## OGMCOAL - Crandall Data-July 2012

**From:** "Leonard, JD" <jleonard@coalsource.com>
**To:** "Ken Hoffman" <kenhoffman@utah.gov>, <ogmcoal@utah.gov>
**Date:** 8/30/2012 3:36 PM
**Subject:** Crandall Data-July 2012
**CC:** "Hibbs, David" <dhibbs@coalsource.com>, "Marshall, Jay" <jmarshall@coals...
**Attachments:** Ken Hoffman Crandall Final Document.xlsx; polymer_test 7_30_12.pdf

Hi Ken,

Attached is the monthly information for Crandall Canyon Mine, if you have any questions or need additional information please contact me.

Thank You
JD Leonard
435-888-4026
jleonard@coalsource.com

SGS

## Analysis Report

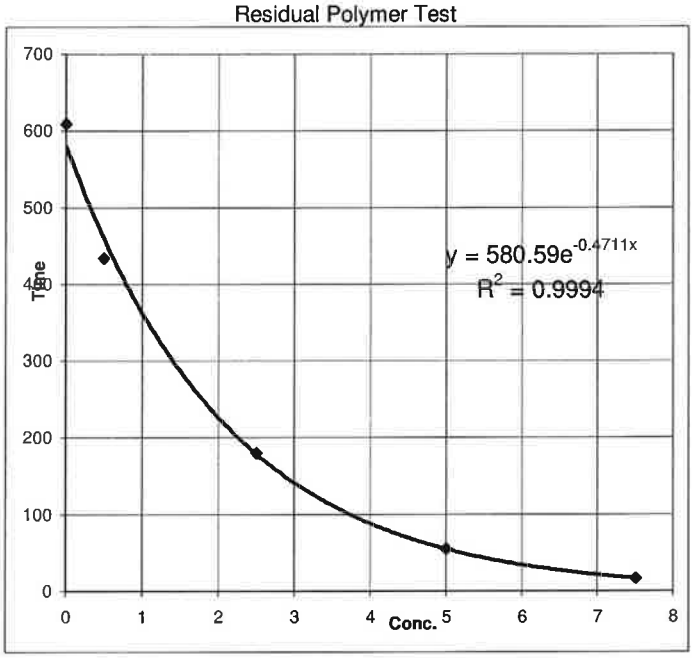


Genwal Resources Inc.
794 "C" Canyon Road
East Carbon, UT 84520

Client Sample ID: Polymer Test
Date Sampled: 7/30/2012
Date Received: 7/31/2012
Product Description:
Sample Taken At: Genwal Mine
Sample Taken By: JD
Time Received: 1339
Time Sampled: 1400

Coagulant (1mg/l) and Flocculent

| Exponent | INTERCEPT | |
|---|---|---|
| -0.4711 | 580.590000 | |
| Standards | Time | Conc. Mg/l |
| BLANK | 609 | 0 |
| 1 | 434 | 0.5 |
| 2 | 180 | 2.5 |
| 3 | 55 | 5 |
| 4 | 17 | 7.5 |




**Comments: Customer supplied method**

Residual Polymer (based on 1 mg/l Coagulant)

| Sample # | mL of Sample | Time | Conc. Mg/l |
|---|---|---|---|
| 1214753-001 | 45 | 557 | 0.09 |
| | | | |

ND = none detect (<0 mg/l)

Domenic Ibanez
Water Lab Supervisor

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## Crandall Canyon Mine

### Post-Treatment Mine Water 2012

| Parameter | Units | January | February | March | April |
|---|---|---|---|---|---|
| | | 1/24/2012 | 2/21/2012 | 3/23/2012 | 4/17/2012 |
| **Field** | | | | | |
| pH | std. units | 7.6 | 8.1 | 8.5 | 7.8 |
| Temperature | deg. C | 9 C | 9 C | 12 C | 11 C |
| Conductivity | µmhos/cm2 | 926 | 733 | 1066 | 1085 |
| Dissolved Oxygen | mg/L | 9.09 | 8.9 | 8.2 | 8.9 |
| **Lab** | | | | | |
| Iron | total, mg/L | 0.08 | 0.05 | 0.068 | <0.05 |
| Iron | dissolved, mg/L | <0.03 | <0.03 | 0.067 | <0.03 |
| Iron | ferrous, mg/L | 0.052 | 0 | 0.06 | 0.02 |
| Aluminum | total, mg/L | 0.1 | 0.09 | 0.14 | 0.08 |
| Aluminum | dissolved, mg/L | <0.03 | <0.03 | <0.03 | <0.03 |
| Manganese | total, mg/L | 0.093 | 0.068 | 0.068 | 0.075 |
| Manganese | dissolved, mg/L | 0.093 | 0.068 | 0.067 | 0.075 |
| Alkalinity | Bicarbonate, mg/L | 357 | 273 | 275 | 300 |
| Alkalinity | Carbonate, mg/L | <5 | <5 | <5 | <5 |
| Alkalinity | Total | 357 | 273 | 275 | 300 |
| Sulfate | mg/L | 147 | 110 | 109 | 120 |
| TDS | mg/L | 590 | 446 | 436 | 477 |
| Suspended Solids | mg/L | <5 | <5 | <5 | <5 |
| Seep Flow | gpm | 3.01 | 1 | 1 | 1.5 |

### Pre-Treatment Mine Water 2012

| Parameter | Units | January | February | March | April |
|---|---|---|---|---|---|
| | | | | | |
| **Field** | | | | | |
| pH | std. units | 7.3 | 7.5 | 7.3 | 7.4 |
| Temperature | deg. C | 11 C | 11 C | 11 C | 11 C |
| Conductivity | µmhos/cm2 | 919 | 723 | 1290 | 1254 |
| Dissolved Oxygen | mg/L | 7.1 | 7.8 | 7.4 | 7.5 |
| **Lab** | | | | | |
| Iron | total, mg/L | 2.290 | 1.580 | 2.960 | 2.450 |
| Iron | dissolved, mg/L | 0.03 | 0.06 | <0.03 | 0.17 |
| Iron | ferrous, mg/L | 0.96 | 0.469 | 1.236 | 0.754 |
| Aluminum | total, mg/L | <0.03 | <0.03 | <0.03 | <0.03 |
| Aluminum | dissolved, mg/L | <0.03 | <0.03 | <0.03 | <0.03 |
| Manganese | total, mg/L | 0.097 | 0.071 | 0.105 | 0.094 |
| Manganese | dissolved, mg/L | 0.097 | 0.071 | 0.105 | 0.094 |
| Alkalinity | Bicarbonate, mg/L | 375 | 282 | 359 | 371 |
| Alkalinity | Carbonate, mg/L | <5 | <5 | <5 | <5 |

| | | | | | |
|---|---|---|---|---|---|
| Alkalinity | Total | 375 | 282 | 359 | 371 |
| Sulfate | mg/L | 148 | 108 | 148 | 145 |
| TDS | mg/L | 603 | 448 | 591 | 576 |
| Suspended Solids | mg/L | <5 | <5 | <5 | <5 |
| Chloride | mg/L | 9 | 7 | 9 | 9 |
| Calcium | Dissolved, mg/L | 98.75 | 72.01 | 100.65 | 99.14 |
| Potassium | Dissolved, mg/L | 8.25 | 5.99 | 8.24 | 8.12 |
| Sodium | Dissolved, mg/L | 33.68 | 24.69 | 33.74 | 32.94 |
| Magnesium | Dissolved, mg/L | 53.18 | 38.57 | 54.42 | 54.95 |
| Silica | Dissolved, mg/L | 8.51 | 5.92 | 7.98 | 8.84 |
| Hot Acidity | mg/L | -374 | <5 | -376 | -370 |
| Average Flow | gpm | 429 | 430 | 395 | 389 |

| May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|
| 5/15/2012 | 6/12/2012 | 7/30/2012 | | | | | |
| | | | | | | | |
| 7.5 | 7.5 | 8.1 | | | | | |
| 13 C | 13 C | 12 C | | | | | |
| 1270 | 933 | 913 | | | | | |
| 9.2 | 8.14 | 11.28 | | | | | |
| | | | | | | | |
| 0.09 | <0.05 | <0.05 | | | | | |
| <.03 | <0.03 | <0.03 | | | | | |
| 0.019 | 0 | 0.03 | | | | | |
| 0.16 | 0.09 | 0.1 | | | | | |
| <.03 | <0.03 | <0.03 | | | | | |
| 0.089 | 0.085 | 0.083 | | | | | |
| 0.089 | 0.085 | 0.083 | | | | | |
| 367 | 359 | 368 | | | | | |
| <5 | <5 | <5 | | | | | |
| 367 | 359 | 368 | | | | | |
| 148 | 150 | 142 | | | | | |
| 595 | 575 | 572 | | | | | |
| <5 | <5 | 14 | | | | | |
| 1.5 | 1.5 | 1.5 | | | | | |

| May | June | July | August | September | October | November | December |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| 7.3 | 7.3 | 7 | | | | | |
| 12 C | 10 C | 11C | | | | | |
| 1290 | 982 | 921 | | | | | |
| 7.6 | 7.5 | 7.08 | | | | | |
| | | | | | | | |
| 2.730 | 4.020 | 2.990 | | | | | |
| <0.03 | <0.03 | <0.03 | | | | | |
| 0.809 | 0.901 | 0.803 | | | | | |
| <0.03 | <0.03 | <0.03 | | | | | |
| <0.03 | <0.03 | <0.03 | | | | | |
| 0.097 | 0.098 | 0.099 | | | | | |
| 0.097 | 0.093 | 0.088 | | | | | |
| 378 | 371 | 375 | | | | | |
| <5 | <5 | <5 | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 378 | 371 | 375 | | | | | |
| 151 | 151 | 144 | | | | | |
| 596 | 581 | 576 | | | | | |
| <5 | <5 | 23 | | | | | |
| 9 | 9 | 9 | | | | | |
| 99.6 | 98.47 | 93.58 | | | | | |
| 8.09 | 7.9 | 8.14 | | | | | |
| 32.75 | 31.9 | 32.29 | | | | | |
| 55.73 | 54.4 | 50.85 | | | | | |
| 8.26 | 7.94 | 9.18 | | | | | |
| -376 | -368 | -374 | | | | | |
| 412 | 399 | 393 | | | | | |