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# WATER QUALITY MEMORANDUM

Utah Coal Regulatory Program

December 3, 2010

TO: Internal File  
THRU: James D. Smith, Permit Supervisor *DS 7 Dec 2010*  
FROM: Steve Christensen, Environmental Scientist *SKC*  
RE: 2010 2<sup>nd</sup> Quarter Water Monitoring, Canyon Fuel Company (CFC), LLC, Dugout Mine, C/007/0039-WQ10-2, Task ID #3560

The Dugout Canyon Mine is currently operational in the Book Cliff Mountain range of Carbon County, UT. Water monitoring data is submitted quarterly to the Division EDI database. Beginning on page 7-40 of the approved Mining and Reclamation Plan (MRP), water monitoring protocols and sampling requirements are provided for surface water, ground water, monitoring wells and Utah Pollutant Discharge Elimination System (UPDES) outfalls. Tables 7-4 and Table 7-5 list the individual monitoring sites and their sampling protocols for ground water and surface water respectively.

**1. Was data submitted for all required sites?**

**Springs** YES  NO

The approved MRP outlines the operational and post-mining monitoring of fourteen springs (200, 203, 227, 259 259A, 260, 321, 322, 324, SC-100, SC-116, SC-14, SC-65 and SP-200). The locations of these springs are depicted on Plate 7-1, Hydrologic Monitoring Stations. Groundwater discharge from the old Gilson coal seam workings is also monitored and identified as location MD-1.

*Data was submitted for all spring monitoring sites.*

**Streams** YES  NO

The approved MRP outlines the monitoring of thirteen stream sites (323, DC-1, DC-2, DC-3, DC-4, DC-5, FAN, PC-1A, PC-2, PC-3, RC-1, SS-1 and SS-2). Sites DC-4 and DC-5 are sampled during the first wet or dry year as conditions permit. The locations of these streams are depicted on Plate 7-1, Hydrologic Monitoring Stations.

*All thirteen stream monitoring sites were accessible and data submitted.*

**Wells**            YES [X] NO [ ]

The approved MRP outlines the sampling of three monitoring wells (GW-10-2, GW-11-2 and GW-24-1). Table 7-4 and Section 731.200 of the MRP specify that the Permittee will obtain quarterly water level measurements from the wells. Due to the ages of the wells and deterioration of the casing materials, water quality data is not collected.

Monitoring well GW-24-1 became blocked during the winter of 2000 and was last sampled in September of 1998. The well was removed from monitoring after the 4<sup>th</sup> quarter of 2004. Monitoring well G-11-2 was last monitored in October 2007. Since that time, the Permittee has reported that the well has appeared to have "caved in". Monitoring well GW-10-2 is still functioning and actively monitored for water level.

Though not required by the approved MRP, three additional monitoring wells (DH-1, DH-2 and DH-3) are monitored at the waste rock disposal site. Water levels are monitored quarterly with additional water quality sampling obtained from DH-1 during low flow periods (i.e. 3<sup>rd</sup> or 4<sup>th</sup> quarter).

*Depths were recorded for wells DH-1, DH-2 and DH-3. Data was submitted for monitoring well GW-10-2. Monitoring well GW-11-2 is inaccessible. It appears that monitoring well GW-11-2 has caved and is no longer able to be monitored.*

**UPDES**            YES [X] NO [ ]

Operational monitoring is required monthly for six active UPDES outfalls (Permit No. UT0025593):

- **001**-Mine water discharge to Dugout Ck.,
- **002**-Sedimentation pond discharge to Dugout Ck. (disturbed area runoff),
- **003**-Storage water discharge to Dugout Ck. (30,000-gallon water tank discharge),
- **004**-Sedimentation pond (waste rock site) discharge to Grassy Trail Ck. Tributary,
- **005**-Pace Canyon fan portal breakout, mine water discharge to Pace Ck.
- **006**-Sediment trap culvert discharge to Pace Creek (disturbed area runoff from Pace Canyon Fan facility).

Specific effluent limitations and self-monitoring requirements as outlined in the UPDES permit are presented below:

Effluent Characteristics	Effluent Limitations
TDS, tons/day	1.0
Total Suspended Solids (TSS), ppm	70
Total Iron, ppm	1.1
Oil & Grease, ppm	10
Total Dissolved Solids (TDS), ppm	2,400
pH	9

3,000 parts per million (ppm) is the water quality standard for total dissolved solids (as established by the Department of Water Quality) for both Pace Creek and Dugout Creek.

*UPDES outfalls 001, 002, 003 and 005 reported discharges for this quarter. Outfalls 004 and 006 did not report a discharge.*

**2. Were all required parameters reported for each site?**

**Springs**      YES  NO

*All required data was reported for the spring monitoring sites that had a measurable flow. No observable flow was reported for spring monitoring sites 200, 227, 259 and SC-100.*

**Streams**      YES  NO

*All required data was reported for the stream monitoring sites that had a measurable flow. No observable flow was reported for DC-3, RC-1, SS-1 and SS-2.*

**Wells**          YES  NO

All required parameters were reported for monitoring wells DH-1, DH-2, DH-3 and GW-10-2. Monitoring well GW-11-2 appears to be no longer functioning.

**UPDES**          YES  NO

All required parameters were reported for the UPDES outfalls that reported a discharge (001, 002, 003 and 005). Outfalls 004 and 006 did not report a discharge this quarter.

### 3. Were irregularities found in the data?

**Springs**      YES [ ] NO [ X ]

**Streams**      YES [X] NO [ ]

Stream monitoring sites DC-3, RC-1, SS-1 and SS-2 reported no observable flow for this quarter.

Stream monitoring site DC-1 had reported elevated dissolved sodium (D-Na), chloride (Cl) and bicarbonate (Bcrb) the previous quarter. However; all of the previously elevated concentrations were back to within two standard deviations of the data set this quarter. Continued monitoring will be conducted at monitoring site DC-1 in order to determine if a trend is emerging.

Monitoring site DC-2 reported elevated dissolved potassium (D-K), dissolved calcium (D-Ca), dissolved magnesium (D-Mg), dissolved sodium (D-Na), Cl, sulfate (SO4) and total dissolved solids (TDS). Site DC-2 was inaccessible during the 1<sup>st</sup> quarter of 2010. However; elevated concentrations of D-K, D-Na, Cl and TDS were reported during the 4<sup>th</sup> quarter of 2009. Continued monitoring of these parameters will be conducted in order to determine if a trend is developing.

The FAN monitoring site below the Pace Canyon Fan portal reported elevated levels of D-Na, CL SO4 and total alkalinity during the 3<sup>rd</sup> and 4<sup>th</sup> quarters of 2009. The site was inaccessible due to snow conditions the first quarter of 2010. An elevated D-Na concentration was reported this quarter.

Site PC-2 began developing an upward trend in TDS and its components. The previous four quarters had shown an upward trend in TDS and its components. However; all reported concentrations for PC-2 returned to within two standard deviations from the mean this quarter. The water quality standard for Pace Creek (as established by the Division of Water Quality) is 3,000 mg/L. The reported TDS value for PC-2 this quarter is 580 mg/L.

**Wells**      YES [ ] NO [ X ]

Water level readings obtained from wells DH-1, DH-2, DH-3 and GW-10-2 were within established trends.

**UPDES**      YES [ ] NO [ X ]

UPDES outfalls 001, 002, 003 and 005 reported flows this quarter. All required parameters were within the compliance levels established by the UPDES discharge permit.

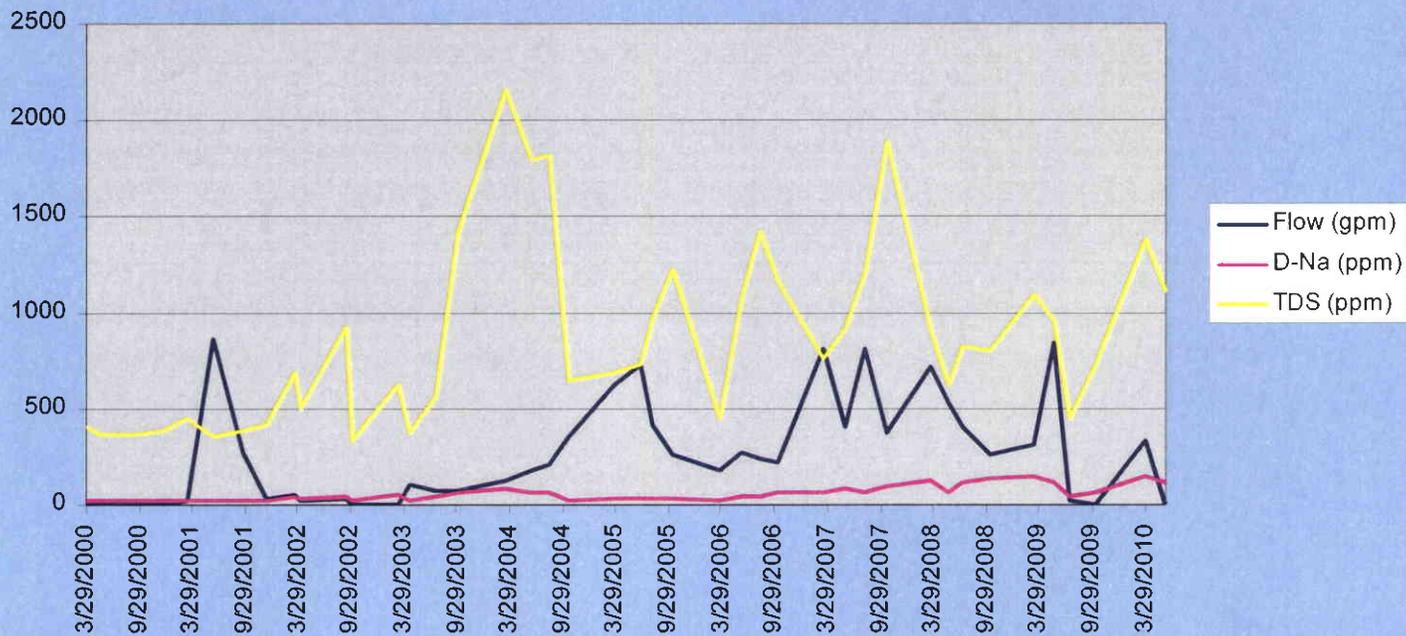
**4. On what date does the MRP require a five-year resampling of baseline water data.**

The resampling of baseline data will next be performed in July 2014. In addition, one water sample will be collected at each spring sampling point during low flow period every fifth year, during the year, preceding re-permitting. These samples will be obtained for the analysis of baseline parameters (See Table 7-4).

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

Continued monitoring of stream monitoring sites DC-1, DC-2, FAN and PC-2 for upward trends in TDS and its chemical constituents.

### DC-1: D-Na, TDS and Flow vs. Time



### FAN Monitoring site: D-Na, Cl, SO4 and Flow vs. Time

