

**WATER QUALITY
M E M O R A N D U M
Utah Regulatory Program**

June 30, 2009

TO: Internal File

THRU: Daron Haddock, Permit Supervisor

FROM: James D. Smith, Environmental Scientist III *JS 6/30/09*

RE: 2008 Third Quarter Water Monitoring, Canyon Fuel Company, LLC, Skyline Mine, C/007/0005, Task ID #3199

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 of the MRP, in particular pages 2-35 through 2-39aa, 2-44, and 2-45.

*Note: Samples are analyzed for isotopes at several sites. 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.

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

In-mine

The MRP requires 3rd quarter sampling of 6 sites classified in the database as "in-mine, roof drippers", but mine discharge stations CS-12, CS-14, MD-1, and SRD-1 and french drain CS-13 are reported as stream sites, and ELD-1, the combined output of JC-1 and JC-3, is reported with the wells.

Springs

The MRP requires spring sampling at 26 springs during the 3rd quarter (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).

The Permittee did not submit any data for the following spring monitoring site for the 3rd quarter 2008:

S36-12: (field); field parameters were measured at S36-12 on July 9, 2008, but this was considered to be the 2nd quarter data because 2nd quarter

sampling can be done through July 15 whenever snow prevents access before June 1. If the July 9 measurements were for the 3rd quarter, then there were no 2nd quarter data at this site.

Streams

The MRP requires spring sampling at 36 stream-sites (CS-3, CS-4, CS-6, CS-7, CS-8, CS-9, CS-10, CS-11, CS-12, CS-13, CS-14, CS-16, CS-17, CS-18, CS-19, CS-20, CS-21, CS-22, CS-23, MD-1, SRD-1, F-9, F-10, UP&L-10, VC-6, VC-9, VC-10, VC-11, VC-12, WRDS-1, WRDS-2, WRDS-3, WRDS-4, EL-1, and EL-2).

The Permittee submitted all required samples for the streams.

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 and reported in the Annual Hydrologic Report (Sec. 2.4.4) and is submitted to the 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. For the 3rd quarter 2008, flow was reported at 13 of these sites for July, August, and September; and at 6 additional sites for August and September

Wells

The MRP requires spring sampling at 18 wells (JC-1, JC-3, ELD-1, 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).

The Permittee submitted all required samples for the wells.

UPDES

The UPDES Permit/MRP require weekly monitoring of 3 outfalls: UT0023540-001, 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. Well JC-3 is permitted as a UPDES point by PacifiCorp; JC-3 has not discharged since July of 2004.

The Permittee submitted all required samples for the UPDES sites. Only outfall -001 discharged during the 3rd quarter 2008.

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

In addition to the sites for which no data were submitted (listed under Item 1 above) the following parameters were missing from data sets that were submitted:

JC-1 age dating: *deuterium, *¹⁴C, and *¹⁸O

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

Tabulated below are parameters that fell outside two standard deviations from the mean. This list is much shorter than for the 2nd quarter 2008, probably because the flows were exceptionally high in the 2nd quarter. Only a handful of site – parameter pairings, indicated by bold type, are repeated from the 2nd quarter.

Parameter	Site	Value	Standard Deviations from Mean	Mean
NO2+NO3 as N	CS-12	2.62 mg/L	2.32	0.59 mg/L
	WQ1-39	4.0 mg/L	5.60	0.78 mg/L
	WQ3-26	3.64 mg/L	2.84	1.42 mg/L
	WQ3-41	3.17 mg/L	3.06	0.27 mg/L
Bicarbonate as CaCO3	S17-2	250 mg/L	2.61	1.52 mg/L
	92-91-03	338 mg/L	2.23	361.45 mg/L
Cation/anion balance	CS-9	6.8 %	2.28	2.66 %
	CS-11	5.5 %	4.16	1.35 %
	CS-13	5 %	2.29	1.50 %
	CS-14	4.2 %	2.48	1.34 %
	S17-2	4.8 %	2.61	1.52 %
	VC-6	4.9 %	2.20	1.79 %
TDS	S10-1	175 mg/L	2.14	105.45 mg/L
	CS-3	397 mg/L	213	275.01 mg/L
Cl	CS-3	63 mg/L	2.35	17.40 mg/L

The cation/anion balance at CS-11 and CS-13 is of concern because this is the second quarter in row that the balance has been greater than 5 %. The lab and Permittee need to investigate the reason for this imbalance.

Up through the 1st quarter 2008, chloride values were increasing steadily at CS-3; however, the value dropped to 29 mg/L during the 2nd quarter 2008. In the 3rd quarter 2008, the value jumped back up, to 63 mg/L. See the attached chart. The National Secondary Drinking Water standard for chloride is 250 mg/L.

Flow values did not exceed two standard deviations from the mean at any site, in contrast to the 2nd quarter when 19 sites had flows above the two standard deviation limit

This is the second quarter that springs WQ3-41 WQ3-26 WQ1-39 had elevated NO₂+NO₃ as N. This parameter was also elevated at stream site CS-12. See the attached charts. There is no evident explanation for these elevated N values. This parameter will be checked in successive quarters to determine if there is a trend or pattern.

Reliability Checks

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.) Several routine Reliability Checks found a number of values outside of those expected.

- TDS/Conductivity
 - Out of 40 samples for which both field specific conductivity and TDS were determined in the 3rd Qtr 2008, 20 have TDS/Conductivity ratios within the typical range of 0.55 and 0.76.
 - None are below 0.6.
 - Thirteen of the 20 sites where this ratio is > 0.76 are UPDES discharge points, and no UPDES sites have a ratio < 0.76.
 - The highest ratios (>0.87) are at 92-91-03, WQ3-26, and CS-3.
 - The Conductivity/Total Cations ratio should be close to 1.00.
 - For the 26 samples that had both parameters measured in the 3rd Qtr 2008, this ratio ranges from 0.66 to 0.89.
 - The highest ratio was at WQ3-26.
 - These two checks indicate that the field specific conductivity measurements could be consistently low.
 - In response to the comment in the First Quarter 2008 Water Quality Memo on calibrating the field specific conductivity meter, the Permittee stated that they routinely clean and calibrate the conductivity meter and verify that the field parameters are within site specific range.
- The Division calculated Reliability Checks that involve dissolved Ca, Mg, K, Na, Cl, and SO₄. There were 26 samples that were analyzed for these five ions in the 3rd Qtr 2008.
 - Ideally the Mg/(Ca + Mg) ratio is < 40%.
 - Of the 26, 24 have a ratio < 40%.

- As during the 1st and 2nd quarters, CS-12, is right at 40%.
- CS-6 has the highest ratio, 42%: this site has few outlying parameter values in the last two years.
- Ideally the Ca/(Ca + SO₄) ratio is > 50%: of the 26 samples, 7 have a ratio < 50%.
 - CS-6 and CS-12 have the lowest ratios, 27% and 17%, so Mg, Ca, and sulfate should be watched for trends at these two sites.
 - Because Mg/(Ca + Mg) values for the other 5 sites are within the expected range, SO₄ values may bear watching at these sites.
- The K/(K+ Na) ratio should be < 20%.
 - As in the 2nd Qtr, half the sites are > 20 %.
 - The highest is 47 %, at S10-1.
- The Na/(Na + Cl) ratio should be > 50%.
 - Only 12 of the 26 sites are > 50 %
 - The ratio is as low as 14 % (at CS-3, which was the lowest 2nd Qtr.)
 - The Permittee and lab need to watch the ion analysis procedures for ions for quality and consistency during the coming quarters.

Reliability Checks not meeting the target value 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 and laboratory. 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 (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 3rd quarter of 2008, the discharge at UPDES Permit discharge points UT0023540-001 (13 weeks) did not exceed the DML for TDS; however, the 30-day average remained well above 500 mg/l and the tons/day load during the 3rd quarter averaged over 14 tons/day (as 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). A copy of the agreement can be found in the Division's Incoming files, and at: <https://fs.ogm.utah.gov/FILES/COAL/PERMITS/007/C0070005/2005/INCOMING/0006.pdf>.

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 to recommend at this time.

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

The Permittee needs to provide the 3rd Quarter data for 36-12.

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

The 2nd quarter Water Monitoring Memo stated that dissolved Fe and dissolved Mn were not reported for well 92-91-03. This was based on Table 2.3.7-5 in the Division's copy of the MRP. As it turns out, the Division approved removal of that table from the MRP in June 2006 and well 92-91-03 is now monitored for the same lab parameters as other sites, which includes total - but not dissolved - Fe and Mn. Table 2.3.7-5 has been removed from the Division's copy of the MRP.

8. Did the Mine Operator account for all missing or irregular data?

The Permittee needs to provide the 3rd Quarter data for 36-12.

Chloride at CS-3



