

#3971

OK

**WATER QUALITY
MEMORANDUM**
Utah Coal Regulatory Program

June 25, 2012

TO: Internal File

THRU: Steve Christensen, Permit Supervisor *SC*

FROM: Ken Hoffman, Hydrologist *KH*

RE: Fourth Quarter of 2011 Water Monitoring, Canyon Fuel Company, LLC, C/007/0005, Task ID #3971

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, 2-38, and 2-39 of the MRP.

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

Second, third, and fourth quarter monitoring requires regular information from 76 sites. Additional locations on streams in the North Lease are monitored for one year before, during, and for one year after their being undermined.

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 fourth quarter sampling at 6 sites categorized as "other" or "in-mine, roof drippers". All 6 are 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 these sites.

Springs

No springs are monitored during the first quarter, but 26 springs are monitored during the second, third, and fourth quarters: 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, WQ4-12, S15-3, S24-1, 2-413, and 8-253 the Permittee submitted all required information for the springs.

Streams

The MRP requires first quarter sampling at only 4 stream-sites: *CS-6, VC-6, VC-9, and VC-10*, but at 28 sites during the second, third, and fourth quarters: *CS-3, 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-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*. EL-1 and EL-2 are for tritium analysis only, and except for EL-1 and EL-2 (See Note above), the Permittee submitted all required information for these stream sites.

The Permittee monitors additional stream sites in the North Lease (designated as NL-1 through NL-42) monthly for 12 months before, during, and 12 months after their 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 measuring flow during other months if the sites are accessible. Twelve NL sites were monitored during the Fourth Quarter of 2011.

Wells

Water levels are measured at 14 wells during the second, third, and fourth quarters: *W79-10-1B, 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, W20-28-1, 91-26-1, W91-35-1, and 92-91-03*. Operational parameters are also measured at 92-91-03.

Monthly flow measurements are required year round at JC-1 and JC-3. During the second, third, and fourth quarters, the Permittee also measures all field parameters, TDS, TSS, and Total Phosphorous at both sites once per quarter, plus isotopes C¹⁴, Tritium, Deuterium, and O¹⁸ at JC-1 once per quarter.

ELD-1 is reported with the "other" or "in-mine, roof drippers" sites. 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. The Permittee submitted all required information for the well sites for the Fourth Quarter of 2011.

UPDES

The UPDES Permit and MRP require 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 first quarter, and monthly flow and quarterly field parameters, TDS, TSS, and T-P during the second, third, and fourth quarters. (The UPDES permit for JC-3 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.

The Permittee submitted all required information for the UPDES sites for the Fourth Quarter of 2011. Outfall 001 flowed throughout the quarter. Outfalls 002 and 003 reported no flow during the entire quarter.

2. Were all required parameters reported for each site?

Springs YES NO

Streams YES NO

Wells YES NO

UPDES YES NO

3. Were any irregularities found in the data?

Springs YES NO

S36-1 October: total dissolved solids, specific conductance

S10-1 November: specific conductance, total calcium

S17-2 November: cation-anion balance

WQ3-26 October: dissolved sodium

WQ3-41 October: total alkalinity, cation-anion balance, dissolved sodium, sulfate, chloride

WQ3-43 October: cation-anion balance, dissolved sodium

WQ4-12 October: dissolved sodium

Streams YES NO

CS-13 November: cation-anion balance

CS-16 November: specific conductance

CS-18 November: specific conductance

CS-19 November: specific conductance, chloride

CS-20 November: dissolved potassium, sulfate

CS-3 November: specific conductance

CS-8 November: water temperature

F-10 November: specific conductance

VC-6 November: bicarbonate

Wells YES NO

W91-26-1 November: depth

W91-35-1 November: depth

92-91-03 November: depth, chloride

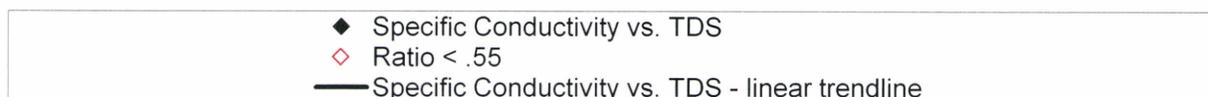
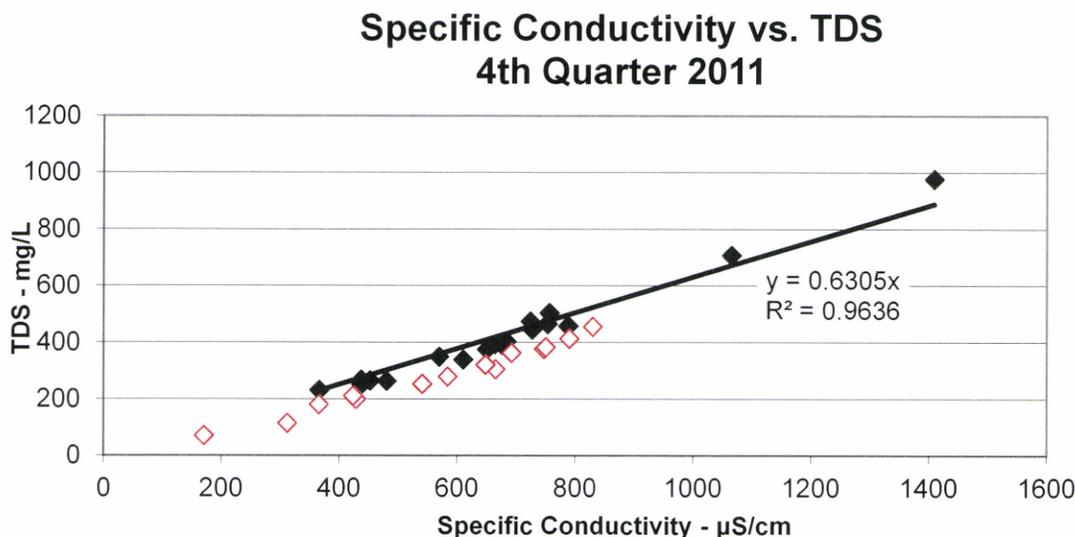
UPDES YES NO

UPDES permit UT0023540 (effective December 1, 2009) allows for a maximum daily effluent limitation (MDEL) for total dissolved solids (TDS) of 1,200 mg/L and a 30-day average of 500 mg/L. There is no tons/day loading limit unless the 30-day average exceeds 500 mg/l; then a 7.1 tons/day limit

is imposed. During the Fourth Quarter of 2011, discharge at Outfall 001 exceeded the 30 day average of 500 mg/L for TDS in October so the loading limitation was triggered. In addition, the 7.1 tons/day limit was exceeded during October. Because of ongoing exceedences, particularly at outfall 001, Canyon Fuel Company participates in the Salinity Offset Plan that was approved by DWQ on January 5, 2005 (retroactive to September 2004). Due participation in the Salinity Offset Plan these exceedences are not violations

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 33 samples for which both field specific conductivity and TDS were determined, 18 have a TDS/Conductivity ratio in the expected range between 0.55 and 0.69.
 - The linear trendline has a slope of 0.63 (see chart).
 - UPDES discharges account for 7 of the 33 samples.



- For 27 samples, the Division calculated Reliability Checks that involve dissolved Ca, Mg, K, Na, Cl, and SO₄. There were not data on dissolved ions at other sites.
 - **Mg/(Ca + Mg) ratio**
 - Ideally the Mg/(Ca + Mg) ratio is < 40%.
 - 0 of 26 samples have a ratio < 40%
 - The CS-12 ratio is at 40%; CS-12 frequently has the highest ratio, right at or slightly above 40%.
 - These results are consistent with results from recent quarters.

- **Ca/(Ca + SO4) ratio**
 - Ideally the Ca/(Ca + SO4) ratio is $\geq 50\%$.
 - Of the 26 samples, 5 have a Ca/(Ca + SO4) ratio $< 50\%$.
 - The lowest ratio is 17%.
 - Because Mg/(Ca + Mg) values are within the expected range, SO4 values may bear watching; however, these results are consistent with results from recent quarters.

- **Na/(Na + Cl) ratio**
 - The Na/(Na + Cl) ratio should be $\geq 50\%$.
 - The ratio ranges from 50% to 94% at 13 sites, slightly under half the sites.
 - These are the very similar to the results from previous quarters

- **K/(K+ Na) ratio**
 - The K/(K+ Na) ratio should be $\leq 20\%$.
 - For 13 of the samples, the ratio is $>20\%$.
 - At the other 13 sites, the ratio ranges from 7 to 19%.
 - These values are consistent with recent results.

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. 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 consistent results of these reliability checks from quarter to quarter might also indicate that local conditions do not match those upon which these Reliability Checks were formulated.

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 2015 (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

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

None.

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

There were no missing or irregular data.