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WATER QUALITY MEMORANDUM Utah Coal Regulatory Program

April 19, 2010

TO: Internal File
THRU: James D. Smith, Permit Supervisor *JS 4/19/10*
FROM: Steve Christensen, Environmental Scientist *SKC*
RE: 2009 3rd Quarter Water Monitoring, Canyon Fuel Company (CFC), LLC, Dugout Mine, C/007/0039-WQ09-3, Task ID #3379

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 [X] 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.

Spring 200 had not reported a measurable flow since the 2nd quarter of 2001. Spring 227 has never reported a measurable flow. Spring 259 last reported a measurable flow in the 3rd quarter of 2001. Spring SC-100 has not reported a measurable flow since the 2nd quarter of 2008.

Of the 14 spring monitoring sites, all but four produced a measurable flow. Data was submitted for the 10 sites that reported a discharge.

Streams YES [X] 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). The locations of these streams are depicted on Plate 7-1, Hydrologic Monitoring Stations.

Data was submitted for all stream monitoring sites with measurable flow.

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 4th 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. 3rd or 4th quarter).

Data was submitted for all functioning monitoring wells (DH-1, DH-2, DH-3 and GW-10-2).

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, 003 and 005 produced a discharge this quarter.

2. Were all required parameters reported for each site?

Springs YES [X] NO []

For accessible springs that produced a measurable flow, the required data was submitted.

Streams YES [X] NO []

For accessible streams that produced a measurable flow, the required data was submitted.

Wells YES [X] NO []

For all accessible/functioning monitoring wells, the required parameters were submitted.

UPDES YES [X] NO []

The required parameters were reported.

3. Were irregularities found in the data?

Springs YES [X] NO []

- **321-** had reported elevated levels of dissolved sodium (D-Na), dissolved magnesium (D-Mg), sulfate (SO4), total alkalinity (T-Alk.), total dissolved solids (TDS) and total

cations (T-Cats) the previous quarter. All reported parameters were back to within two standard deviations from the mean and following established trends based.

- **SC-116** reported elevated concentrations of SO₄, TDS and T-Cats the previous quarter. For the second consecutive quarter, SO₄, TDS and T-Cats were reported outside of two standard deviations. Additionally, D-Ca, was reported outside of two standard deviations. (See Chart Below).
- **SC-65** had reported elevated concentrations of D-Ca, T-Alk and bicarbonate (Bcarb) the previous quarter. For this quarter, the reported concentrations of all required parameters were within two standard deviations of the mean.

Streams YES [X] NO []

DC-1 reported D-Na concentrations within two standard deviations of the data set. Historically, this site has produced erratic D-Na trends typified by spikes in the late spring/early summer. (See Chart Below)

Monitoring site DC-2 reported a second consecutive D-Na concentration within two standard deviations of the mean.

The surface water-monitoring site (FAN) below the Pace Canyon Fan portals reported an elevated D-Na value. The concentration was outside of two standard deviations with an average value of 53.39 ppm and a reported value of 78.5 ppm. Continued monitoring will be conducted in order to ascertain if a trend is emerging.

The previous quarter reported a D-K value outside of two standard deviations for monitoring site PC-1A. The D-K value for this quarter was within two standard deviations. It's unclear as to what caused the spike, however; continued monitoring of this parameter will be conducted.

During the previous quarter, site PC-2 had reported several parameters outside of two standard deviations (D-Ca, D-Mg, total alkalinity and bicarbonate). In addition to the aforementioned parameters being outside of two standard deviations for the second consecutive quarter; field conductivity, chloride, total cations, total anions, sulfate and total dissolved solids were also outside of two standard deviations. (See Chart Below).

Monitoring site DC-3 reported elevated levels of dissolved potassium (D-K) during the 4th quarter of 2008. However, no observable flow has been reported for the last three quarters.

Wells YES [X] NO []

Elevated levels of D-Ca and Cl were reported during the 4th quarter of 2008 (WQ 08-4) at monitoring well DH-1. However, as water quality data is only obtained at this well during the latter quarters of the year, it's unclear at this time what caused the elevated concentrations. Continued monitoring will be conducted as additional water quality data is obtained. Water levels at well DH-1 remained within two standard deviations of the mean.

For the second time in the last three quarters, monitoring well GW-10-2 reported a depth to water outside of two standard deviations from the mean (reported value-757.08 ft., average value-738.79 ft.). Continued monitoring of water levels in well GW-10-2 will be conducted to ascertain if a downward trend is emerging. (See Chart Below).

Water levels reported for wells DH-1, DH-2 and DH-3 were all within two standard deviations of the mean. (See Chart Below).

UPDES YES [] NO [X]

UPDES outfalls 001, 003 and 005 produced flows during this quarter.

Based upon five measurements, Site 001 averaged a flow of 23.12 gallons per minute (gpm). Two non-compliant values for total iron (T-Fe) were reported the previous quarter. However, this quarter all four laboratory samples that were submitted for analysis were within their established UPDES compliant level of 1.1 ppm for T-Fe (0.07ppm, 0.14 ppm, 0.05 ppm and 0.1 ppm respectively). (See Chart Below).

Site 003 averaged a flow of 197gpm. All reported water quality parameters were within two standard deviations of the mean as well as within UPDES compliance levels.

Site 005 averaged a flow of 14.1 gpm. The reported TDS value was outside of two standard deviations (800 ppm). However, the value is well within the UPDES compliance level (2,400 ppm).

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

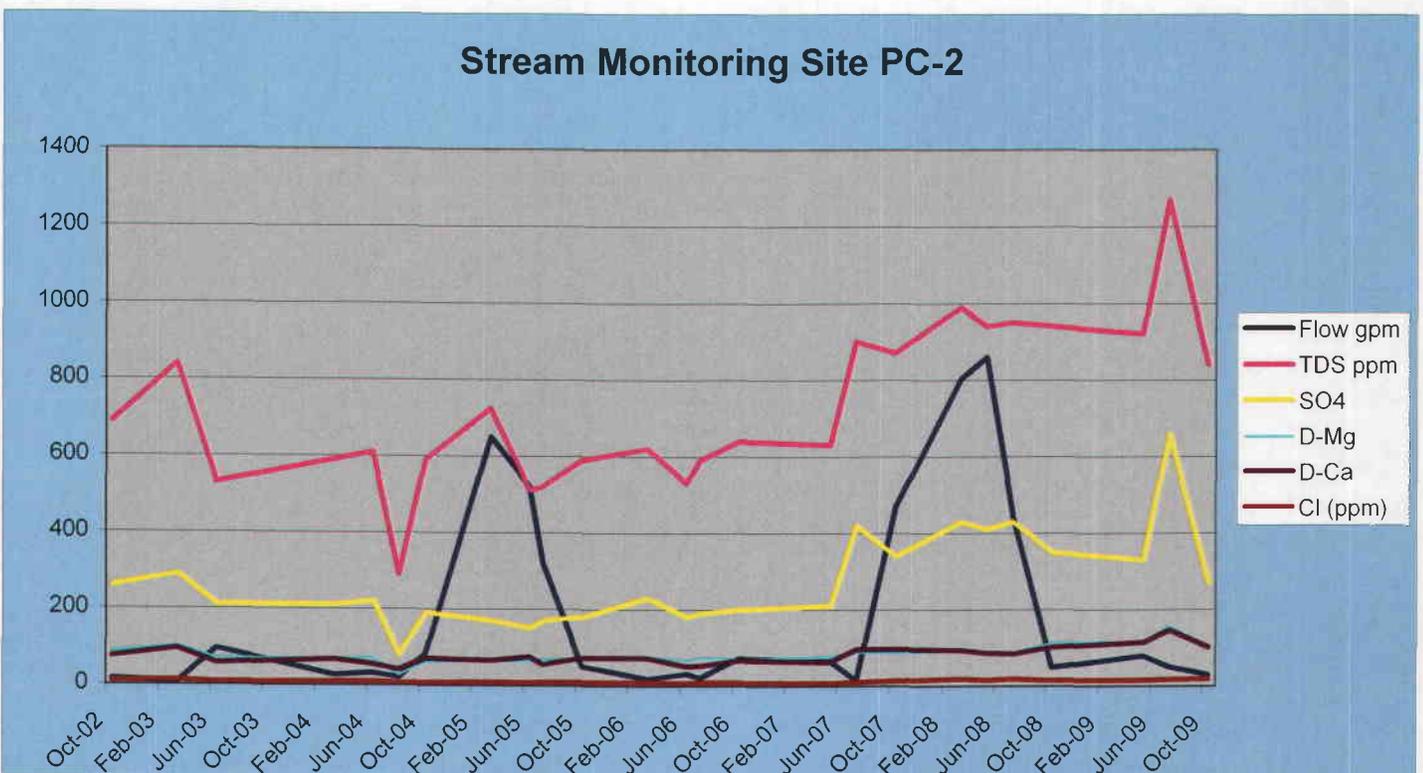
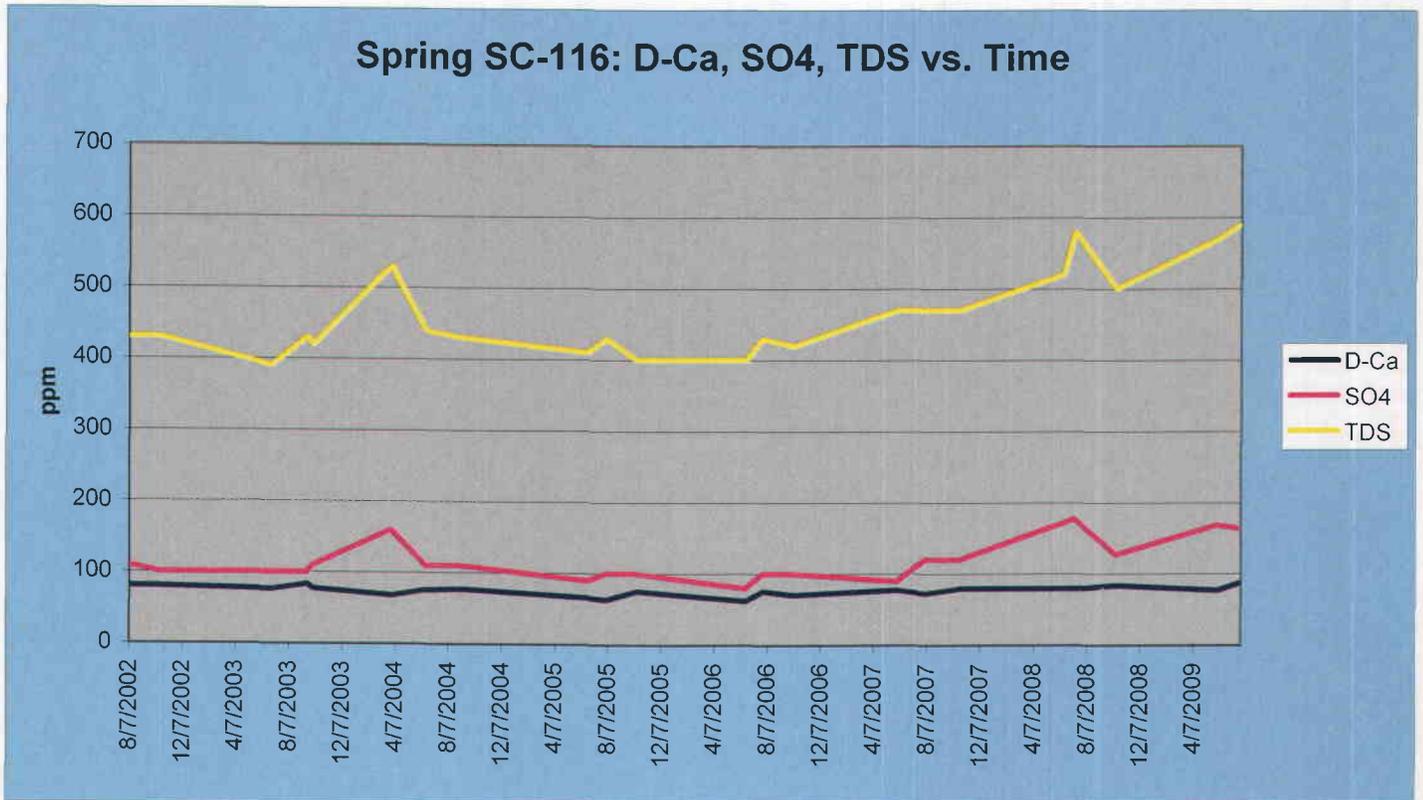
The resampling of baseline data will next be performed in July 2014. In addition, one water sample will be collected at each spring sampling point during low flow period every fifth year, during the year, preceding re-permitting. These samples will be obtained for the analysis of baseline parameters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

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

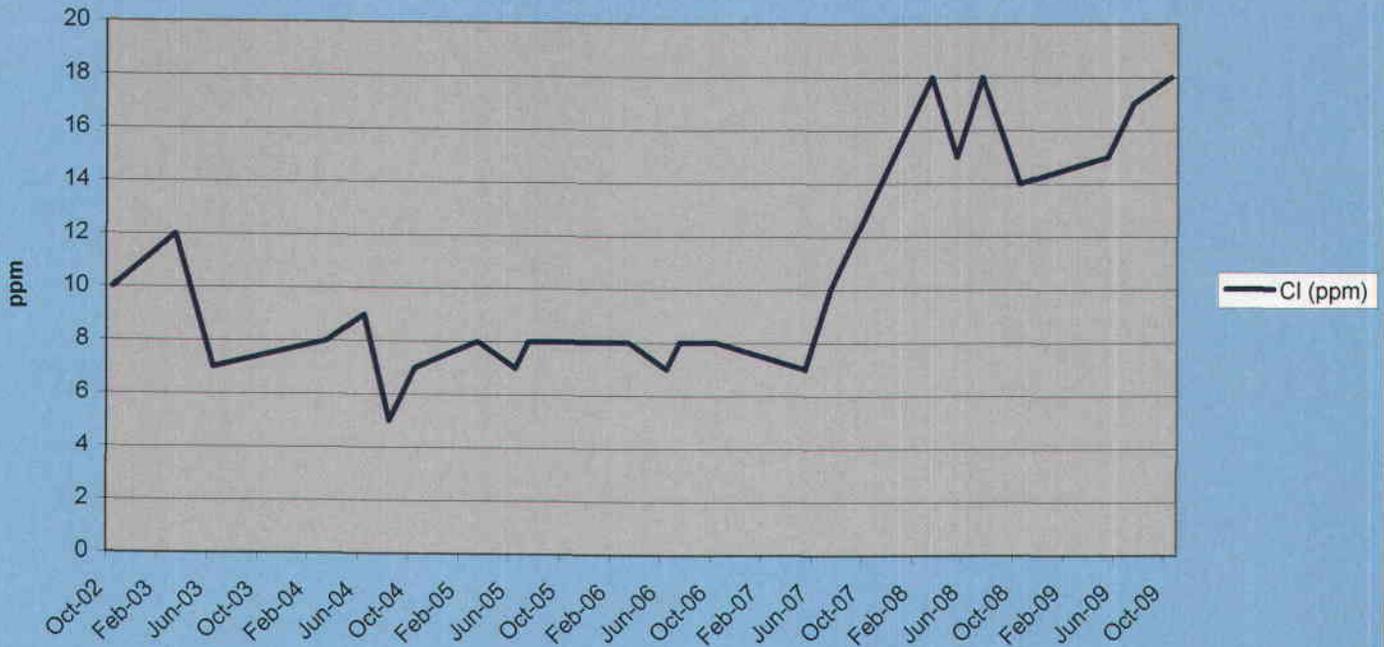
Continued monitoring of elevated concentrations.

During the next mid-term review, the water-monitoring program in the approved MRP should be revised. Ground water monitoring wells GW-24-1 and G-11-2 have become impacted to the degree that obtaining measurements/samples is not possible. The MRP and Division EDI database should be revised to reflect the current condition on the ground. The approved MRP should also be revised to reflect the active monitoring of wells DH-1, DH-2 and DH-3.

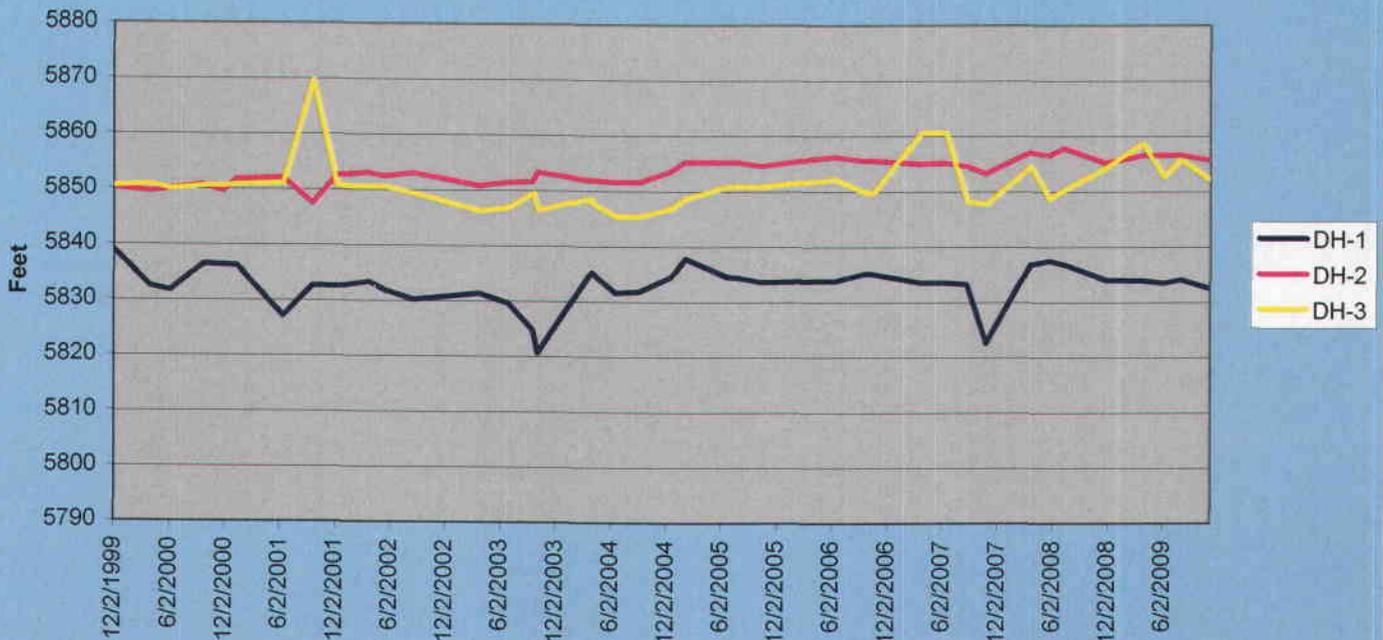
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Stream Monitoring Site PC-2



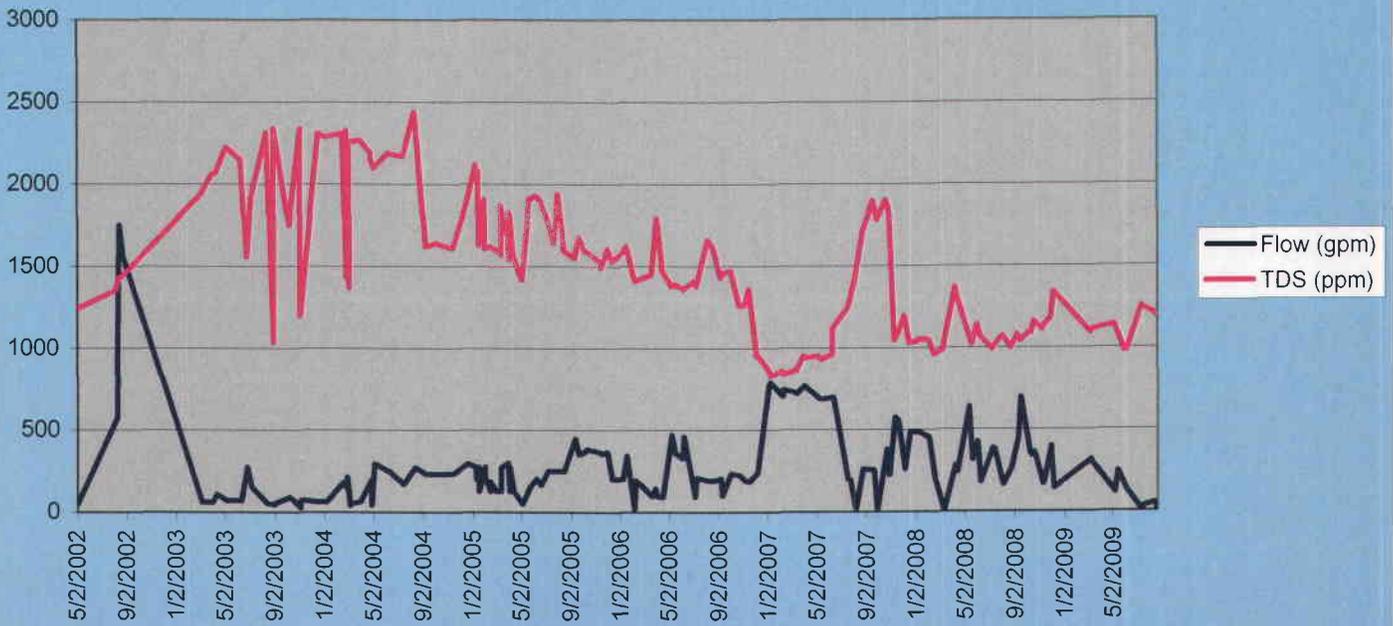
Monitoring Wells DH-1, DH-2 and DH-3: Water Level vs. Time



Monitoring Well GW-10-2



UPDES Outfall 001: Flow, TDs vs. Time



UPDES Outfall 001: T-Fe vs. Time

