

WATER QUALITY MEMORANDUM

Utah Coal Regulatory Program

August 26, 2005

TO: Internal File

THRU: D. Wayne Hedberg, Permit Supervisor

FROM: Dana Dean, P.E., Senior Reclamation Hydrologist

RE: 2004 Third Quarter Water Monitoring, Canyon Fuel Company, Skyline Mine, C/007/0005, Task #1991

- 1. Was data submitted for all of the MRP required sites?** YES NO
Identify sites not monitored and reason why, if known:

- 2. On what date does the MRP require a five-year resampling of baseline water data.**
See Technical Directive 004 for baseline resampling requirements. Consider the five-year baseline resubmittal when responding to question one above. Indicate if the MRP does not have such a requirement.

Resampling due date

There is no commitment in the MRP to resample for baseline parameters.

- 3. Were all required parameters reported for each site?** YES NO
Comments, including identity of monitoring site:

- 4. Were irregularities found in the data?** YES NO
Comments, including identity of monitoring site:

Several parameters fell outside of two standard deviations from the mean encountered at the respective sites. Ignoring seasonal temperature values that naturally fluctuate widely, they were:

Site	Parameter	Value	Standard Deviations from Mean	Mean
CS-1	Turbidity	9 NTU	2.60	3.66 NTU
CS-19	Total Suspended Solids	49 mg/L	2.04	20.83 mg/L
CS-3	Chloride	53 mg/L	3.07	12.11 mg/L
CS-6	Dissolved Calcium	139 mg/L	5.25	75.05 mg/L
CS-6	Dissolved Magnesium	83.8 mg/L	4.18	35.52 mg/L
CS-6	Dissolved Potassium	9.99 mg/L	2.35	4.62 mg/L
CS-6	Total Dissolved Solids	926 mg/L	2.68	452.18 mg/L
CS-7	Dissolved Magnesium	20.3 mg/L	2.12	13.41 mg/L
MC-2	Total Dissolved Solids	869 mg/L	5.10	420.60 mg/L
MC-3	Conductivity	1168 µmhos/cm	4.91	665.6 µmhos/cm
MC-3	Total Dissolved Solids	837 mg/L	5.34	413 mg/L
MC-4	Conductivity	1181 µmhos/cm	5.42	652.20 µmhos/cm
MC-4	Total Dissolved Solids	845 mg/L	5.34	408.40 mg/L
VC-6	Dissolved Calcium	162 mg/L	3.97	82.24 mg/L
VC-6	Total Dissolved Solids	1008 mg/L	2.11	500.73 mg/L
VC-6	Dissolved Magnesium	88.9 mg/L	2.39	38.38 mg/L
VC-6	Sulfate	536 mg/L	2.47	176.65 mg/L
VC-9	Dissolved Calcium	134 mg/L	3.08	78.21 mg/L
VC-9	Dissolved Magnesium	83.2 mg/L	3.05	36.97 mg/L
VC-9	Dissolved Potassium	10.2 mg/L	2.32	4.61 mg/L
VC-9	Total Dissolved Solids	918 mg/L	2.33	465.07 mg/L
92-91-03	Dissolved Calcium	229 mg/L	2.23	175.56 mg/L
92-91-03	Dissolved Magnesium	46.8 mg/L	2.11	33.20 mg/L
92-91-03	Total Hardness	765 mg/L	2.06	557.30 mg/L
92-91-03	Turbidity	320 NTU	4.10	30.98 NTU
W79-35-1B	Depth	190.33 ft.	2.04	174.31 ft.
S24-12	Total Iron	5.37 mg/L	3.44	0.42 mg/L
S36-12	Turbidity	29 NTU	3.41	3.74 NTU
WQ4-12	Turbidity	31 NTU	6.65	9.74 NTU
WQ4-12	Total Suspended Solids	42 mg/L	6.72	17.20 mg/L
MD-1	Conductivity	1403 µmhos/cm	3.77	803.80 µmhos/cm
Site	Parameter	Value	Standard Deviations from Mean	Mean
MD-1	Total Dissolved Solids	1004 mg/L	3.25	525.88 mg/L

CS-2	Dissolved Calcium	160 mg/L	4.31	81.49 mg/L
CS-2	Dissolved Magnesium	87 mg/L	2.32	38.75 mg/L
CS-2	Total Dissolved Solids	1037 mg/L	2.42	472.62 mg/L

Increased mine discharge accounts for most of the irregular parameters (CS-6, MC-2, MC-3, MC-4, VC-6, VC-9, and MD-1).

The turbidity reading at CS-1 was high due to precipitation.

At CS-19, there is no obvious cause for the suspended solids to be high. This site is not near any current mining and is just above Scofield Reservoir in Woods Canyon. The most likely reason for the statistical anomaly is that there are only eight samples in the database for this site.

The high chloride reading at CS-3 was due to highway salt runoff.

The well recovery at 92-91-03 is quite low, causing the water to be turbid. The hardness of the water increased to 765 mg/L, which falls into the “very hard” range. However, the hardness at 92-91-03 has always been “hard” to “very hard,” with twenty-nine of the thirty samples falling into the “very hard” range.

The depth readings at W79-35-1B have been off since the Permittee undermined the well around the third quarter of 2003. Subsidence may have damaged the well casing.

The iron at S24-12 has always been less than 2 mg/L, except for this reading. S24-12 is located above the mine, high in the South Fork of Eccles Canyon, and no mining has taken place near it in the past year. The Permittee notes that this was due to a high suspended load, but the suspended load has been much higher in the past with no such effect on iron load. It is unclear why this reading was high, however the November, 2004 reading was back to <2mg/L.

The Permittee disturbed the sediment at S36-12 while taking the sample, which explains the high turbidity reading.

There is no mining activity near WQ4-12 yet, since it is located in Bob’s Canyon above the North Lease. The turbidity and total suspended solids, which are related, are both quite high. The sediment may have been disturbed while taking this sample as well.

Several routine Reliability Checks were outside of standard values. They were:

Site	Reliability Check	Value Should Be...	Value is...
CS-1	K/(Na + K)	< 20%	28%
CS-10	K/(Na + K)	< 20%	28%
CS-11	Na/(Na + Cl)	> 50%	42%
CS-16	K/(Na + K)	< 20%	24%

CS-17	K/(Na + K)	< 20%	24%
CS-18	Na/(Na + Cl)	> 50%	48%
CS-19	Mg/(Ca + Mg)	< 40 %	44%
CS-20	K/(Na + K)	< 20%	28%
CS-3	Na/(Na + Cl)	> 50%	14%
CS-6	Mg/(Ca + Mg)	< 40 %	50%
CS-7	K/(Na + K)	< 20%	34%
CS-8	Na/(Na + Cl)	> 50%	41%
F-10	K/(Na + K)	< 20%	23%
UPL-10	Na/(Na + Cl)	> 50%	35%
VC-10	TDS/Conductivity	>0.55 & <0.75	0.55
VC-10	K/(Na + K)	< 20%	27%
VC-6	TDS/Conductivity	>0.55 & <0.75	0.76
VC-6	Mg/(Ca + Mg)	< 40 %	48
VC-6	Ca/ (Ca + SO4)	> 50 %	42
VC-9	Mg/(Ca + Mg)	< 40 %	51%
CS-21	K/(Na + K)	< 20%	91%
92-91-03	K/(Na + K)	< 20%	21%
JC-1	TDS/Conductivity	>0.55 & <0.75	0.54
2-413	Na/(Na + Cl)	> 50%	42%
S13-7	K/(Na + K)	< 20%	27%
S13-7	Na/(Na + Cl)	> 50%	43%
S14-4	K/(Na + K)	< 20%	21%
S14-4	Na/(Na + Cl)	> 50%	29%
S15-3	TDS/Conductivity	>0.55 & <0.75	0.53
S15-3	Na/(Na + Cl)	> 50%	40%
S17-2	Na/(Na + Cl)	> 50%	43%
S22-11	K/(Na + K)	< 20%	20%
S22-5	Na/(Na + Cl)	> 50%	24%
S23-4	K/(Na + K)	< 20%	31%
S24-12	K/(Na + K)	< 20%	34%
S26-13	K/(Na + K)	< 20%	27%
S34-12	K/(Na + K)	< 20%	22%
S35-8	K/(Na + K)	< 20%	29%
S361-12	TDS/Conductivity	>0.55 & <0.75	0.51
Site	Reliability Check	Value Should Be...	Value is...
S361-12	Na/(Na + Cl)	> 50%	45%
WQ1-39	K/(Na + K)	< 20%	21%
WQ3-26	K/(Na + K)	< 20%	27%
WQ4-12	K/(Na + K)	< 20%	28%
CS-14	Mg/(Ca + Mg)	< 40 %	48%

CS-14	Ca/ (Ca + SO4)	> 50 %	42%
MD-1	Mg/(Ca + Mg)	< 40 %	48%
MD-1	Ca/ (Ca + SO4)	> 50 %	43%
UT0023540-001 Jul. 7	TDS/Conductivity	>0.55 & <0.75	0.52
UT0023540-001 Aug. 11	TDS/Conductivity	>0.55 & <0.75	0.51
UT0023540-001 Aug. 24	TDS/Conductivity	>0.55 & <0.75	0.49
UT0023540-001 Sep. 16	TDS/Conductivity	>0.55 & <0.75	0.75
UT0023540-001 Sep. 28	TDS/Conductivity	>0.55 & <0.75	0.79

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. These inconsistencies do not necessarily mean that a sample is wrong, but it does indicate that something is unusual. An analysis and explanation of the inconsistencies by the Permittee would help to increase the Division's confidence in the samples. The Permittee can learn more about these reliability checks and some of the geological and other factors that could influence them by reading Chapter 4 of *Water Quality Data: Analysis and Interpretation* by Arthur W. Hounslow.

5. Were DMR forms submitted for all required sites?

1st month, YES NO
 2nd month, YES NO
 3rd month, YES NO

6. Were all required DMR parameters reported?

YES NO

Comments, including identity of monitoring site:

7. Were irregularities found in the DMR data?

YES NO

Comments, including identity of monitoring site:

Because the Permittee had to increase mine discharge to keep up with inflows, the total dissolved solids (TDS) began to exceed the UPDES permit limit of 7.1 tons per day (tpd) in September. However, the discharge continued to comply with the 1310 mg/L limit for TDS.

Canyon Fuel worked closely with DWQ to remedy the situation, and after much study and effort, DWQ modified the Skyline Mine UPDES permit in May of 2003 to remove the 7.1 ton per day limit for TDS, unless the 30-day average were to exceed 500 mg/l.

The Utah Division of Water Quality (DWQ) issued the current permit on Nov. 23, 2004, it allows for a daily maximum of total dissolved solids discharged (TDS) of 1310 mg/l and a 30-day average of 500 mg/l. There is no tons per day (tpd) daily maximum, unless the 30-day average exceeds 500 mg/l; then a 7.1-tpd limit is imposed. The permit also states:

Upon determination by the Executive Secretary that the permittee is not able to meet the 500 mg/L 30-day average or the 7.1 tons per day loading limit, the permittee is required to participate in and/or fund a salinity offset project to include TDS offset credits, within six (6) months of the effective date of this permit.

In September of 2004, Skyline's mine discharge began averaging 850-950 mg/l TDS, and due to volume of water pumped (approx 3500 gpm) they routinely exceed the tons per day limit. Because the conditions at the mine will require such pumping for quite some time, Canyon Fuel Company prepared a salinity offset plan and submitted it as required to DWQ. The Division of Water Quality approved the plan on January 5, 2005, but is retroactive to September 2004.

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

No further actions are required at this time.