WATER QUALITY MEMORANDUM

Utah Coal Regulatory Program

#3906

March 29, 2012

TO: Internal File

THRU: Steve Christensen, Permit Supervisor SJSC

FROM: Ken Hoffman, Environmental Scientist KBH

RE: 2011 Third Quarter Water Monitoring, PacifiCorp, Deer Creek Mine. C/015/0018, Task ID #3906

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?** YES ☒ NO ☐

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

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

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

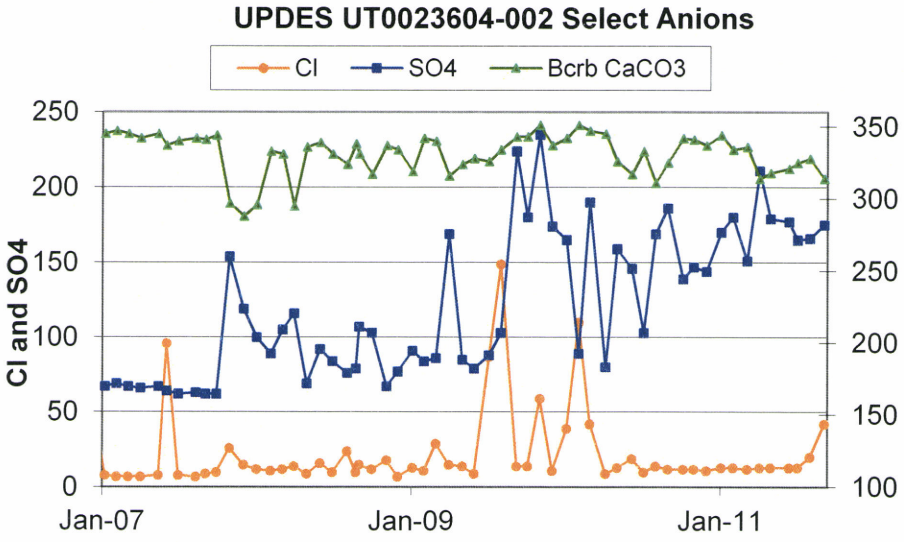
Streams YES ☒ NO ☐

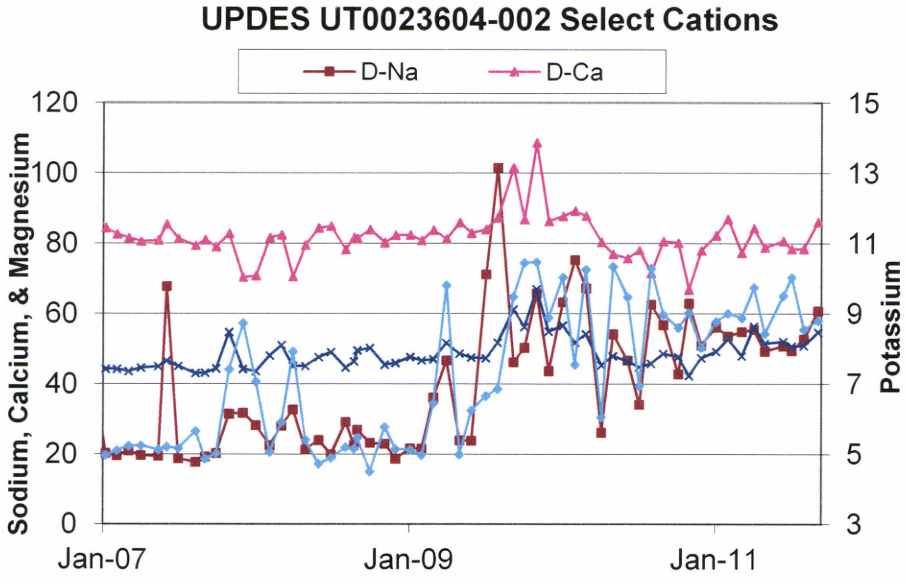
DCR04 Flow: July, August, and September
DCR06 Flow: July, August, and September
MF-A September: specific conductivity, dissolved magnesium, dissolved sodium, sulfate
MFU-03 September: specific conductivity, dissolved magnesium, dissolved sodium, sulfate
MHC 01 September: specific conductivity, dissolved magnesium
RCF-1 September: specific conductivity
RCF2 September: specific conductivity
RCLF1 July: flow; September: specific conductivity
RCLF2 July: flow; September: specific conductivity

UPDES YES ☒ NO ☐

001 July: dissolved magnesium; August: bicarbonate

Recently, potassium values have frequently been outside two standard deviations from the mean at UT0023604-002, but – as can be seen on the following charts – with the exception of bicarbonate, major ion concentrations have tended to fluctuated upwards in recent years.

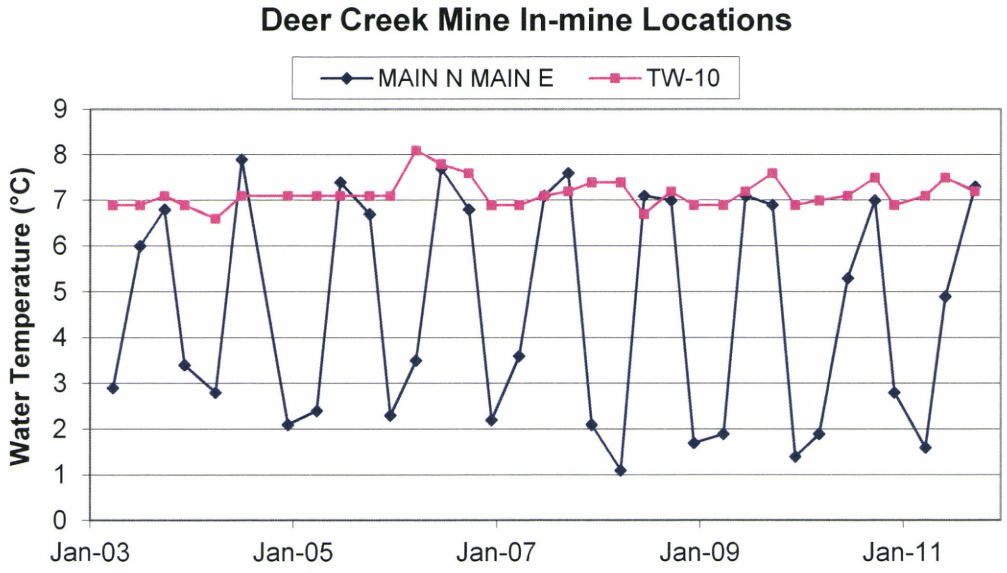




In-mine YES ☒ NO ☐

Main N Main E September: cation-anion balance

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 ☐

The following springs had flows which were more than two standard deviations from the mean for July: 79-35, 80-48, 89-60, 89-66, 89-68, EM 216, EM POHND, MF 10, MF 213, MF 7, MFR-10, SP1-26, Ted's Tub, UJV 101, and UJV 206.

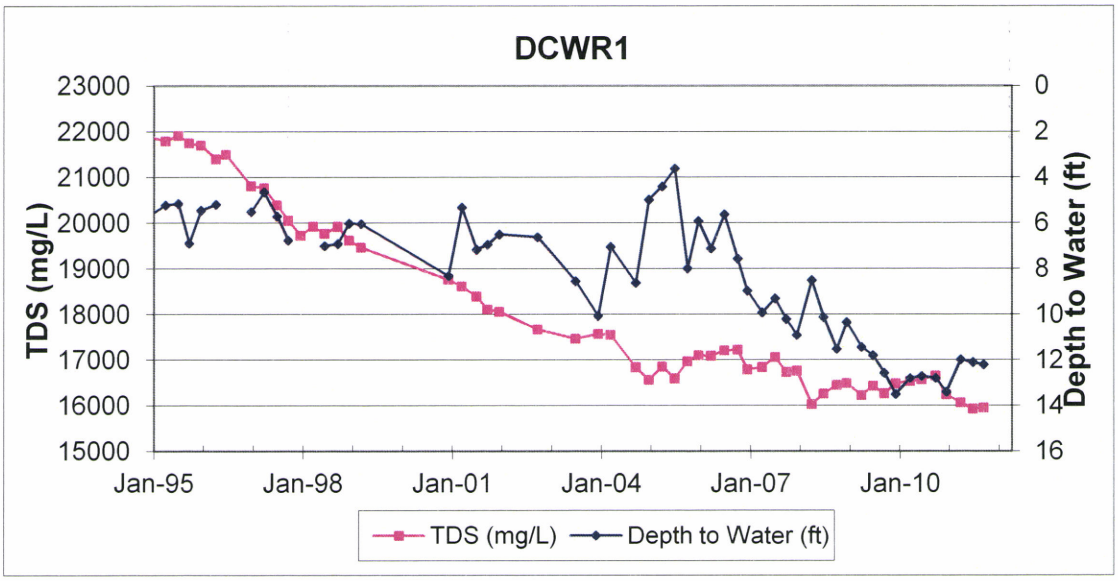
79-10 July: flow, bicarbonate
79-15 July: specific conductivity, flow, cation-anion balance
79-2 July: bicarbonate
79-26 July: specific conductivity, flow, dissolved calcium
79-28 July: water temperature
79-29 July: dissolved magnesium
79-34 July: flow, dissolved magnesium, dissolved sodium
79-35 July: bicarbonate

79-40 July: specific conductivity
80-41 July: specific conductivity
80-46 July: specific conductivity
80-50 July: dissolved calcium
84-56 July specific conductivity, dissolved sodium
89-65 July: flow, acidity*
89-67 July: water temperature, field pH, flow
91-72 July: dissolved sodium
GRANT SPRING July: flow, specific conductivity, total dissolved solids
Little Bear July: dissolved calcium
MF 19B July: flow, bicarbonate
MF 219 July: flow, dissolved calcium
MFR-30 July: water temperature
NEWUA Meter 3 August: flow; September: specific conductivity, bicarbonate
RR 15 July: flow, dissolved magnesium, total hardness
RR 23A July: dissolved magnesium, sulfate
RR 5 July: flow, dissolved magnesium
SP1-29 July: water temperature, flow
UJV 213 July: flow, dissolved sodium

Wells YES ☒ NO ☐

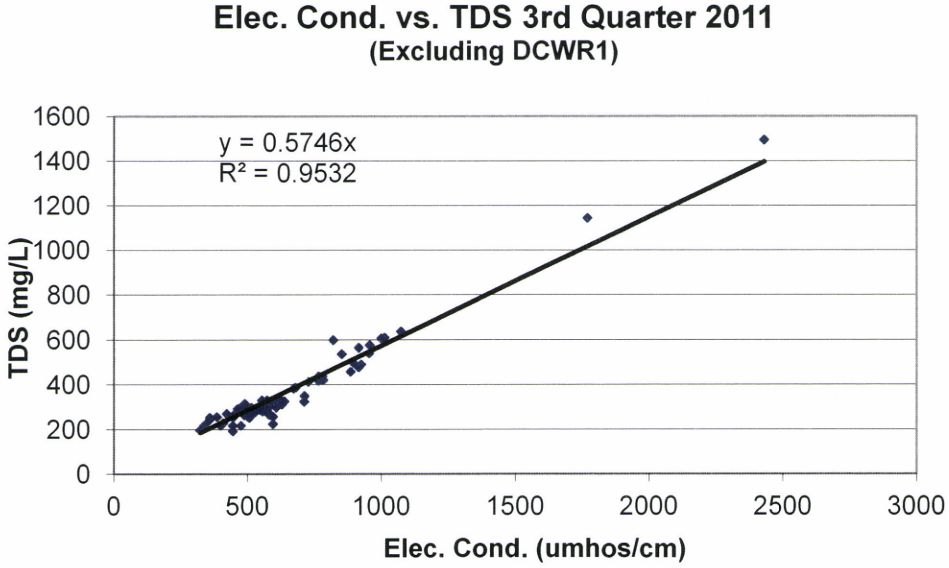
DCWR1 September: pH

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 have stabilized. 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.



TDS/field electric conductivity ratios – all sites

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 2011 at the Deer Creek Mine generally results in a ratio that falls within this range: DCWR1 is not included in the trendline calculation.



DCWR1 (TDS/field electric conductivity = 0.876) lies outside the upper end of the range. The comparison of the 3rd and 4th Quarter 2010 and 1st and 2nd Quarter 2011 values in the following table indicates DCWR1 has consistently high values for the TDS/ field electric conductivity ratio.

	Quarter					
	4th 2010	1st 2011	2nd 2011	3rd 2011		
	TDS/ EC.	TDS/ EC.	TDS/ EC.	EC (field) µmhos/ cm	TDS (mg/L)	TDS/ EC.
DCWR1	0.95	0.922	0.876	17260	15952	0.924

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

Baseline analyses were performed in 2001 and 2006 and are to be repeated every 5 years. Baseline analyses are currently being conducted in 2011.

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

There is no indication of trends or extremes in any of the parameter values. 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.

None.

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

NA.

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