

WATER QUALITY
MEMORANDUM
Utah Coal Regulatory Program

#3568
OK

December 2, 2010

TO: Internal File

THRU: Daron Haddock, Permit Supervisor *RDH*

FROM: James D. Smith, Environmental Scientist III *JS 12/2/2010*

RE: 2010 Second Quarter Water Monitoring, Canyon Fuel Company, LLC, Skyline Mine, C0070005, Task ID # 3568

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, especially pages 2-36, 2-36a, 2-36b, 2-37, 2-38, and 2-39.

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 sampling at 6 sites categorized as "other" or "in-mine, roof drippers" for all four quarters. All 6 are monitored at the surface: *CS-12, CS-14, 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 for the Second Quarter 2010.

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, and WQ4-12* Except for tritium values 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 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 for the Second Quarter 2010.

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 Second Quarter 2010.

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. None of these wells are monitored during the First Quarter.

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.

Except for isotopic data at JC-1 (See Note above), the Permittee submitted all required information for the well sites for the Second Quarter 2010.

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 Second Quarter. Outfall 001 flowed throughout the quarter but Outfalls 002 and 003 reported no flow during the entire quarter.

2. Were all required parameters reported for each site? YES NO
3. Were any irregularities found in the data? YES NO

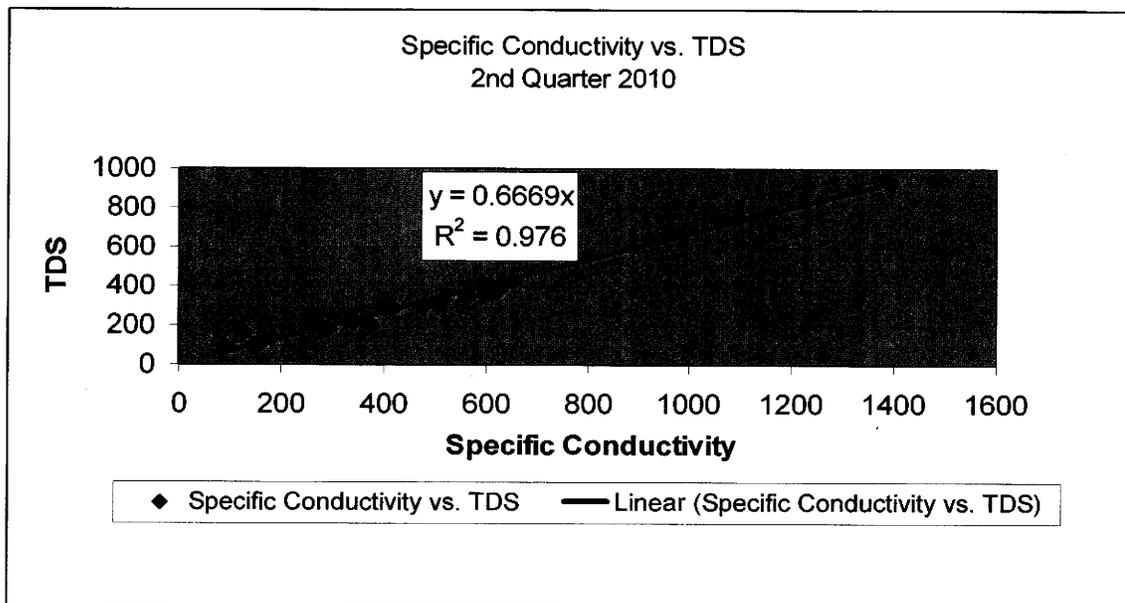
Listed parameters were more than two standard deviations from the mean. Parameters in bold typeface were also more than two standard deviations from the mean during the last quarter when monitoring was done. Underlined and bolded parameters have been more than two standard deviations from the mean during two or more consecutive monitoring events. An asterisk indicates the parameter is not required.

Site Name	Type	Parameters
CS-13	Other	water temperature
CS-19	Stream	total hardness , TDS, and Cl
CS-20	Stream	total hardness, flow, and total cations*
CS-21	Stream	field electric conductivity , total alkalinity, total cations*, D-Ca, D-Mg, total hardness, TDS, bicarbonate as CaCO ₃ , SO ₄
F-10	Stream	flow
VC-6	Stream	total hardness
VC-9	Stream	total hardness and bicarbonate as CaCO ₃
VC-11	Stream	flow
VC-12	Stream	flow
S23-4	Spring	flow
S35-8	Spring	flow
WQ1-1	Spring	field electric conductivity
WQ1-39	Spring	flow, total hardness, TDS, and field electric conductivity
WQ3-6	Spring	total hardness
WQ3-26	Spring	flow and cation-anion balance
W91-35-1	Well	depth

With the exception of WQ3-26, S10-1, and S13-7, cation-anion balances were within 5% for all samples that were analyzed for the appropriate ions. The 25.96 % difference at WQ3-26 indicates possible errors in the analyses for anions and cations.

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 26 samples for which both field specific conductivity and TDS were determined, 23 have a TDS/Conductivity ratio in the expected range between 0.55 and 0.76.
 - CS-19 is just outside the bottom of that range at 0.53.
 - The ratio was 1.04 at WQ3-26 and 1.29 at S10-1: these are the two leftmost points on the chart.
 - The linear trendline has a slope of 0.67 (see chart).



- The 26 samples for which both field specific conductivity and total cations were determined have a Conductivity/Cations ratio of 78 to 100; this ratio should be close to 100.
- For 26 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 $\leq 40\%$.
 - All 26 samples have ratios $\leq 40\%$.

- The CS-12 ratio is right at 40%; CS-12 frequently has the highest ratio, right at or slightly above 40%.
- These results are consistent with results from recent quarters (see summary comment below).
- **Ca/(Ca + SO₄) ratio**
 - Ideally the Ca/(Ca + SO₄) ratio is $\geq 50\%$.
 - Of the 26 samples, 7 have a Ca/(Ca + SO₄) ratio $< 50\%$.
 - The lowest ratio is 16%.
 - 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.
- **K/(K+ Na) ratio**
 - The K/(K+ Na) ratio should be $\leq 20\%$.
 - For 14 of the samples, the ratio is $>20\%$.
 - At the other 12 sites, the ratio ranges from 6 to 16%.
 - These values are consistent with recent results.
- **Na/(Na + Cl) ratio**
 - The Na/(Na + Cl) ratio should be $\geq 50\%$.
 - The ratio ranges from 50% to 94% at 14 sites, slightly over half the sites.
 - These are the very similar to the results from previous quarters

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.

UPDES

UPDES permit UT0023540 (effective December 1, 2009) allows for a DML for TDS of 1,200 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 Second Quarter of 2010, the discharge at Outfall 001 did not exceed the DML for TDS of 1,200 mg/L; however, the 30-day average was 502 mg/L (471 to 530 mg/L) and the tons/day load (calculated from the weekly values for TDS and flow in the database) during the Second Quarter averaged over 10 tons/day, ranging from 8.6 to 14.2 tons/day. 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).

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 Third Quarter (MRP p. 2-44).

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

Other than submitting the isotope data when they become available, 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

The Permittee needs to submit the isotope data when they become available.

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

None.

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

The Permittee needs to submit the isotope data when they become available and the associated field parameters for S15-3.