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# TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

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February 8, 2011

TO: Internal File

THRU: Steve Christensen, Lead *SC*

FROM: Ingrid Campbell, Environmental Scientist II *IC*

RE: Division Order Response, Genwal Resources Inc., Crandall Canyon Mine, Permit # C/015/0032 and Task #3724

## SUMMARY:

Water discharging from the inactive Crandall Canyon mine since 2007 contained an excessive amount of iron which stained the receiving creek (Crandall Creek) orange. The Division and other regulatory agencies including the US Forest Service were concerned that the elevated iron levels and the significant amount of orange precipitate in the creek bed would adversely affect aquatic organisms and habitat in Crandall Creek and Huntington creek. In order to comply with the Crandall Canyon Mining and Reclamation Plan and the Division of Water quality UPDES permit, the mine was required to immediately treat the discharge water to settle out the iron before discharging it to the stream. The Division also required immediate commencement of macroinvertebrate surveys in the spring and fall of every year to assess and monitor the impacts. Currently, JBR Environmental consultants have conducted a fall 2009 survey, and a spring and fall 2010 survey. The 2009 and spring 2010 survey reports have been submitted to the Division and are discussed in this memo. The next survey is scheduled for June 2011.

This application cannot be recommended for approval at this time. Prior to approval, the permittee must submit the following in accordance with:

**R645-301-312, -333:** Please remove the statement on page 16 of the appendix 7-15, PHC determination, "the additional modest quantity of flow in the creek, particularly during the low-flow season, is likely beneficial to aquatic habitat rather than being detrimental to the overall

aquatic habitat." This statement is incorrect and contrary to information in both the September 2009 and June 2010 macroinvertebrate reports for Crandall canyon.

Please investigate and address the potential impacts to fish and wildlife resources, specifically impacts to aquatic communities and aquatic habitat, due to an increased flow from the mine water discharge. Include names of professional persons or organizations that will collect and analyze the data, dates of the collection and analysis of the data, and descriptions of the methodology used to collect and analyze the data.

**TECHNICAL ANALYSIS:**

## **OPERATION PLAN**

### **FISH AND WILDLIFE INFORMATION**

Regulatory Reference: 30 CFR Sec. 784.21, 817.97; R645-301-322, -301-333, -301-342, -301-358.

**Analysis:**

**Protection and Enhancement Plan**

Three macroinvertebrate studies have been conducted in the Crandall creek since the iron discharge was noticed. The permittee is required to have a professional consultant conduct macroinvertebrate surveys every spring and fall. Three sample sites were selected in coordination with the Division and the USFS in the summer of 2009 (see inspection report # 2125). It was agreed upon that the stream reach above the mine culvert would act as a reference for the two below discharge stream reaches. The sample reaches below the discharge are located in the immediate vicinity of the discharge and further downstream near the confluence of Crandall creek and Huntington creek. The site nearest the discharge should give information about the immediate effects of the iron discharge in the stream. The downstream site was selected to identify effects further downstream and may indicate impacts to Huntington creek. The two downstream sites are intended to produce information on the spatial extent of the discharge impacts to the stream, if any.

The first survey was conducted September 16, 2009 by JBR Environmental consultants (See 2010/Incoming/2009annualreport/0001.pdf). Results from the sampling showed that neither the stream above the mine discharge point nor below the discharge point was in good condition. There were slightly worse conditions downstream of the mine water discharge. However, it is problematic, according to the report, to attribute the degraded conditions directly to the iron content because there were no specific taxa known to be present or absent in iron laden waters. Also, the discharge adds considerable more flow at warmer temperatures to the two downstream sites which could also impact aquatic communities. The data did show similarity with other studies, though, that addressed impacts to macroinvertebrates to heavy metals. The stream was sampled for macroinvertebrates in 1980 prior to construction of the mine, but there is a lack of information as to where the sample sites were located and how the data was interpreted. Overall, however, the data shows a degradation of macroinvertebrate community structure between 1980 and 2009 at both upstream and downstream sites. Further sampling must be conducted in order to better assess the impact of the mine water discharge to the stream. The report summarized that

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in future sampling, a 500-micron kick net will be used rather than a 1000micron surber sampler to increase the amount of specimens collected. Also, a full stream reach sample will be taken at each site as well as a targeted riffle sample in order to better analyze the differences between sites.

The spring 2010 survey was conducted by JBR Environmental consultants in June 2010. The high elevation and high spring runoff prevents earlier spring surveys. The conditions in June 2010 were very similar to the fall 2009 results. All three sites data indicated a degraded condition with the site directly below the discharge showing a slightly more degraded condition than the upstream site. Iron is no longer being discharged into the stream, but iron precipitates are still evident in the stream bed.

The fall 2010 survey was conducted and the report is currently being prepared. The next survey is scheduled for June 2011.

It has been concluded in discussions with the Division and US Forest Service that actively cleaning the remaining iron precipitate out of the stream with mechanical means may harm the aquatic habitat and community more than allowing it to remain in the stream. The mine is no longer discharging iron into the stream thereby preventing further impacts. The permittee will be responsible for improving the conditions of the stream during reclamation (removing most of the culvert). The reclamation operations will include a significant amount of earthwork within the stream, so restoration after that occurs is preferred.

Page 16 (83 of 91) of the PHC amendment stated that the, "additional modest quantity of flow in the creek, particularly during the low-flow season, is likely beneficial to aquatic habitat rather than being detrimental to the overall aquatic habitat." This statement is not supported by any scientific information. Substantially increasing flow could affect the aquatic habitat by changing the stream substrate and increasing the temperature (if the discharge is a higher temp). This is brushed upon on page 12 of the June 2010 macro invertebrate report by JBR consultants, where it explains that high flows typically decrease abundance of invertebrates. This statement needs to be removed because it is inaccurate and unfounded.

**Findings:**

The information provided in the Division order response is not considered adequate to meet the minimum requirements for this section. Prior to approval, the permittee must include the following in accordance with:

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**RECOMMENDATIONS:**

This application is not recommended for approval at this time.