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**OGMCOAL - Fwd: Crandall Canyon Mine Water Discharge: Response to DOGM Letter to OSM**

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**From:** Steve Christensen  
**To:** OGMCOAL  
**Date:** 9/24/2012 8:46 AM  
**Subject:** Fwd: Crandall Canyon Mine Water Discharge: Response to DOGM Letter to OSM  
**Attachments:** Genwal's response to Baza's letter.PDF; Petersen Crandall Canyon Mine discharge update 17 September 2012 version 2.pdf

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>>> Dana Dean <danadean@utah.gov> 9/21/2012 4:24 PM >>>

Dana Dean, P.E.  
Associate Director - Mining  
Utah Division of Oil, Gas and Mining

[ogm.utah.gov](http://ogm.utah.gov)

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----- Forwarded message -----

From: **Dragoo, Denise** <ddragoo@swlaw.com>  
Date: Mon, Sep 17, 2012 at 5:10 PM  
Subject: Crandall Canyon Mine Water Discharge: Response to DOGM Letter to OSM  
To: Julie Ann Carter <juliecarter@utah.gov>  
Cc: John Baza <JOHNBAZA@utah.gov>, Dana Dean <danadean@utah.gov>, Mike Johnson <MIKEJOHNSON@utah.gov>, Steve Alder <stevealder@utah.gov>

Julie Ann, on behalf of Genwal Resources, Inc, we request that you forward these letters to Board Chairman Jim Jensen and to the Board members who will be in attendance at the September hearing. Thanks for your assistance! Denise

~~~~~

Denise A. Dragoo

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September 17, 2012

James T. Jensen  
Chairman  
Utah Board of Oil, Gas & Mining  
1594 West North Temple  
Salt Lake City, Utah 84116

**RE: *Crandall Canyon Water Quality – Response to Director Baza’s Letter of August 24, 2012***

Dear Chairman Jensen:

On behalf of Genwal Resources, Inc. (“**Genwal**”), we are responding to Director Baza’s letter dated August 24, 2012 to the federal Office of Surface Mining, Reclamation and Enforcement (“**OSM**”) regarding water quality at the Crandall Canyon Mine. Genwal is concerned by both the tone and substance of this letter which questions the findings of the Board’s Order dated March 6, 2012 (the “**Board Order**”). We have reviewed the letter with Dana Dean Assistant Director, Utah Division of Oil, Gas & Mining (the “**Division**”) and she confirmed that the letter responds to OSM’s request for information and also provides an annual update as required by the Board Order, ¶ 3, p. 30. However, Genwal is concerned that this information was filed with OSM first, prior to Board review and further questions the Board’s finding that “the high iron concentrations at issue will not likely persist for more than three years.” Board Order, ¶ 2, p. 30. On the basis of this finding, Genwal timely posted a bond of \$720,000.00 for three years of water quality treatment costs.

The Division’s letter to OSM challenges the Board’s finding which was based in part on a November 2011 report prepared by Erik Petersen, Petersen Hydrologic. Mr. Petersen’s report was based on data collected through October 18, 2011, including a “reasonably plausible decay curve” for future total iron concentrations. The Division then compares Mr. Petersen’s decay curve, which was based on previous data to new data from November 2011 to June 2012 and asserts that Genwal’s curve results in a “126% under estimate of actual total iron and approximately a 50% under estimate of the 6 month average.” The Division then asserts that total iron concentrations in the untreated mine water discharge “appear to be stabilizing at approximately 2.5 mg/L.” At our request, Erik Petersen has reviewed the Division’s trend analysis and disagrees with their conclusions which are premature and are based in a statistical

James T. Jensen  
September 17, 2012  
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analysis found to be in error. See letter from Erik Petersen dated September 17, 2012 enclosed. By contrast, it is Mr. Petersen's opinion that total iron concentrations from Crandall Canyon water discharge will likely fall below 1.24 mg/L within 2.5 years or less, as previously determined by the Board.

Although the Board requested an annual update of water quality from Crandall Canyon Mine, the Division's recent data review and trend analysis is premature and is filed with OSM prior to Board review. The Board Order in this matter was not finalized until May 3, 2012 in an order on motion for rehearing which allowed Genwal until July 3, 2012 to comply with the Board's bonding requirements. In July, 2012, Genwal timely filed a water treatment bond with the Division. Only one month later, in August, 2012, the Division determined that it would issue the annual review of water quality monitoring data and a trend analysis.

Rather than filing this information for preliminary review by the Board and the operator, the Division filed the report directly with the federal OSM. If the Division has concerns with this data, it should petition the Board for further review. Inviting action by OSM is contrary to the Board Order and Utah's role as the primary regulatory authority under the Utah Coal Program.

We appreciate your consideration of this matter.

Very truly yours,



Denise A. Dragoo

DAD:jmc  
Enclosure

cc: David Hibbs  
Jay Marshall  
Erik Petersen  
Director John R. Baza



## PETERSEN HYDROLOGIC

17 September 2012

Ms. Denise Dragoo  
Snell & Wilmer, L.L.P.  
15 West South Temple, Suite 1200  
Beneficial Tower  
Salt Lake City, Utah 84101

Denise,

At your request, we have evaluated recent total iron concentration measurements from the Genwal Resources, Inc. Crandall Canyon Mine discharge water. Specifically, we have evaluated information obtained subsequent to the preparation of our previous report entitled *Investigation of Iron Concentrations in the Genwal Resources, Inc. Crandall Canyon Mine Discharge Water*, dated 7 November 2011. The reader is referred to that document for additional supporting information in this regard.

On 6 March 2012 the Utah Board of Oil, Gas and Mining (Board) found that elevated iron concentrations will not likely persist in the Crandall Canyon Mine discharge water beyond the next 3 years. Subsequent to the Board's finding, Genwal Resources, Inc. has continued to collect monthly samples of the mine discharge water for analysis of total iron concentration as specified in the mine's UPDES permit. Three additional samples were also collected by the Utah Division of Oil, Gas and Mining (Division) for total iron analysis. The measured total iron concentrations in the Crandall Canyon Mine discharge water are plotted in Figure 1.

It is apparent from the data plot in Figure 1 that there are two distinct components to the plot of total iron concentrations from the Crandall Canyon Mine discharge water. These include 1) a relatively smooth, sub-parabolic-shaped base concentration trend, and 2) a series of upward-trending spikes which generally project upward from the base concentration trend.

The base concentration trend, which is shown in blue on Figure 1, is believed to be generally representative of the total iron concentration of the Crandall Canyon Mine discharge water as it flows to the mine surface. This conclusion is strongly supported by the observations that there are no “downward spikes” in the total iron concentration data and also by the relatively smooth and predictable trend of the base concentration trend (which is entirely consistent with the reactant-limited geochemical model presented in our November 2011 report). The lack of any downward spikes in the historical data relative to the base concentration trend is likely attributable to the fact that total iron is not readily “uncontaminated” while it is known that the inclusion of iron-hydroxide particulate matter from any source will always result in an upward spike in the concentration relative to the base concentration.

The fact that the base concentration trend continues to decline generally as projected suggests that indeed the rates of pyrite oxidation and/or chemical transport within the Crandall Canyon Mine workings are slowing as projected. This condition has likely resulted in a diminishing supply of total iron for transport to the mine portals.

Because of the two-component nature of the historical total iron data (a population of base trend total iron concentration measurements which are likely representative of the bulk mine pool geochemistry and a population of short-duration upward spike measurements which are likely not representative of the bulk mine pool geochemistry), it is probably not appropriate to statistically analyze these data as though they were from a single population. It is likely in large part for this reason that the 95% confidence level was not met in the Division’s statistical analysis. Accordingly, the Division’s conclusion that the total iron concentrations are not declining is believed to be in error. It also seems premature for the Division to come to their conclusion less than six months following the Board’s determination of a three-year timeframe.

Encouragingly, based on an extrapolation of the base concentration trend as shown in Figure 1 (which shows a smoothly declining trend since peaking in early 2010), it appears likely that the base total iron concentration of the groundwater emerging from the Crandall Canyon Mine may reach the 1.24 mg/L UPDES permit limit as early as the end of 2012 or early 2013 (which would be approximately two years ahead of the Board determination timeframe). Indeed, as of mid-February 2012, the measured base total iron concentration in the mine discharge water was 1.58 mg/L, which is only 0.34 mg/L above the mine’s UPDES permit discharge limit for total iron. Dissolved iron concentrations in the untreated mine discharge water during 2012 are consistently very low (<0.1 mg/L).

However, it is noted that upward spikes in total iron concentration continue to be observed in the recently collected mine discharge samples (Figure 1). The UPDES permit specifies a maximum total iron concentration of 1.24 mg/L – regardless of whether the iron in the sampled water represents the base concentration or an upward spike condition. As discussed in our November 2011 report, the inclusion of iron-hydroxide particulates in samples collected from an incompletely purged sampling system was believed to be a major cause of such spikes. However, as indicated by Genwal Resources and Division sampling personnel, the recently collected samples were collected after considerable purging periods. We suspect that a more effective purging technique or an enhanced sampling protocol may increase the likelihood that representative data may be collected. It is also possible that inherent shortcomings in the existing sampling system design may complicate the collection of representative water samples. The mobilization of iron hydroxide particulates as a result of agitation along the pool “short line” may also occur. Regardless of the source(s) of solid particulate matter, it is apparent that 1) the base concentration continues to decline as predicted, and 2) that the magnitudes of the upward spike events also generally continue to decline (Figure 1).

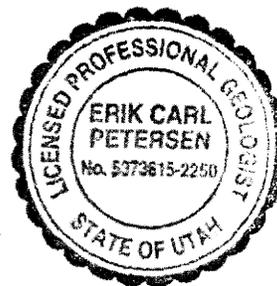
Based upon the information presented here, it is my opinion that total iron concentrations in the Crandall Canyon Mine discharge water will likely fall below the 1.24 mg/L UPDES limit within a timeframe of about 2.5 years or less as was previously determined by the Utah Board of Oil, Gas and Mining. To verify this conclusion, Genwal Resources, Inc. will continue to collect and analyze hydrologic data relating to the Crandall Canyon Mine discharge as required.

Please feel free to contact me should you have any questions in this regard.

Sincerely,



Erik C. Petersen, P.G.  
Principal Hydrogeologist  
Utah PG #5373615-2250



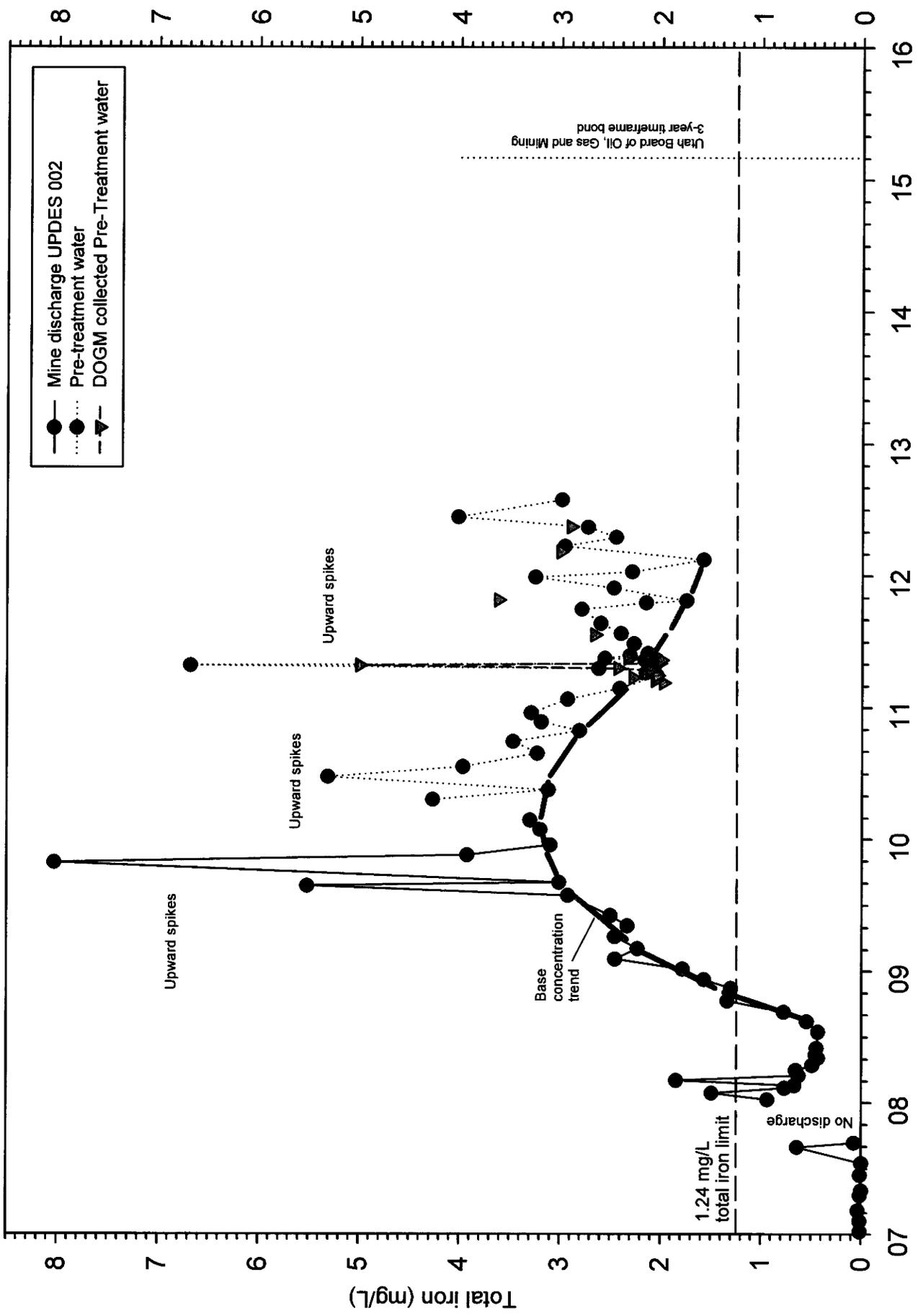


Figure 1 Total iron concentrations in untreated mine discharge water (based on pre-treatment data).