

# WATER QUALITY MEMORANDUM

Utah Coal Regulatory Program

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February 4, 2008

*JK*

TO: Internal File

THRU: Pamela Grubaugh-Littig, Permit Supervisor *PL*

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

RE: 2007 First Quarter Water Monitoring, West Ridge Resources, Inc, West Ridge Mine, C/007/0041-WQ07-1, Task ID #2732

The West Ridge Mine is a currently operational longwall mine. Water monitoring data is evaluated from the data that is submitted quarterly by the mine to the Division EDI database. Water monitoring protocols, and surface, groundwater and monitoring wells, and UPDES sample parameters are outlined in the mine's MRP on Tables 7-1 to 7-6.

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

### ***Springs***

*The MRP requires the Permittee to monitor 10 springs each quarter.*

The Permittee submitted all required samples for the spring sites; eight were inaccessible due to snow pack conditions.

### ***Streams***

*The MRP requires the Permittee to sample 12 streams each quarter.*

The Permittee submitted all required samples for the stream sites.

### ***Wells***

*The MRP requires the Permittee to monitor one well each quarter.*

The Permittee submitted the required well site sample.

### ***UPDES***

*The UPDES Permit/MRP require monthly monitoring of two outfalls: 001, Sedimentation Pond Discharge; and 002, Mine Water Discharge.*

The Permittee submitted all required samples for the UPDES sites. Only outfall 002 reported flow.

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

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

Some parameters fell outside of two standard deviations from the mean encountered at the respective sites. They were:

Site	Parameter	Value	Standard Deviations from Mean	Mean
ST-5	Flow	987.36 gpm	4.68	74 gpm
ST-6	Flow	987.36 gpm	3.66	106.55 gpm
ST-8	Cation/Anion Balance	-3.63 %	2.40	1.16 %
SP-15	Total Dissolved Solids	507 mg/L	4.17	402.52 mg/L
SP-16	Cation/Anion Balance	2.32 %	2.17	1.31 %
DH-86-2	Cation/Anion Balance	-5.19 %	2.27	1.54 %

ST-5 and ST-6 are ephemeral streams that mostly have flow only from the mine water discharge. At times, though they have had some base flow pushing their flows above the mine water discharge. This seems to be the case this quarter.

The cation/anion balance has only been reported as negative or positive, instead of absolute value for 3 quarters now. The balance at ST-8 and SP-16 is within the expected range (<5% absolute value). As mentioned below, at DH 86-2 it is outside of the expected value.

There is a weak upward trend in total dissolved solids at SP-15 ( $R^2 = 0.4619$ ), with a weak negative correlation to flow ( $R^2 = 0.276$ ).

Several routine reliability checks fell outside of standard values:

Site	Reliability Check	Value Should Be...	Value is...
ST-5	Cation/Anion Balance	<5%	5.6
ST-5	TDS/Conductivity	>0.55 & <0.75	1.09
ST-5	Conductivity/Cations	>90 & < 110	59
ST-5	Mg/(Ca + Mg)	< 40 %	60%
ST-5	Ca/ (Ca + SO4)	> 50 %	20%
ST-6	Mg/(Ca + Mg)	< 40 %	57%

ST-6	Ca/ (Ca + SO4)	> 50 %	22%
ST-8	Conductivity/Cations	>90 & < 110	83
ST-8	Mg/(Ca + Mg)	< 40 %	58%
SP-15	Conductivity/Cations	>90 & < 110	85
SP-15	Mg/(Ca + Mg)	< 40 %	59%
SP-16	Conductivity/Cations	>90 & < 110	80
SP-16	Mg/(Ca + Mg)	< 40 %	65%
DH-85	Cation/Anion Balance	<5%	5.2
DH-85	TDS/Conductivity	>0.55 & <0.75	0.95
DH-85	Conductivity/Cations	>90 & < 110	85
DH-85	Mg/(Ca + Mg)	< 40 %	70%
DH-85	Ca/ (Ca + SO4)	> 50 %	32%

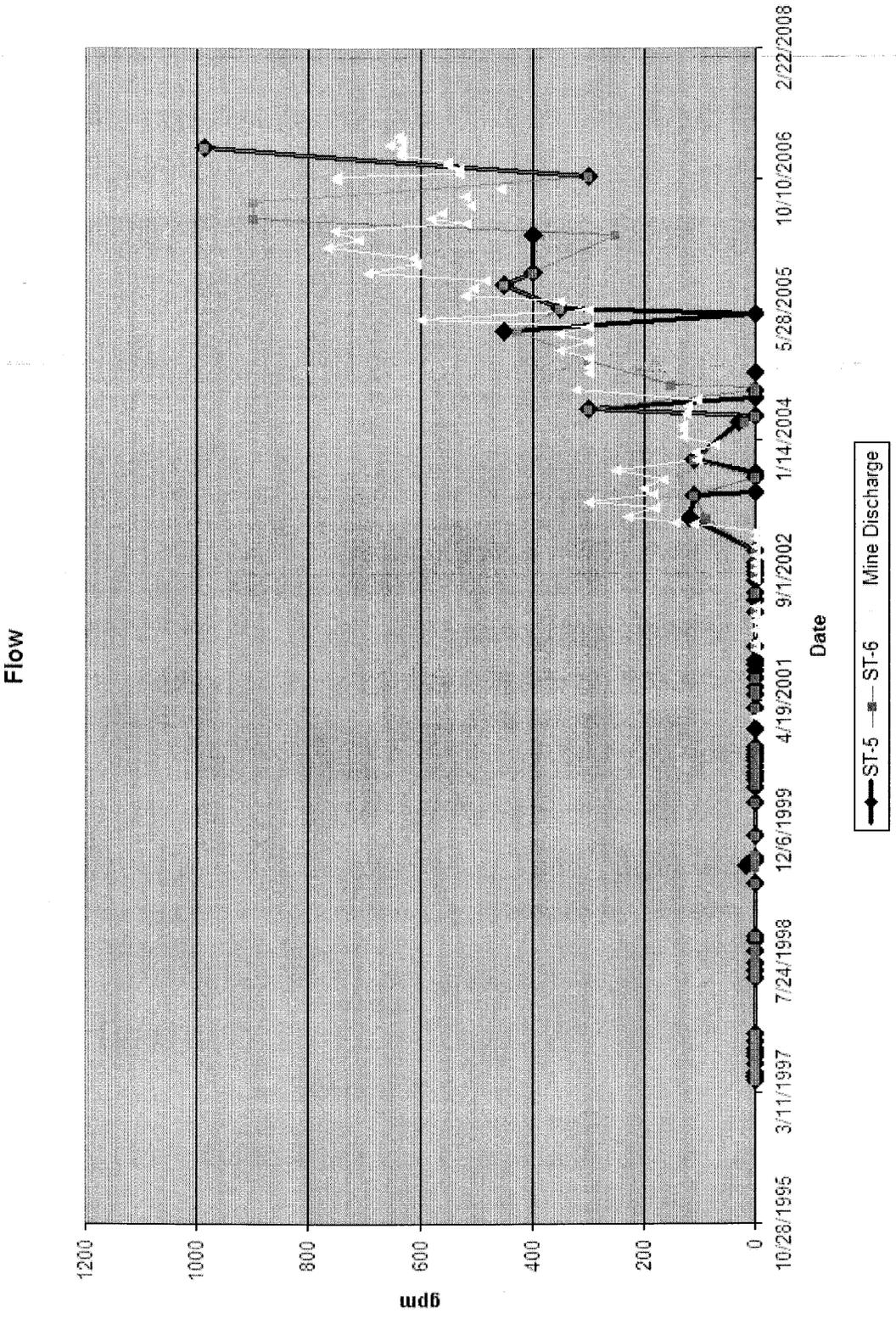
These inconsistencies do not necessarily mean that a sample is wrong, but it does indicate that something is unusual. An analysis and explanation of the inconsistencies by the Permittee would help to increase the Division's confidence in the samples. The Permittee should work with the lab to make sure that samples pass all quality checks so that the reliability of the samples does not come into question. 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.

**4. On what date does the MRP require a five-year re-sampling of baseline water data.**

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

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

No further actions are necessary at this time.



Total Dissolved Solids

$R^2 = 0.4619$

