C

Outgoing
C0150032
#3724
K

State of Utah

DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Oil, Gas and Mining

JOHN R. BAZA
Division Director

GARY R. HERBERT
Governor

GREGORY S. BELL
Lieutenant Governor

February 16, 2011

Dave Shaver, Resident Agent
Genwal Resources, Inc.
P.O. Box 910
East Carbon, Utah 84520-0910

Subject: Division Order 10A Response to Task #3582 Bullet Items 1,3 and 4 (Task ID #3714) and Division Order 10A Response to DOGM Letter of December 21st, 2010, Bullet Items 1, 2 and 3 (Task ID #3724), Genwal Resources, Inc., Crandall Canyon Mine, C/015/0032, Outgoing File

Dear Mr. Shaver:

On December 14, 2010 and January 6, 2011, the Division of Oil, Gas and Mining (the Division) received amendments to the Crandall Canyon Mining and Reclamation Plan (MRP) from Genwal Resources, Inc. (the Permittee).

The December 14, 2010 amendment provides revisions to Appendix 7-65, *Mine Water Treatment System*, of the Crandall Canyon MRP (Task #3714). The January 6, 2011 amendment provides revisions to Appendix 7-15, *Probable Hydrologic Consequences Determination* (Task #3724). The two amendments are in response to Division Order 10A (DO-10A), dated August 16, 2010 as well as commitments contained within the approved MRP as a result of a permitting action in July of 2010 (Task #3582).

Upon completing its technical review, the Division finds that the amendments are deficient and that additional information/revisions are required prior to receiving final approval. Additionally, the Division finds that the Permittee is in violation of their approved MRP and has issued Citation #10073 (Issued 2/16/11 and mailed under separate cover).

In an effort to simplify the numerous Crandall Canyon permitting actions, the attached deficiency list covers both Task #3714 and Task #3724 with two exceptions. The iron sludge disposal option component of Task #3714 was previously denied and returned to the Permittee (Division letter dated February 3, 2011) along with Task #3713, *Sediment Pond A Storage*. Task #3713 was the accompanying iron sludge disposal amendment for the Centennial Mine MRP. Additionally, Task #3732, *Work Plan Hydrogeologic Study* was found deficient and returned (Division letter dated February 7, 2011).

Please respond to the deficiencies not associated with the Probable Hydrologic Consequences (PHC) (See Attached) and NOV #10073 abatement measures by March 16, 2011. The PHC deficiencies identified during the technical review have been broken out separately (See Attached). The response to these PHC deficiencies must be submitted by November 11, 2011 along with the PHC requirements as identified in the Denise Dragoo letter dated December 9, 2010 and Division letter dated December 21, 2010.

If you have any questions, please feel free to call me at (801) 538-5325 or Steve Christensen at (801) 538-5350.

Sincerely,

Daron R. Haddock
Permit Supervisor

DRH/SKC/sqs
CC: Denise Dragoo, Esq.
Price Field Office
O:\015032.CRA\WG3714\WG3714_3724_DefLtr.doc

Deficiency List

Task No.'s #3714 and #3724

The members of the review team include the following individuals:
Ingrid Campbell (IC)
Kevin Lundmark (KL)

Responses to the following Non-Probable Hydrologic Consequences (PHC) deficiencies due March 16th, 2011

Experimental Treatment Design Information

R645-300-143 The information describing the experimental treatment design must be submitted as an amendment to the MRP. (KL)

R645-301-120, R645-301-130, R645-301-731 The permittee must provide the following information, or state that the information is unavailable and provide the reason that the information was not collected: (KL)

Treatment Technology Screening

- Consultant reports and descriptions for technology screening, if any, prior to selection of oxidizer unit
- Oxidizer(Maelstrom) unit bench testing information
- Consultant reports from the three Geotube companies and one press company to which sludge samples were sent July 2010
- Consultant reports describing successful "Geobag" testing completed October 2010, including Geobag specifications, operating conditions, concentrations and types of additional treatment chemicals employed.
- Consultant report(s) for cyclone testing completed 11/5/2010 (type of cyclone and operation settings)

Chemical Additives

- Concentrations of treatment chemicals used:
  - 2/24/2010 - Sodium Hydroxide (NaOH)
  - 2/25/2010 - Nalco 7763 plus NaOH
  - 3/15-16/2010 - Nalco 7763 and Nalco 7888 (8187)
  - 3/19/2010 - Nalco 8158
  - 3/25/2010 - NeoSolutions 18100
  - 4/16/2010 - Nalco 8187
  - 10/20/2010 – Solve 151
- Consultant reports and analytical results for polymer testing results from Nalco and WaterSolve

Field Data and Lab Analytical Results

- Field measurements (sludge settling times, field-measured iron concentrations, turbidity measurements, etc.) used to evaluate treatment effectiveness
- Laboratory analytical results for samples analyzed to evaluate treatment effectiveness

Mine-water Flow Data

- Date that the flow meter used for Outfall 002 was first suspected or known to be malfunctioning.

Sludge Disposal

- Volume sludge sent to Crandall Sediment pond between July 19 and August 23, 2010
- Specific dates and volume of sludge sent to Crandall sediment pond November 2010.

Appendix 7-65 Mine Discharge Water Iron Treatment Facility

R645-301-121 The Background section of Appendix 7-65 must be corrected to identify all components of the water treatment system. The water treatment system comprises five unit operations: aeration, chemical addition, sludge recirculation, settling / clarification, and sludge disposal. (KL)

R645-301-120, R645-301-731, R645-301-728 Genwal must revise the amendment to identify: the concentrations of coagulant and flocculant being used under current operating conditions; the concentration of flocculant prepared in the make-down unit; and the sludge recirculation rate being used under current operating conditions. (KL)

R645-301-731 Genwal must add a commitment that only treatment chemicals certified under NSF60 will be utilized for the mine water treatment system, and Genwal will monitor the dosage rate (in mg/L) for all treatment chemicals used. Genwal will monitor treated water for carryover of treatment chemicals on a monthly basis or when dosage rates or chemical products are changed. Dosage rates will not exceed the NSF60 certified concentrations without a prior demonstration to the Division, Forest Service and DWQ that elevated dosage rates are acceptable based on analytical results for treated water samples. (KL)

R645-301-742.230 Genwal must revise Appendix 7-65 to identify the approximate clean out frequency under current operating conditions (i.e., quarterly) and include criteria used to determine when clean out will be performed, e.g., prior to sludge accumulation in the settling basin cell closest to the outfall. (KL)

R645-301-731 The following text must be maintained in Appendix 7-65 page 7:
"Care will be taken during the clean-out process to minimize stirring up the accumulations so that suspended iron particles do not flow out of the pond. During the clean-out process, excelsior logs or other suitable sediment control (filtration) devices will be installed at the basin outlet spillway to help trap any iron material stirred up. Visual observations and sampling of the water will be made at the spillway (i.e., UPDES monitoring point) to make certain that stirred up iron material is not exiting the basin. If needed, cleaning operations will be delayed until sufficient time is allowed to re-settle any stirred up material." (KL)

R645-301-131 The permittee must include in the MRP the analytical results for treatment sludge and supernatant which were previously included as Exhibits 4, 5 and 6 of the Deleted Attachment 9 to Appendix 7-65. (KL)

R645-301-731 The Permittee must revise the Maintenance Section of Appendix 7-65 to remove references to a "mechanically simple system" and to demonstrate that necessary repairs to any of the pumps, chemical injection systems, flow meters, or piping can be accomplished within the 8-hour window available by routing untreated mine water to the settling basin. (KL)

R645-301-731.200 The Permittee should remove from Appendix 7-65 discussion of ongoing baseline water monitoring associated with the mine water discharge and groundwater seepage from the highwall face and update Section 7.31.2 of the MRP, as appropriate, to describe ongoing baseline monitoring. Monitoring associated with water treatment system performance , including analysis for treatment chemical residuals should be included in Appendix 7-65 .(KL)

R645-301-761 Permittee must include a description of the removal and reclamation of the operational treatment system. (KL)

R645-301-830 The Permittee must submit an amendment to the MRP with projected cost information for the water treatment system for the following line items:

- Equipment costs (capital)
- Chemical costs (annual)
- Sludge cleanout, transportation, and disposal costs (annual)
- Electricity, propane and water costs (annual)
- Operational Labor (annual)
- Maintenance Labor (annual)

R645-301-121.100 The Permittee must update Appendix 7-65 Attachment 8 (Construction Specifications and Drawings) to describe the installation of all aspects of the water treatment system, including the seven pumps, two chemical injection systems, two flow meters and associated piping and controls. The Permittee must also include the revised Iron Treatment Facility As-Built Plan (Sheet 1 from the November 30, 2010 submittal) and correct the number of fabric curtains shown in the Process Flow Diagram Figure. (KL)

Responses to the following PHC deficiencies due November 11th, 2011

Appendix 7-15 Probable Hydrologic Consequences Determination

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. (IC)

R645-301-122, R645-301-130, R645-301-728.200 Permittee must supply supporting data providing a basis for these determinations, or modify/remove the following statements in Appendix 7-15: (KL)

- Groundwater Interception, 3rd paragraph, Page 2: Provide data to support the observation that the source of groundwater intercepted by the mine in Section 26 & 35, T15S, R6E is release from storage.
- Groundwater Interception, 4th paragraph, Page 3: Provide basis (not just a reference to Division's water database) for the conclusion that springs within the permit area have not been affected by mining operations.
- Spring and Seep Interception, 4th paragraph, page 7: Define the dates for the "period of active mining" when inflows were "modest in magnitude and of short duration". Identify the date(s), flow rates and the specific locations within the mine where "appreciable groundwater inflows were encountered". Provide data to support the observation that the source of groundwater intercepted by the mine in Section 26 & 35, T15S, R6E is release from storage.
- Spring and Seep Interception, 6th paragraph, page 8: Identify when the flow meter used for Outfall 002 was first suspected or known to be malfunctioning.
- Pumping from Crandall Creek, page 10: Provide the "baseline water flow which needs to remain within Crandall Creek to sustain the existing flora and fauna" which Genwal committed to have determined by August 31, 1995.
- Mine Water Discharge, 10th paragraph, page 14: Provide WET testing reports
- Mine Water Discharge, 12th paragraph, page 14: For the chemicals referred to in list item 2), identify the specific chemicals being used to treat the water, their application rates and the applicable NSF60 criteria and provide a commitment in the MRP that chemical usage rates will not exceed NSF60 criteria.
- Mine Water Discharge, 16th paragraph, page 15: Provide data, reports, field notes and/or observations from "experiences at the Crandall Canyon Mine and other coal mining

operations in the Wasatch Plateau" which support the estimate that "elevated iron concentrations will not persist more than about 10 years".

R645-301-728.310 The Permittee must correct the following errors or deficiencies in Table 1 to describe whether adverse impacts may occur to the hydrologic balance: (KL)

- Acid-toxic Materials, Table 1, page 24: The likelihood of toxic-forming materials must be shown as either "moderate" or "high". The elevated (greater than 1 mg/L) iron concentrations in the untreated mine water discharge are evidence that "toxic-forming materials" are present within the coal, overburden, or underburden at the Crandall Canyon mine.
- Groundwater Availability, Table 1, page 24: The "probability of occurrence" for "interception of groundwater by mine workings" is "high (observed)" not "low". This table entry must be revised to agree with the groundwater discussion presented elsewhere in the PHC.
- Groundwater Quality, Table 1, page 24: The quality of groundwater being discharged from the Crandall Canyon mine is degraded to the point that treatment is required; therefore, "Elevated dissolved solids and iron concentrations" must be added as a potential impact to groundwater quality with a probability of occurrence of "high (observed)".
- Surface Water Quality, Table1, Page 24: An entry is required identifying "spilled or residual treatment chemicals" as a potential impact to surface water quality.
- Surface Water Quantity, Table 1, page 24: The permittee must revise this table entry or explain how mine discharge treatment to reduce iron concentrations is a mitigation measure for surface water quantity.

R645-301-728.320 The discussion of toxic-forming materials in the 1st paragraph of the Acid-toxic Materials section (page 18) and Findings Section 728.320 must be revised. The elevated (greater than 1 mg/L) iron concentrations in the untreated mine water discharge are evidence that "toxic-forming materials" are present within the coal, overburden, or underburden at the Crandall Canyon mine. Iron present at elevated concentrations (e.g., greater than 1 mg/L) in water or precipitated on stream substrate is likely to be detrimental to biota or uses of the water. (KL)

R645-301-728.330, the Permittee must address the following deficiencies relating to potential impacts from coal mining and reclamation operations: (KL)

- The Permittee must either modify or support the findings that it is "unlikely" that "groundwater quantity or quality will be affected by the underground mining operation" (PHC Section 728.332) and why the "Crandall Canyon Mine is expected to have little impact on groundwater" (PHC Section 728.334). The explanation must consider that the mine discharges approximately 500 gallons per minute of intercepted groundwater which requires treatment due to its poor water quality.
- The permittee must address the impacts on the hydrologic balance of intercepting groundwater and discharging groundwater at approximately 500 gallons per minute.
- The permittee fails to address potential impacts on surface water quality from utilizing water treatment chemicals, either resulting from either spills of unused chemical products or from residual chemicals in the treated mine water effluent. The permittee must identify the specific chemicals being used to treat the water and the

sampling and analytical methods used to monitor for residual treatment chemicals in the treated mine water discharge and/or the receiving water(s).

- In the section Mine Water Discharge (18th paragraph, page 16 and last paragraph, page 20), the Permittee must describe how monitoring the mine-water chemistry prior to treatment will support an evaluation of the effect of discharge of treated water to the receiving water (Crandall Canyon Creek). The Permittee must also describe procedures for monitoring the concentrations of residual water treatment chemicals being introduced to Crandall Canyon Creek.

R645-301-120 The Permittee must address the following deficiencies to ensure the application contains current information which is clear and concise: (KL)

- Groundwater Interception, 4th paragraph, Page 3: Define the "northwest portion of the Crandall Canyon mine" and provide the date that the northwest portion of the mine was sealed.
- Groundwater Interception, 6th paragraph, Page 3 AND Mine Water Discharge, 3rd paragraph, page 12: Either provide a map showing the geometry of the mine after the 2007 collapse, or modify the statements to read "...based on the geometry of the Crandall Canyon Mine workings prior to the 2007 collapse...."
- Groundwater Interception, last paragraph, Page 6: Update the tense used in this paragraph and provide date(s) that the CVSSD culinary water treatment plant was constructed.
- Increased Sediment Loading, 2nd paragraph, page 11: The storage volume values provided for the discussion of the sediment pond do not agree with values provided in Appendix 7-4 Sediment and Drainage Control Plan, Table 11 Sediment Pond Design. Revise the text or Appendix 7-4 as appropriate.
- Mine Water Discharge, 16th paragraph, page 15: Define what is meant (including numeric values) by the phrase "elevated iron concentrations", and define from what date Genwal is predicting these elevated iron concentrations to "not persist more than about 10 years" – e.g., from January 2011.
- Figure PHC-1: Correct the units shown for the y-axis of this figure, and add a footnote identifying that "Flow measurements prior to 3/19/2010 are not accurate" and identifying the date when the flow meter used for Outfall 002 was first suspected or known to be malfunctioning.
- PHC Attachment: No reference to this attachment is made in the text of Appendix 7-15; therefore, the Permittee should either remove this attachment or add explanations of the data presented in the attachment at appropriate sections of Appendix 7-15.