

# WATER QUALITY MEMORANDUM

## Utah Coal Regulatory Program

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January 11, 2011

TO: Internal File

THRU Daron R. Haddock, Permit Supervisor *DRH*

FROM: James D. Smith, Environmental Scientist III *JDS 01/11/11*

RE: 2010 Third Quarter Water Monitoring, PacifiCorp, Deer Creek Mine, C/015/0018, Task ID #3626

The Deer Creek Mine monitoring plan is described in Appendix A of Volume 9 of the MRP.

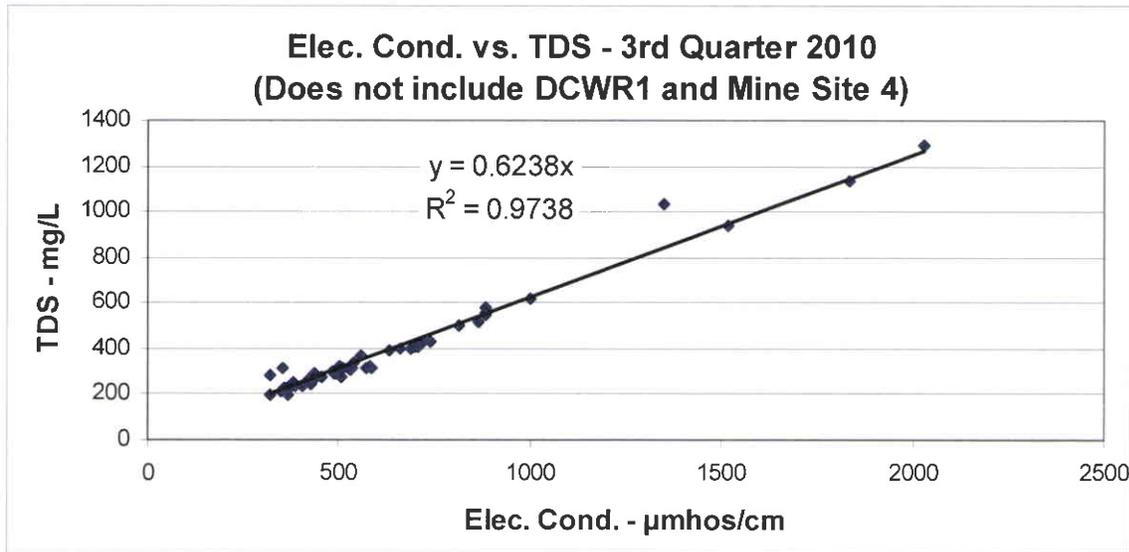
**1. Were data submitted for all of the MRP required sites?**

<b>Streams</b>	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
<b>UPDES</b>	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
<b>In-mine</b>	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
<b>Springs</b>	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
<b>Wells</b>	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>

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

**3. Were any irregularities found in the data?**

The TDS/field electric conductivity ratio typically falls between 0.55 and 0.76 for dissolved solids concentrations found in natural waters. As the following chart shows, data for these two parameters submitted for the Third Quarter 2010 at the Deer Creek Mine generally (DCWR1 and Mine Site 4 data are not included) result in a ratio that falls within this range.



The ratios at Mine Site 4 and DCWR1 are outside the expected range, possibly because of the higher TDS levels in those waters. The following table compares the five sites having the highest ratios of TDS/field electric conductivity in the 3<sup>rd</sup> Quarter 2010 to values from the 2<sup>nd</sup> Quarter. TDS and field electric conductivity values remain high at DCWR1 and Mine Site 4; the TDS/field electric conductivity ratio at RCW4 is just within the expected range. At springs MF 7 and MF 213, the 3<sup>rd</sup> Quarter values for field electric conductivity were anomalously low (more than two standard deviations from the mean) which is why the ratios are high for these two sites.

	2 <sup>nd</sup> Quarter 2010			3 <sup>rd</sup> Quarter 2010		
	EC (field) μmhos/cm	TDS – mg/L	TDS/EC.	EC (field) μmhos/cm	TDS – mg/L	TDS/EC
RCW4	498	315	0.635	1349	1030	0.763
MINE SITE 4	2620	2352	0.898	2600	2264	0.870
MF 7	545	340	0.624	354	313	0.884
MF 213	504	301	0.597	320	285	0.890
DCWR1	17580	16575	0.943	17200	16658	0.968

Parameters listed below were more than two standard deviations from the mean. An asterisk (\*) indicates this is not a parameter or site required by the MRP. Parameters in bold type were also more than two standard deviations from the mean during the previous quarter.

**Streams**

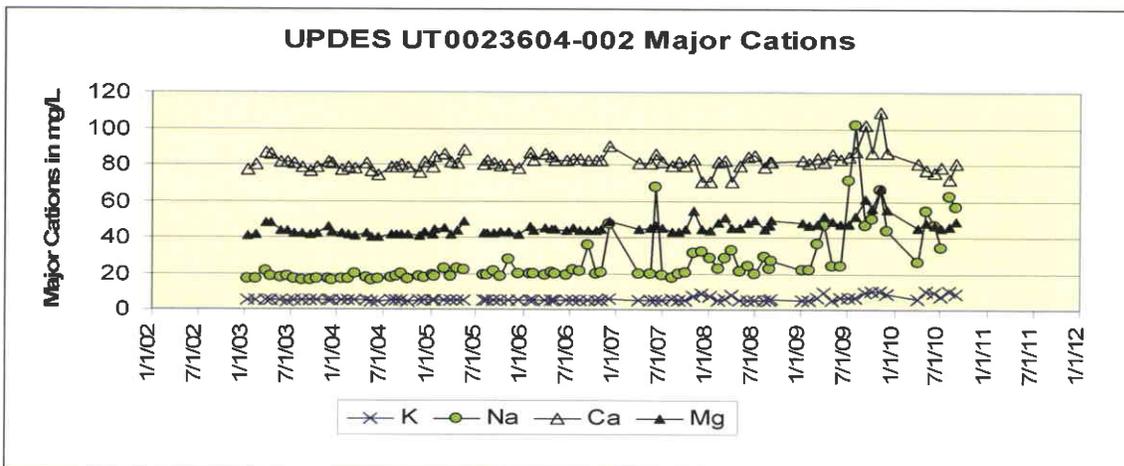
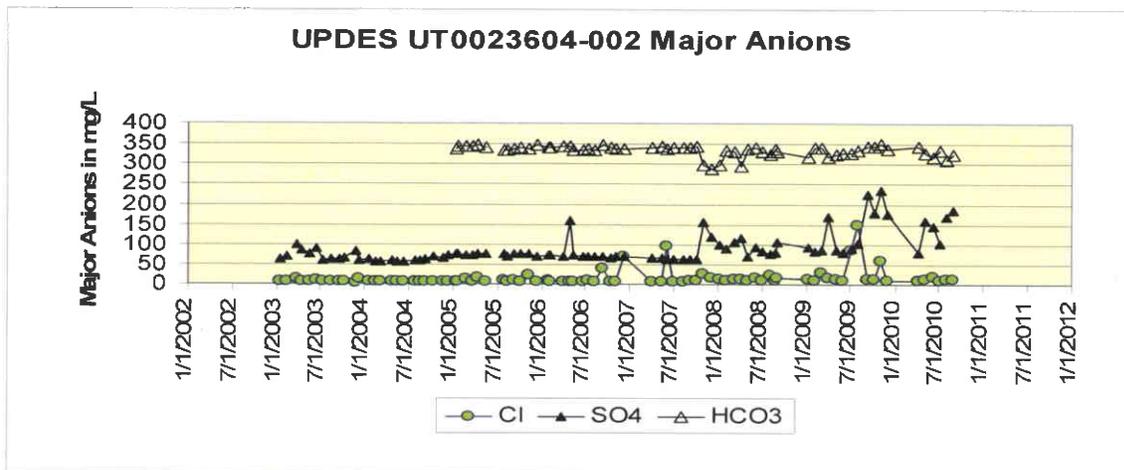
YES  NO

- DCR04 July: **flow**;
- DCR04 August: **flow**;
- DCR04 September: **flow**;
- DCR06 July: **flow**;
- DCR06 August: **flow**;
- DCR06 September: **flow**, cation - anion balance;
- HCC01 September: cation - anion balance;

**UPDES**

YES  NO

- UT0023604-002 August: **K**.

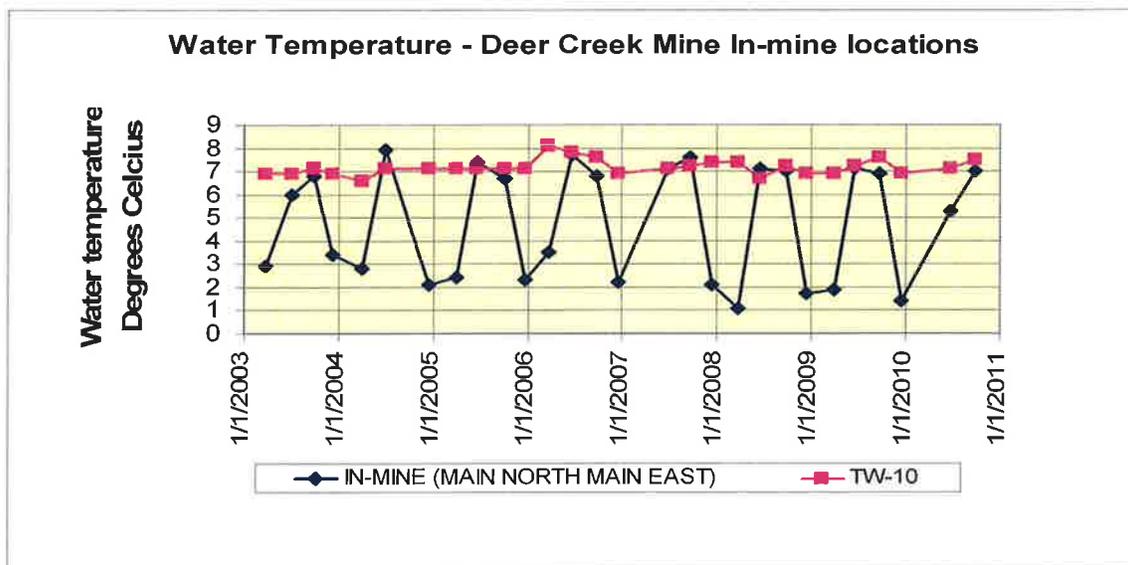


Potassium values have frequently been outside two standard deviations from the mean, but – as can be seen on the preceding charts - with the exception of bicarbonate, major ion concentrations have tended to fluctuated upwards in recent years.

**In-mine**

YES  NO

The water temperature at Main North Main East varies seasonally year-after-year (see following chart), indicating that this in-mine source is most likely fed by infiltration of surface water rather than draining surrounding strata. The temperature at TW-10 shows some seasonal variation but it is not as definitive as at Main North Main East.



**Springs**

YES  NO

- Burnt Tree Spring July: D-Na;
- Elk Spring July : acidity\*;
- 79-2: D-Na;
- 79-10 July: water temperature;
- 79-15: field electric conductivity, D-Ca, D-Mg, D-Na, bicarbonate as CaCO<sub>3</sub>, acidity\*, total alkalinity\*, lab electric conductivity\*, TDS, total anions;
- 79-29 July: D-Na;
- 79-34: D-Mg, D-Na, bicarbonate as CaCO<sub>3</sub>, Cl, total alkalinity\*;
- 79-38: water temperature, D-Na;
- 89-60: water temperature, D-Na, cation - anion balance;
- JV-9: acidity\*;

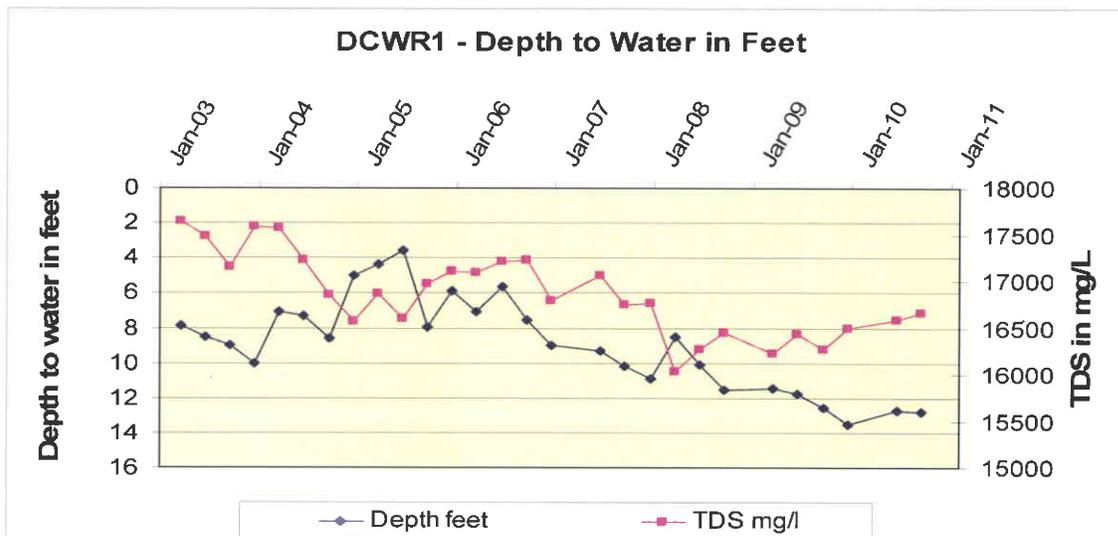
- MF 7: field electric conductivity, D-Na;
- MF 10: D-Ca, D-Mg, bicarbonate as CaCO<sub>3</sub>, total alkalinity\*, total hardness\*, lab electric conductivity\*, TDS;
- MF19B: water temperature;
- MF213: field electric conductivity;
- MF 219: flow, D-Ca;
- MFR-10: lab pH\*;
- RR 5: total hardness\*;
- RR 15: flow;
- RR 23A: flow, total alkalinity\*;
- SP1-29: D-Na, total alkalinity\*;
- UJV 206: water temperature;
- EM Pond: water temperature, D-Ca, bicarbonate as CaCO<sub>3</sub>, total alkalinity\*, total hardness\*, lab electric conductivity\*;
- Grant Spring: bicarbonate as CaCO<sub>3</sub>, acidity\*, total alkalinity\*, lab electric conductivity\*;
- 91-72\*: D-K;

**Wells**

YES  NO

DCWR1: cation - anion balance;

Although it hasn't been flagged as varying from the mean by more than two standard deviations, water level at DCWR1 has been dropping since 2006 (following a small rise in 2004-2005). TDS was dropping at a similar rate, but now appears to be trending back up. These changes are probably from factors other than disposal of waste rock at this site: a similar drop in water level is seen at WCWR1 at the Cottonwood/Wilberg Mine Waste Rock Disposal Site.



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

Baseline analyses were performed in 2001 and are to be repeated every 5 years; baseline analyses were done in 2006 and should be done again in 2011: this schedule applies to all the PacifiCorp mines, irrespective of the permit renewal date. For the Deer Creek Mine, renewal submittal is due 10/07/10, and renewal is due 02/07/11.

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

No further action recommended 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.** NA

**8. Did the Mine Operator submit all the missing and/or irregular data?** NA