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# WATER QUALITY MEMORANDUM

Utah Coal Regulatory Program

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December 7, 2010

TO: Internal File  
THRU: Jim Smith, Permit Supervisor *JS 13 Dec 2010*  
FROM: Steve Christensen, Environmental Scientist *SKC*  
RE: 2010 Second Quarter Water Monitoring, West Ridge Resources, West Ridge Mine, Task ID #3576

The West Ridge 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 7-34 of the approved Mining and Reclamation Plan (MRP), water monitoring protocols and sampling requirements are provided for surface water, ground water, monitoring wells and UPDES outfalls in Tables 7-1, 7-2, 7-3 and 7-4 respectively.

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

### *Springs*

The approved MRP outlines the monitoring of 10 springs. Four of the springs (SP-12, SP-13, SP-15 and SP-16) discharge from the lower slopes of West Ridge in Whitmore Canyon. Two springs (WR-1 and WR-2) discharge from the upper slope of West Ridge in Whitmore Canyon. One spring (SP-8) discharges in the upper drainage of C Canyon. Hanging Rock Spring (S-80) is located near the northwest corner of the permit area and discharges from the east slopes of Whitmore Canyon. Spring 101 monitors Little Spring at the bottom of West Ridge. Spring 102 is located within Spring Canyon.

*Data was submitted for all ten of the spring monitoring sites.*

### *Streams*

The approved MRP outlines the monitoring of 12 stream sites. Grassy Trail Creek is the only perennial stream in the permit and adjacent areas. Operational sampling is required quarterly for six stream sites (ST-3, ST-8, ST-9, ST-10, ST-13 and ST-15). Sites ST-11 and ST-12 were added to the water-monitoring program based upon field inspections conducted in 2005.

The field inspections were conducted as part of a proposed lease expansion by the Permittee. At the time of the inspections, the Bear Canyon drainage had exhibited measurable flow. As a precaution, sites ST-11 and ST-12 were established within that drainage. Since that time (summer of 2005) neither site has produced appreciable/measurable flow. However, the sites remain as part of the surface water monitoring program and are inspected quarterly.

*All 12 stream monitoring sites were accessible and data was submitted for each site. No observable flow was recorded for stream monitoring sites: ST-11, ST-12, ST-13, ST-15, ST-6A, ST-7 and ST-9.*

**Wells**

Quarterly operational sampling is required for one groundwater-monitoring well (Site DH 86-2).

*Monitoring well DH 86-2 was sampled during this quarter and all required data submitted.*

**UPDES**

Operational sampling is required monthly for two active UPDES sites (Permit # UT0025640). Site D001 is the mine sites primary sediment pond discharge to the ephemeral 'C' Canyon drainage. Site D002 is the mine-water discharge to the ephemeral 'C' Canyon drainage. Specific limitations and self-monitoring requirements as outlined in the UPDES permit are presented in the table below:

<b>Effluent Characteristics</b>	<b>Effluent Limitations</b>
Flow, MGD (million gallons per day)	1.0
Total Suspended Solids (TSS), ppm	70
Total Iron, ppm	1.3
Oil & Grease, ppm	10
Total Dissolved Solids (TDS), ppm	2,000
pH	9

*Data was submitted for UPDES Outfalls 001 and 002.*

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

**Surface Water Monitoring Sites:** *All required parameters were reported for each of the surface water monitoring sites.*

**Groundwater and Well Monitoring Sites:** *All required parameters were reported for the spring and well monitoring sites. .*

**UPDES:** *All required water quality parameters were reported for Outfalls 001 and 002.*

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

**Surface Water Monitoring Sites-**

Of the 12 surface water monitoring sites, four reported no observable flow for the quarter (ST-11, ST-12, ST-13 and ST-15).

**ST-5-** Flow values at monitoring site ST-5 have been historically erratic. The primary source of flow at this ephemeral drainage monitoring site is the mine-water discharge and as a result, is subject to change as mining activity is altered underground. The reported flow at this site has been reported well outside of two standard deviations from the mean for the last two quarters (1,482 gpm and 1,197 gpm respectively). As the flow at this site is generated primarily from the mine-water discharge, particular attention has been paid to the TSS and T-Fe values.

The reported TSS value for site ST-5 increased from 12 ppm (WQ10-1) to 17 ppm this quarter. However, the concentration is significantly lower than what was reported the last three quarters of 2009 (22 ppm, 29 ppm and 28 ppm respectively).

The reported T-Fe value for ST-5 went down from 0.824 ppm the previous quarter to 0.53 ppm this quarter. The T-Fe values at this monitoring site have been steadily decreasing since the 3<sup>rd</sup> quarter of 2009.

**ST-6-** As with site ST-5, the majority of the flow within this drainage comes from the mine-water discharge.

As with monitoring site ST-5, ST-6 has historically produced erratic flow values. With the exception of flow, all reported concentrations of the required water quality parameters were within two standard deviations from the mean.

The reported TSS concentration increased from the previous quarter to 22 ppm from 15 ppm. Additionally, the T-Fe concentration increased significantly from 0.724 ppm the previous quarter to 1.267 ppm this quarter. The UPDES compliance limit at Outfall 002 (mine-water discharge) for T-Fe is 1.3 ppm. The 1.267 ppm concentration is a concern in that such a high concentration was obtained approximately 1 mile from UPDES discharge point 002. Continued monitoring will be conducted.

### **Groundwater Monitoring Sites-**

Spring monitoring site SP-101 reported elevated levels of dissolved sodium (D-Na). Last quarter, the site was inaccessible. An elevated dissolved calcium (D-Ca) value was reported the previous quarter (WQ09-4).

Spring monitoring site SP-102 reported elevated concentrations/values for dissolved magnesium (D-Mg), D-Na, chloride (Cl), total alkalinity (T-Alk), total hardness (T-Hardns.), bicarbonate (Bcrb) and total cations (T-Cats).

Spring monitoring site SP-12 reported elevated concentrations/values for conductivity (Cond.), D-Ca, D-Mg, D-Na, sulfate (SO<sub>4</sub>), T-Hardns, total dissolved solids (TDS), Bcrb, T-Cats and total anions (T-Anis). The previous quarter, the site was inaccessible. However, elevated concentrations of the aforementioned parameters were reported the 3<sup>rd</sup> and 4<sup>th</sup> quarter of 2009 (WQ09-3 and WQ09-4). Continued monitoring of these parameters will be conducted in order to evaluate a potential cause for the elevated concentrations of TDS and its primary components.

Spring monitoring site SP-13 reported an elevated concentration for D-Na this quarter.

Spring monitoring site SP-15 reported elevated concentrations for SO<sub>4</sub> and T-Hardns.

Spring monitoring site SP-8 reported elevated concentrations of D-Na, T-Alk and T-Cats.

**Monitoring Well DH 86-2** TDS, its associated components have been reported at elevated concentrations for the last two quarters. D-Ca, D-Mg, T-Hardns all reported values outside of two standard deviations from the mean this quarter. It's unknown what's causing this upward trend. Continued monitoring will be conducted in order to evaluate what may be causing this shift in water chemistry.

### **UPDES Sites- (UPDES Permit #UT0025640)**

**Site D001-** UPDES outfall D001 (primary sediment pond at mine site) did not report a discharge this quarter.

### **Site D002-**

UPDES Outfall 002 was sampled two times this quarter. The reported concentrations for TSS and TDS were well below the compliance limits as established by the UPDES discharge permit. However; the April 21<sup>st</sup> sampling event reported an elevated T-Fe concentration of 1.504 ppm. The Division of Water Quality is aware of the elevated T-Fe value and continued monitoring is being conducted.

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

On page 7-35 of the approved MRP, the Permittee commits to collecting baseline samples *“from each spring in the monitoring program during the low flow (fall) sampling and from each stream monitoring sites during low flow every five years beginning with the first mid-term review.”*

Baseline sampling of ground and surface water sites will be required during the 3<sup>rd</sup> quarter of 2011.

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

Continue to monitor the data irregularities cited above for any trends.

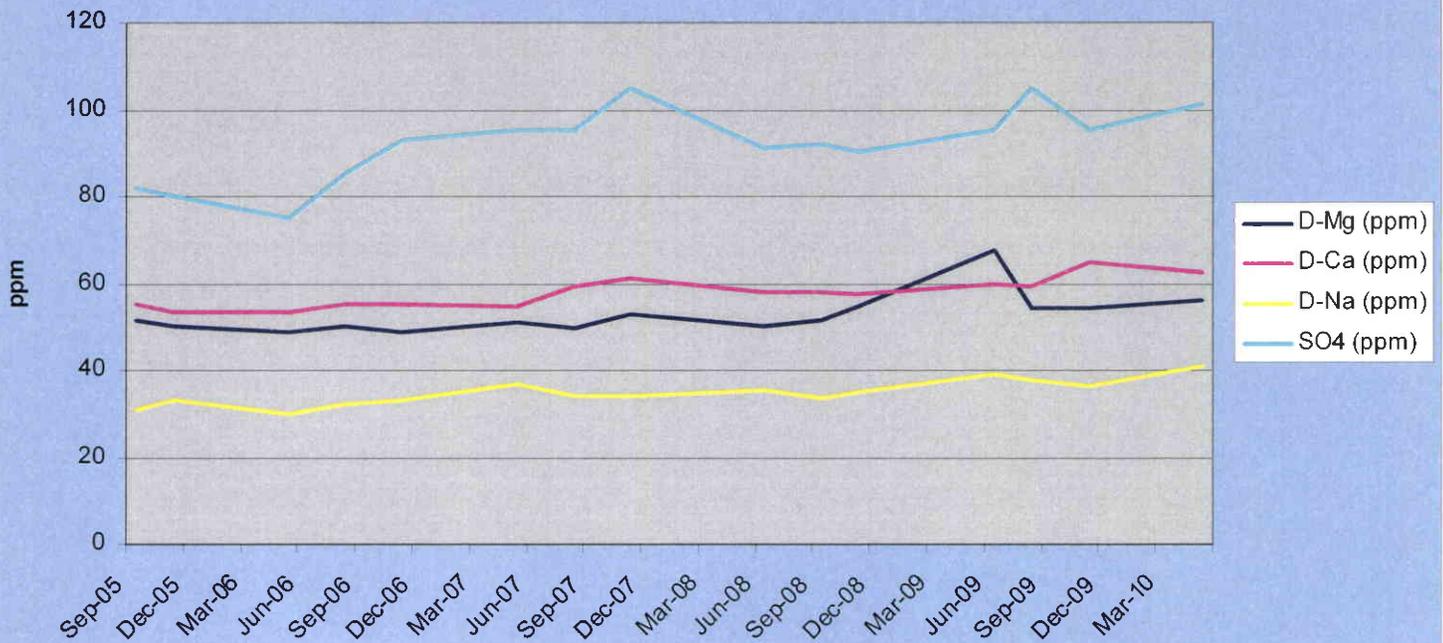
**6. Does the Mine Operator need to submit more information to fulfill this quarter's monitoring requirements?**

YES  NO

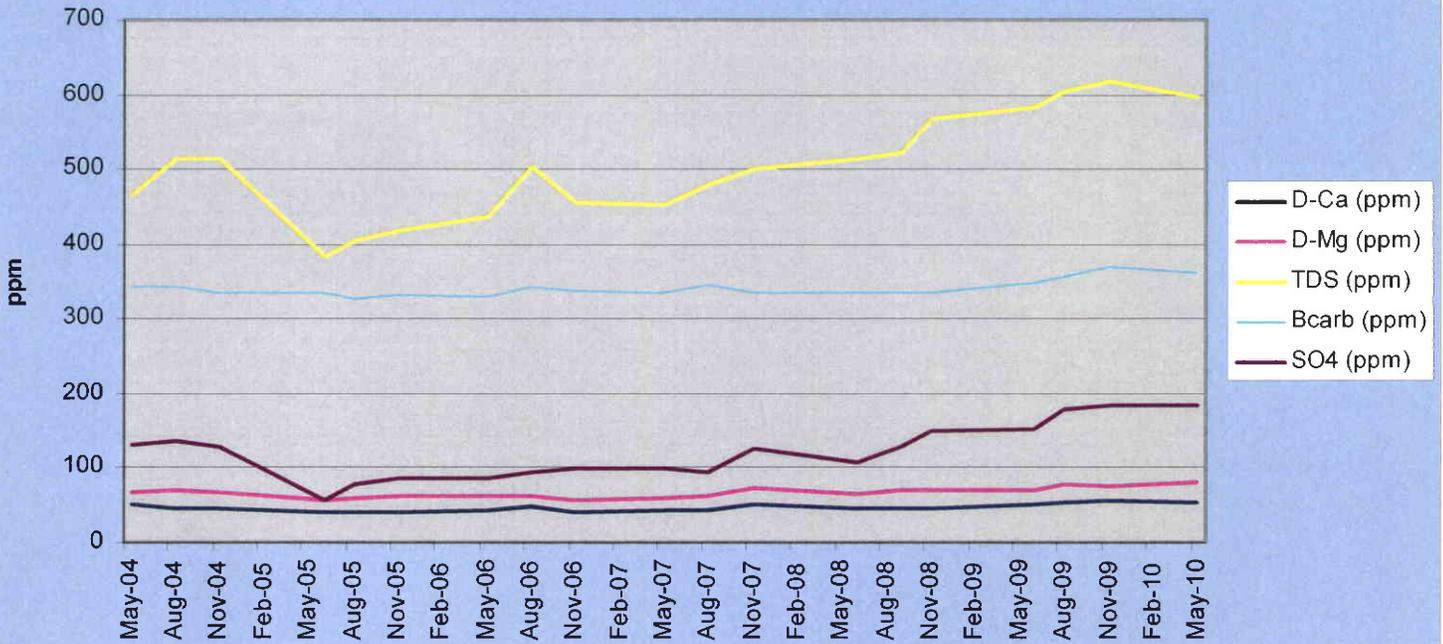
**7. Follow-up from last quarter, if necessary.**

YES  NO

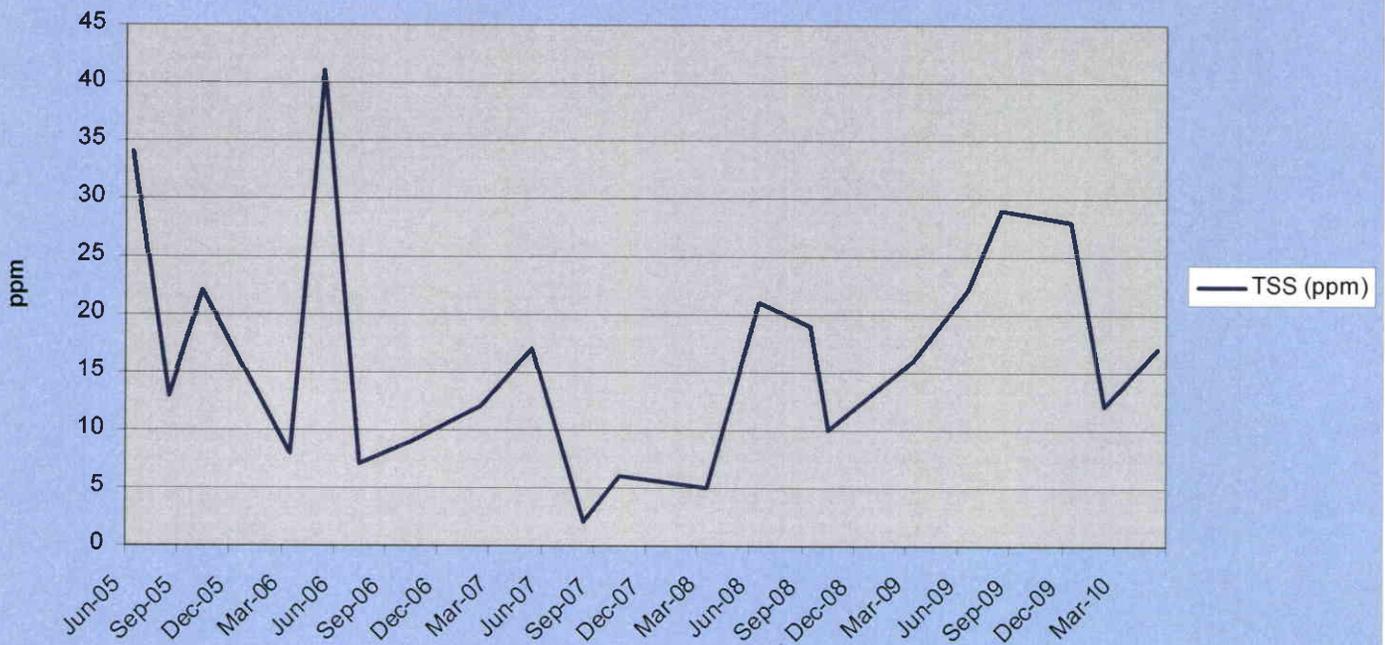
### Spring SP-101



### Spring SP-12

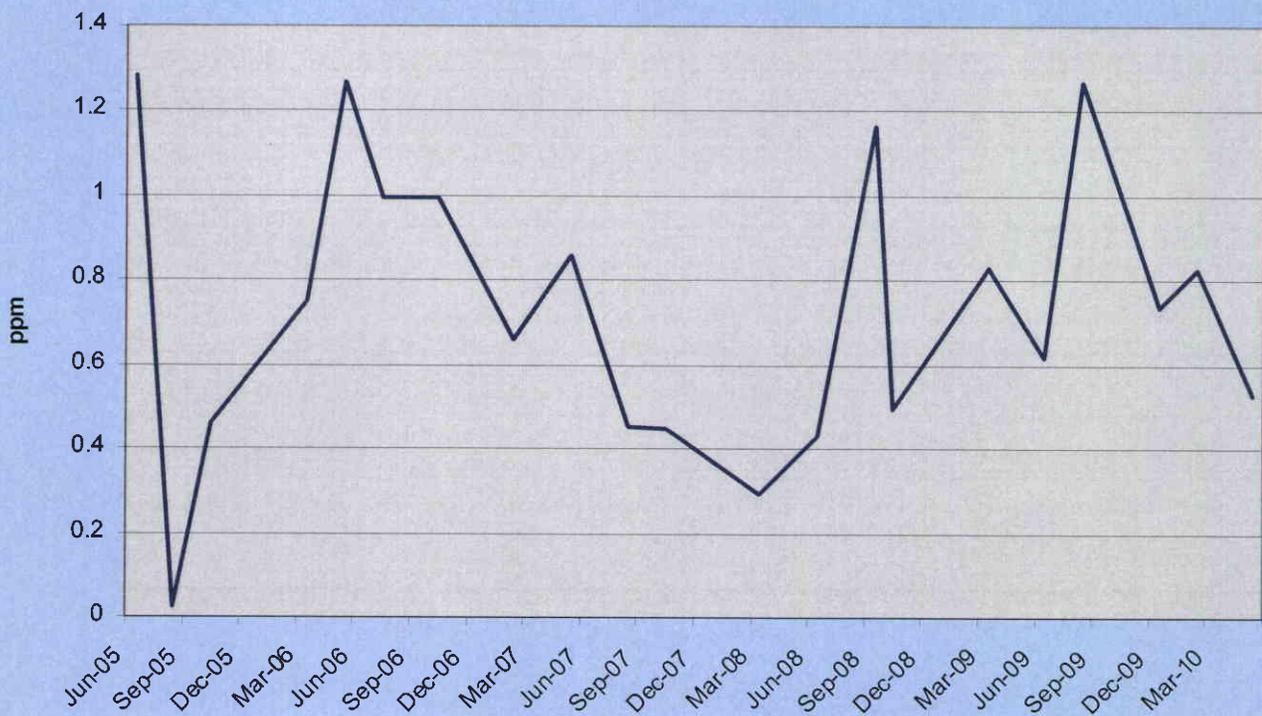


### ST-5: TSS vs. Time



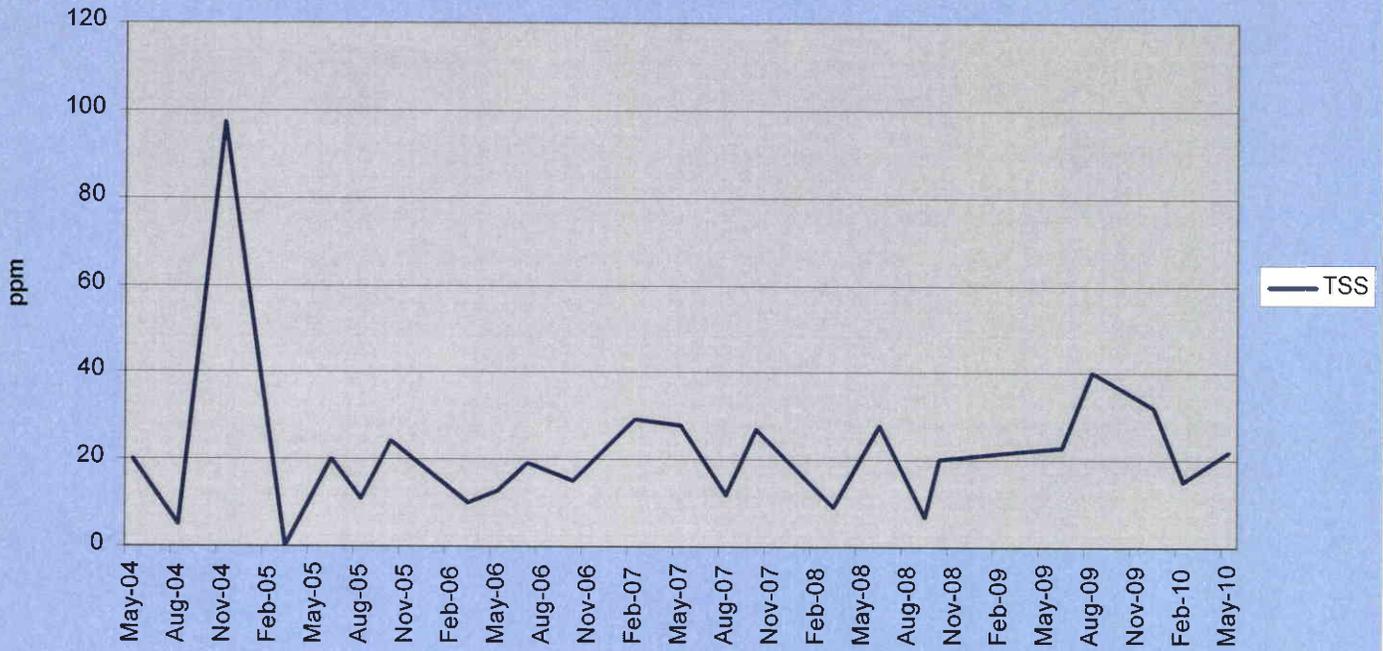
UPDES Limit for TSS- 70 ppm.

### ST-5: T-Fe vs. Time



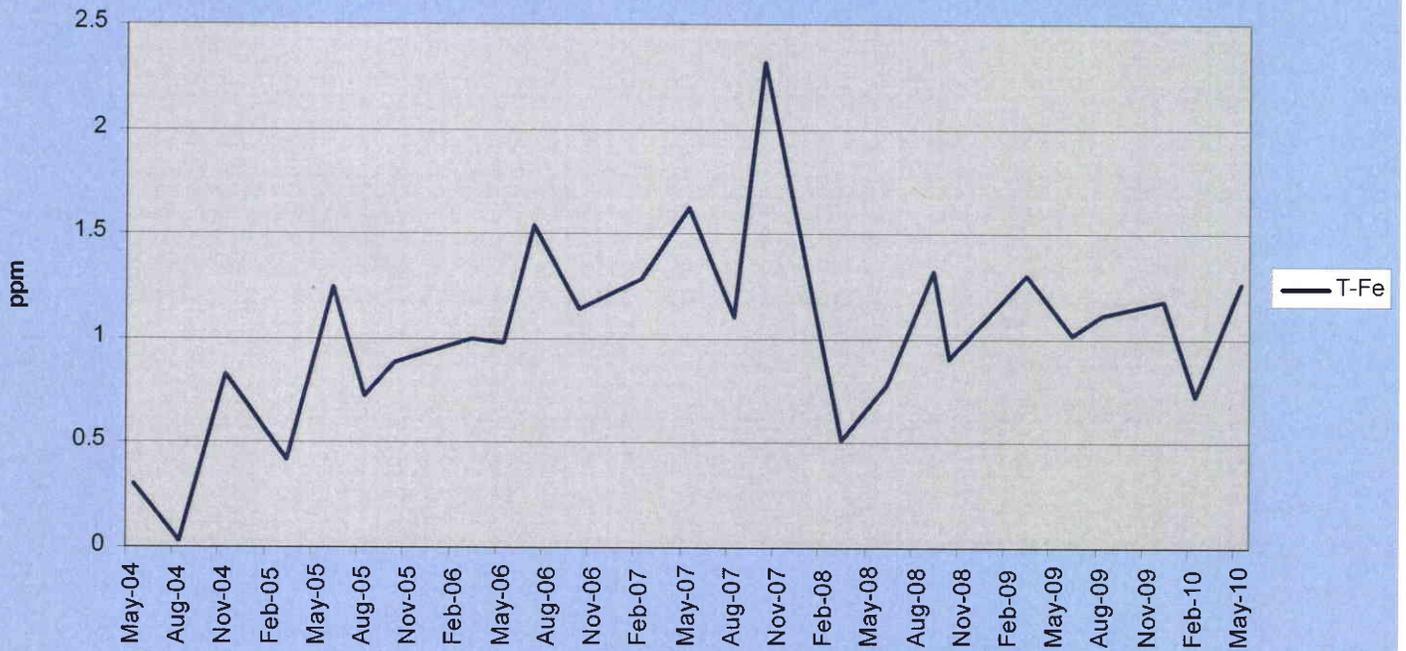
UPDES Limit for T-Fe- 1.3 ppm.

### ST-6: TSS vs. Time



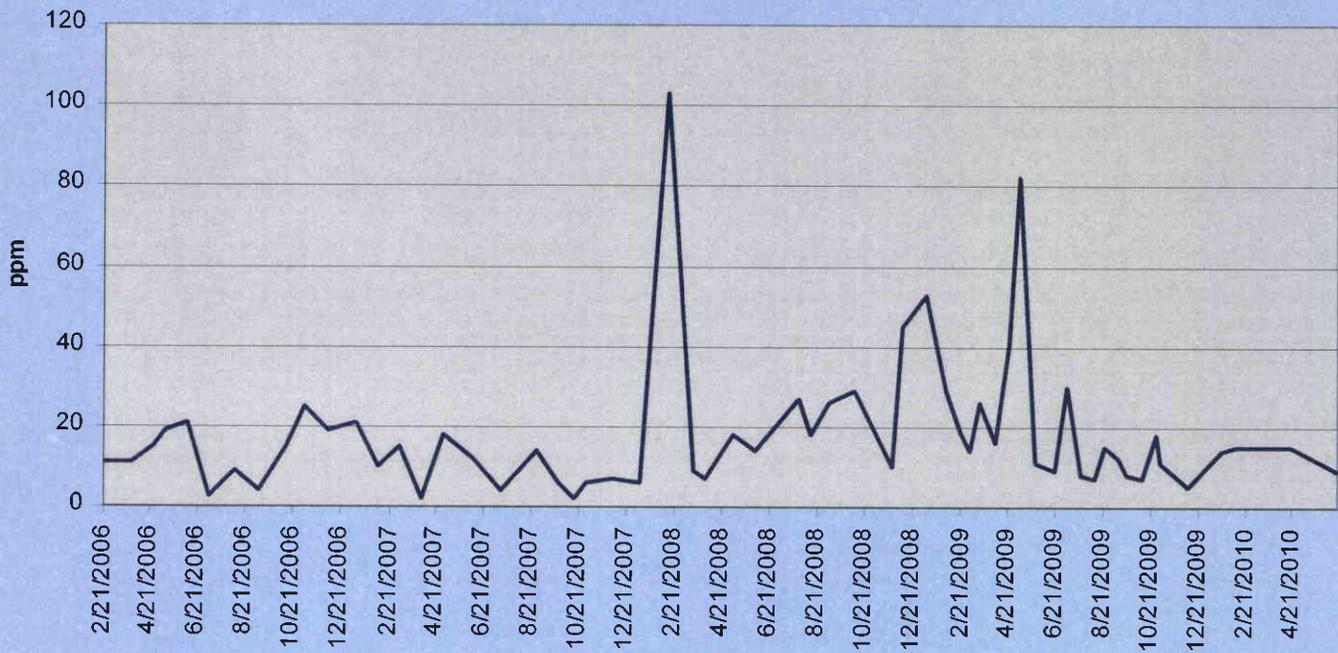
UPDES Limit for TSS- 70 ppm.

### ST-6: T-Fe vs. Time



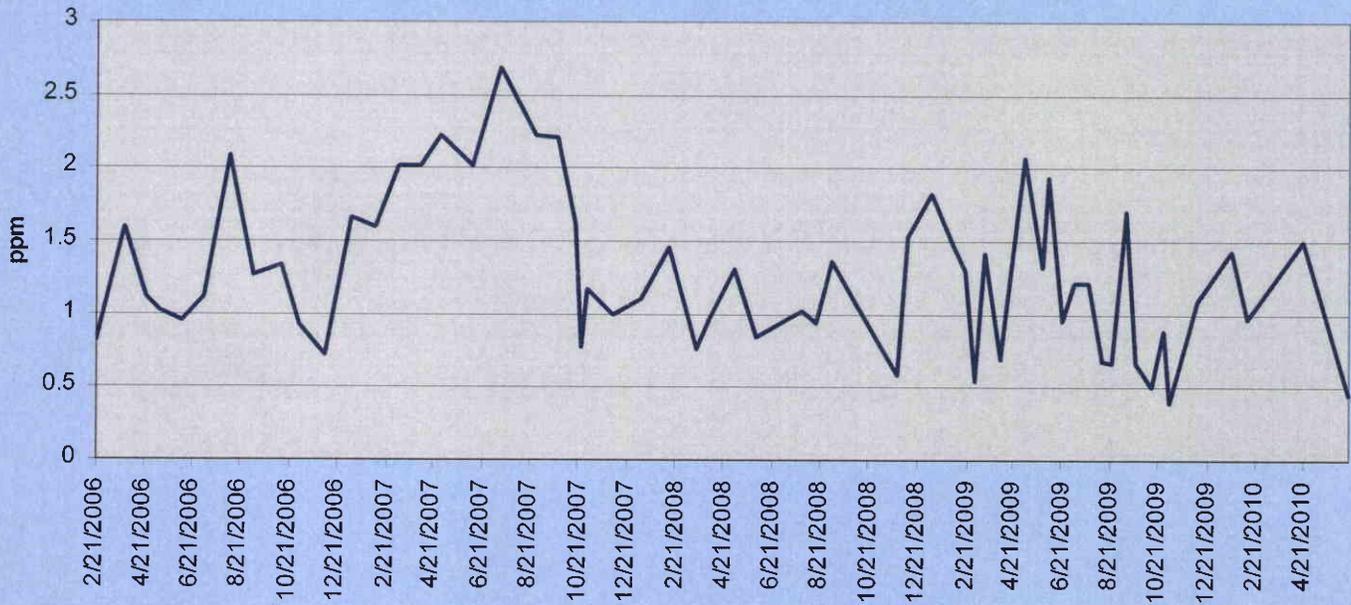
UPDES Limit for T-Fe- 1.3 ppm.

### UPDES Outfall D002: TSS vs. Time



UPDES Limit for TSS- 70 ppm.

### UPDES Outfall D002: Total Iron (T-Fe) vs. Time



UPDES Limit for T-Fe- 1.3 ppm.

# Monitoring Well DH 86-2

