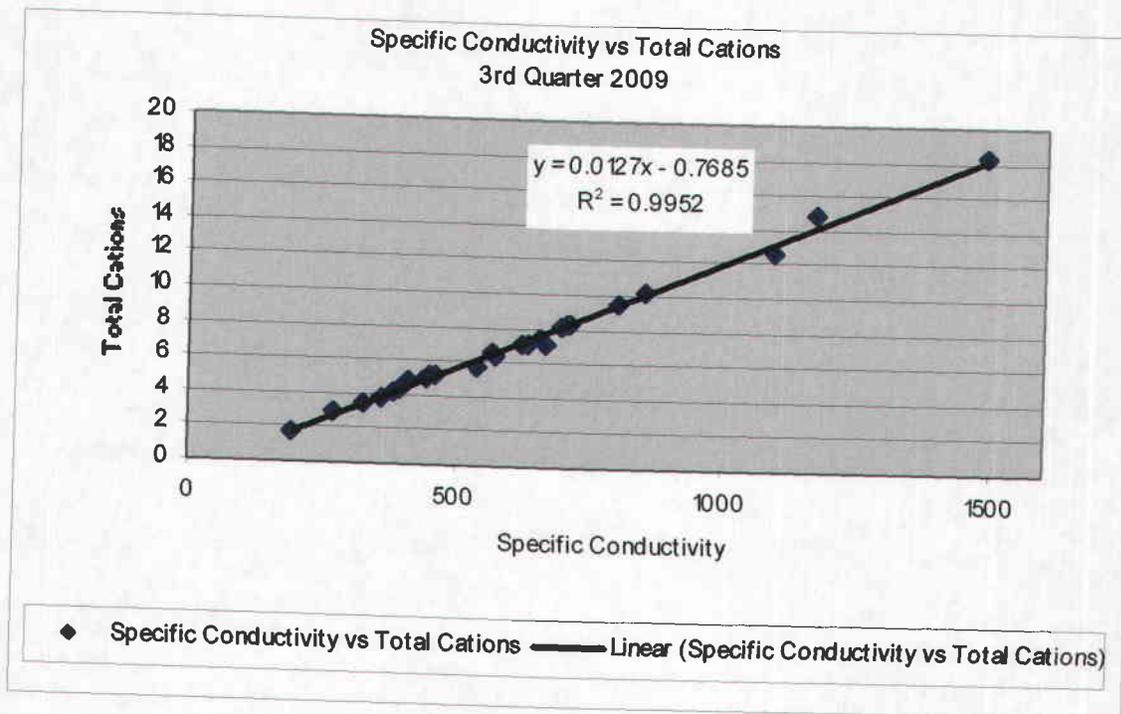
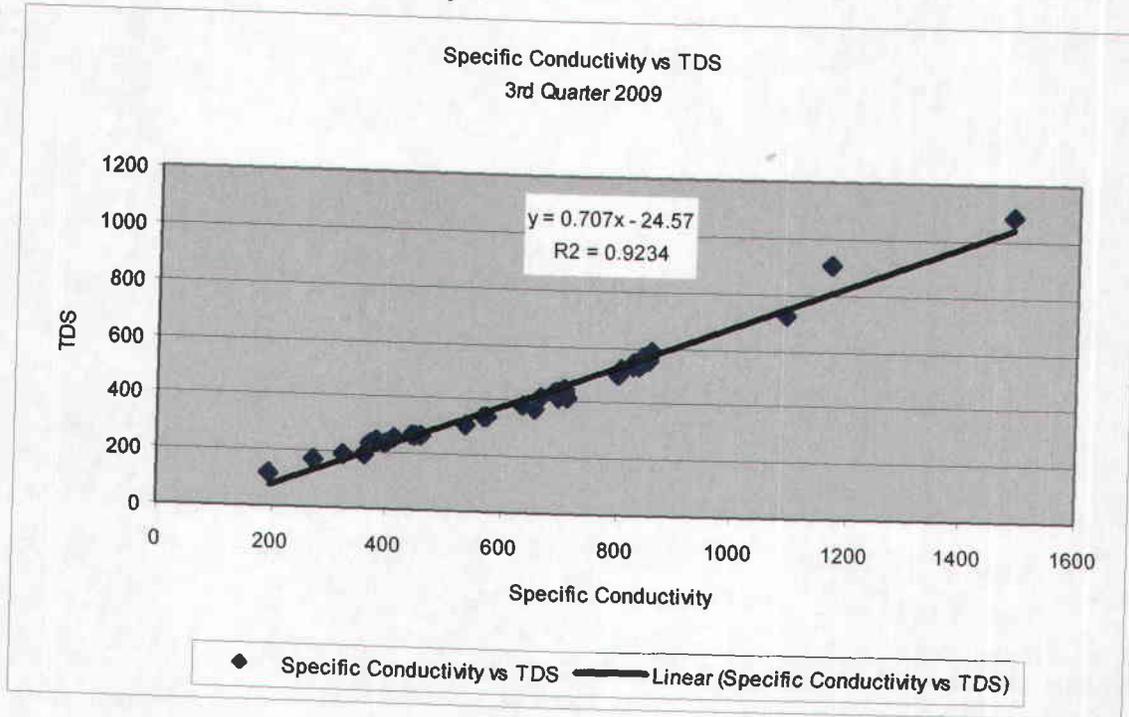
W95-31-1: depth

Cation/anion balance was within 5% for all samples that were analyzed for the appropriate ions.

The Division calculated the following Reliability Checks (see Chapter 4, *Water Quality Data: Analysis and Interpretation* by Arthur W. Hounslow.)

- TDS/Conductivity
 - Out of 39 samples for which both field specific conductivity and TDS were determined, 38 have TDS/Conductivity ratios between 0.55 and 0.76, and the ratio at 92-91-03 is 0.77. The linear trendline has a slope of 0.71 (see chart).
 - The 25 samples for which both field specific conductivity and total cations were determined have a Conductivity/Cations ratio of 0.87 to 1.26%, with an average value of 1.12%; this ratio should be close to 1%.
 - These two Reliability Check results are close to the expected values. The same checks done in previous quarters did not match expected

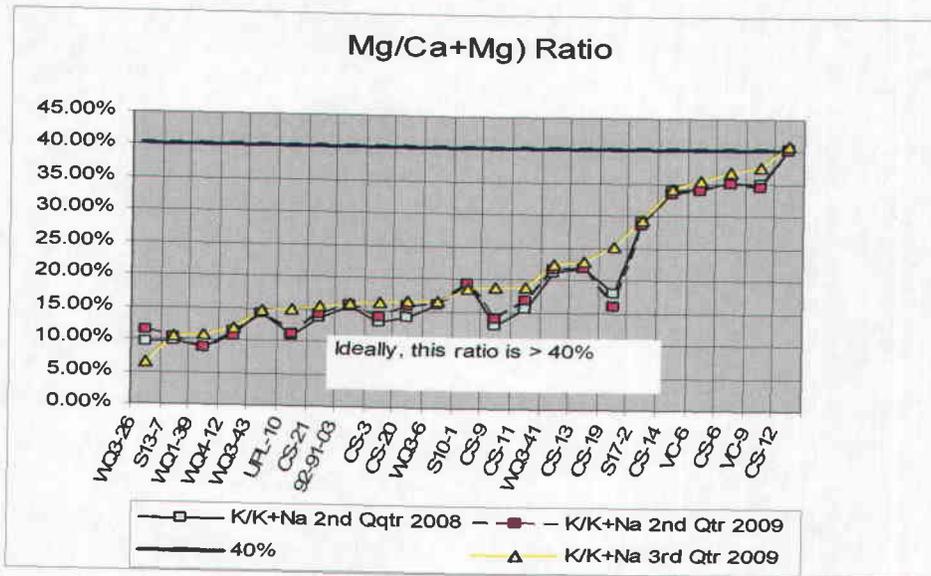
values as closely.



- For 25 samples, the Division calculated Reliability Checks that involve dissolved Ca, Mg, K, Na, Cl, and SO₄. There were not sufficient dissolved ions data for other sites.

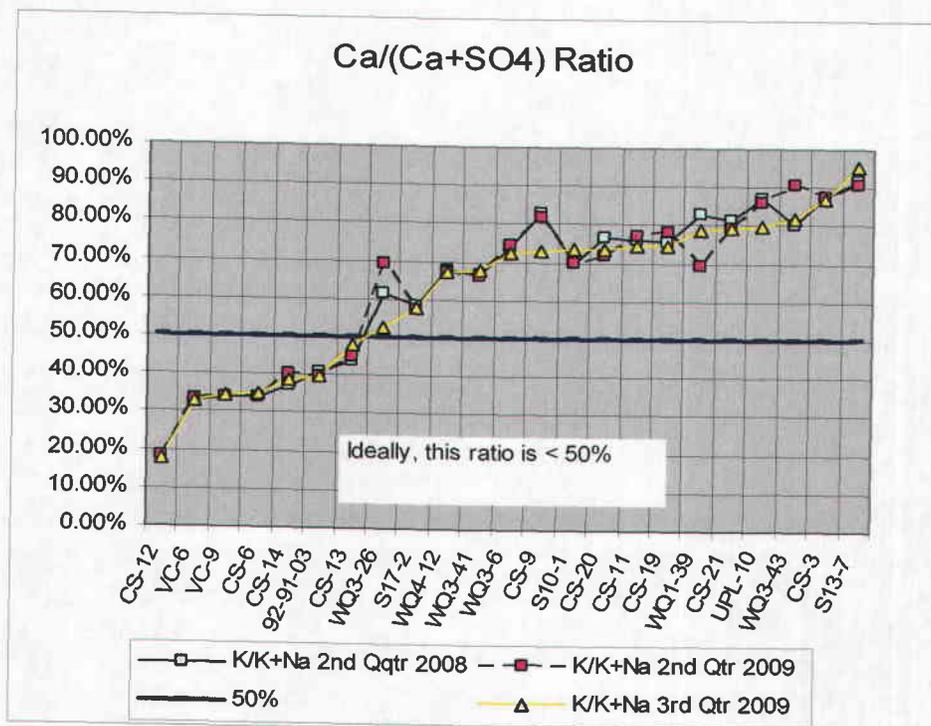
○ **Mg/(Ca + Mg) ratio**

- Ideally the Mg/(Ca + Mg) ratio is < 40%.
- Of the 25 3rd Qtr 2009 samples, only CS-12 has a ratio > 40%.
- At CS-12, the ratio is 41%; CS-12 seems to consistently have the highest ratio (see chart – 23 of 25 sites).



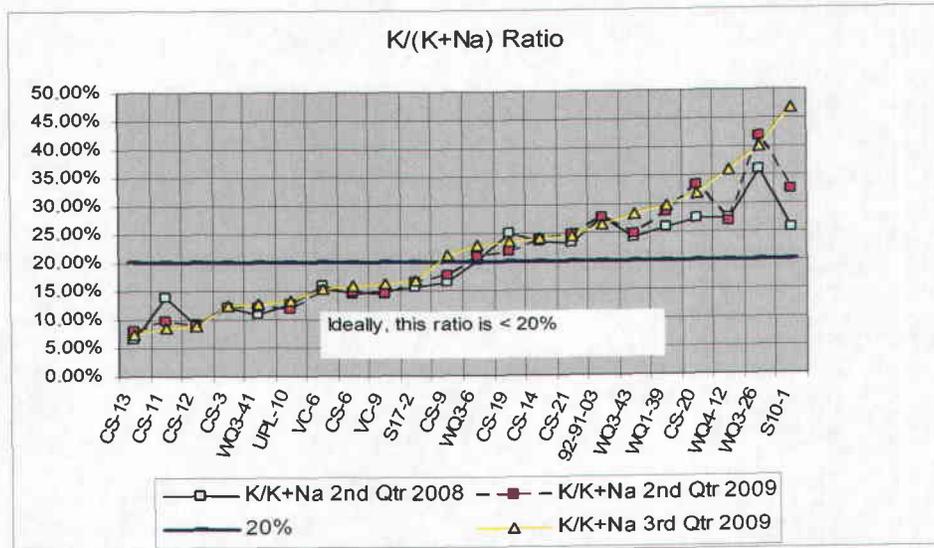
○ **Ca/(Ca + SO4) ratio**

- Ideally the Ca/(Ca + SO4) ratio is < 50%
- Only 8 of the 25 3rd Qtr 2009 samples have a Ca/(Ca + SO4) ratio < 50%.
- This relationship appears to be consistent over time (see chart – 23 of 25 sites).



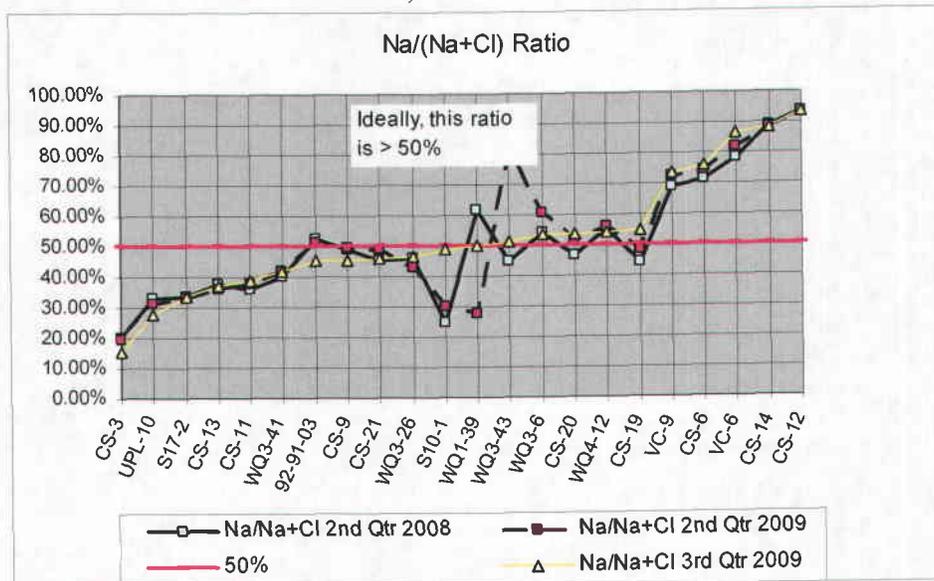
○ **K/(K+ Na) ratio**

- The K/(K+ Na) ratio should be < 20%.
- This ratio is > 20% for 14 of the 25 3rd Qtr 2009 samples.
- At the remaining sites, the ratio ranges from 7 to 17%.
- This relationship appears to be consistent over time (see chart – 22 of 25 sites).



○ **Na/(Na + Cl) ratio**

- The Na/(Na + Cl) ratio should be > 50%.
- For 13 of 25 3rd Qtr 2009 samples it is < 50%.
- The ratio is 50% to 93% at the remaining sites.
- This relationship appears to be consistent over time (see chart – 22 of 25 sites).



When these 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. However, the seeming consistency of these reliability checks from quarter to quarter at individual sites also indicates local conditions might not match those upon which these Reliability Checks were formulated.

UPDES

The UPDES permit (dated Nov. 23, 2004) in effect during the Third Quarter 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 Third Quarter of 2009, the discharge at UPDES Permit discharge point UT0023540-001 Permittee did not exceed the DML for TDS of 1,310 mg/L; however, the average was 534 mg/L and the tons/day load averaged over 10 tons/day, ranging from 8.7 to 15 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

Isotopic data and the accompanying field data still need to be submitted for EL-1, EL-2, S15-3, S24-1, 2-413, 8-253, and JC-1,

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

Second Quarter 2009 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 waiting for the rest of the isotope data for JC-1.

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

There were no missing or irregular data for the Third Quarter 2009; however, deuterium, carbon¹⁴, and oxygen¹⁸ data for the 3rd and 4th Quarters 2008 have still not been submitted to the database.

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