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TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

December 18, 2012

TO: Internal File

THRU: Steve Christensen, Permit Supervisor ^{SIC}
Daron Haddock, Coal Program Manager 

FROM: Ken Hoffman, Hydrologist 

RE: Revised Probable Hydrologic Consequences Update, Genwal Resources, Inc.,
Crandall Canyon Mine, C/015/0032, Task ID #4206

SUMMARY:

On November 21, 2012, the Division of Oil, Gas and Mining (the Division) received a proposed amendment to the Crandall Canyon Mining and Reclamation Plan (MRP). The amendment was submitted by Genwal Resources, Inc. (the Permittee). The amendment revises the probable hydrologic consequences section of the MRP (primarily Appendix 7-15, *Probable Hydrologic Consequences Determination*) relative to the mine-water discharge. The amendment has been submitted previously and reviewed by the Division four times (Task ID #3724, #3983, #4103, and #4194). During the review of the previous amendments, deficiencies were identified and the amendments returned.

Upon completing its technical review, the Division finds that the amendment meets the State of Utah R645-Coal Mining Rule requirements for the PHC and is recommended for final approval.

TECHNICAL MEMO

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Probable Hydrologic Consequences Determination

The amendment meets the requirements for the Probable Hydrologic Consequences Determination of the State of Utah R645-Coal Mining Rules.

To examine the hydrologic balance and impacts to surface water the Permittee has included discussion of macroinvertebrate studies on page 23 and attached the reports as Appendix 7-69. Whole effluent toxicity testing WET testing results are discussed on page 29 including documentation of the results of the initiated toxicity identification evaluation (TIE) from the fall of 2011. In addition, the results of this testing is included as Appendix 7-68.

To examine the hydrologic balance and impacts to groundwater the Permittee provides details and designation of shallow active-zones of groundwater and deep inactive-zone. The Permittee documents their belief the 5,950,000,000 gallons groundwater, intercepted since 1996, has been from the deep inactive-zone. This deep inactive-zone groundwater is held within the Blackhawk or Starpoint Formations. The Blackhawk Formation is estimated to hold approximately 16 billion gallons of inactive-zone groundwater in storage and the Starpoint Formation is estimated to hold 8.9 billion gallons of inactive-zone groundwater in storage.

Additionally, the Permittee conducted a field investigation of surface water to evaluate if impacts of diminished surface flow could be observed due to vertical communication of shallow active-zone groundwater to the mine water discharge. The 2011 field survey did not find any signs of diminished surface water flow. Continued monitoring with constantly be evaluating for this possibility and the isotopic analysis of the mine water discharge will help evaluate the presence of modern water in the discharge.

The previous technical analysis (Task ID #3983) identified deficiencies involving the duration of the high levels of total iron in the mine water discharge. This issue was addressed by the Division's Board in Board Order 2010-026 filed March 6, 2012 which found:

"Based on Petersen's opinion and the data set forth in his reports, including in Figure 7 as discussed above, but given the uncertainty surrounding whether the

above-limit total iron levels will extend significantly into 2014, the Board finds that the above-limit iron concentrations are not likely to persist for more than three years. The Board therefore finds that 3 years is an appropriate duration upon which to base a bond."

Given the Board's findings the Division will continue to update the Board on the total iron concentration annually.

The Permittee has included language discussing the barometric pressure at Price Airport and the correlation of barometric pressure on mine water discharge rate on Page 21 and Figure PHC-7 as required by previous technical analysis (Task ID #4103). This language discusses the discharge rate of minewater in relation to barometric pressure and documents this relationship as observable but not in any predictable manor.

The previous technical analysis (Task ID #4103) identified a deficiency involving consistency between Appendix 7-4 Sediment and Drainage Control Plan, Table 11 and the Increased Sediment Loading Section of the PHC. The Permittee adjusted the values on Page 29 to the correct values.

Section 728.310 discusses whether adverse impacts may occur to the hydrologic balance. As required by a previous technical analysis (Task ID #4103), the Permittee has added language on page 42 discussing findings on the potential for adverse impacts to the hydrologic balance. This narrative discussion includes the topics of Acid-toxic Materials, Groundwater Availability, and Surface Water Quality. The Acid-toxic Materials discusses the discharge of minewater containing elevated iron and the need for continued chemical treatment of this minewater so it does not have a negative impact on the hydrologic balance of surface water. The Groundwater Availability section discusses the possibility of interception of active and/or inactive zone groundwater. The Surface Water Quality section discusses the need for and implementation of a spill prevention controls and countermeasure plan and the continued need for macroinvertebrate studies. To document the chemicals being used the Permittee has included the MSDS sheets in Appendix 7-70.

Finding:

The current amendment meets the State of Utah R645-Coal Mining Rule requirements for the PHC and is recommended for final approval.