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TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

May 9, 2011

TO: Internal File

THRU: James Owen, Engineer and Team Lead JCO

FROM: April A. Abate, Environmental Scientist III AAA 5-12-11

RE: Change to Year 1 Mining Sequence, Alton Coal Development, Coal Hollow Mine, C/025/0005, Task #3812

SUMMARY:

On April 18, 2011, the Utah Division of Oil Gas & Mining received an application for an amendment to the Coal Hollow Mine MRP. The amendment includes updates to the mine's Coal Removal Sequence map (5-10).

The updates to the map provide for a change in the mining sequence during the first part of the year 1 mining projection. Pits that were previously numbered 4 -8 were left un-numbered. The mining sequence of these pits will be determined during the mining of pits 1-3. The applicant states that when the sequence has been finalized, an amendment showing the sequence will be submitted to the Division prior to mining.

Recent mining operations have encountered high sulfur coal at the face of the coal outcrop found in the upper 3 feet. The mine has determined that this lower quality coal cannot be blended and has opted to leave this material in the pit. This material is to be combined with overburden during the backfilling of the pit during contemporaneous reclamation. Concerns were raised by the Division during the inspection process that this lower grade coal interacting with higher than expected groundwater inflows into the pit could present a groundwater leachate contamination problem.

This memo addresses compliance with the hydrology (R645-301-700) section of the Utah Coal Mining Rules. The following deficiency was identified:

[R645-728.320]: The MRP contains language that states that no selenium was detected in the exploratory boring samples collected from the Coal Hollow mine in 2006-2007. Upon review of the laboratory analytical data found in Appendix 6-2, water extractable selenium was detected in several of the samples. In addition, the MRP also states that the

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neutralization potential exceeds the acid potential in all samples analyzed. This is a true statement for all overburden and underburden samples analyzed; however, the data show that in most of the *coal* samples, acid potential did exceed neutralization potential. This language will need to be corrected in the MRP.

[R645-748.333]: In light of the heavy precipitation events that occurred in the winter of 2011, the amount of unanticipated inflows to groundwater was higher than expected. As a result of the large volumes of groundwater, a water management plan needed to be refined and implemented at the Coal Hollow mine. This information in the MRP requires updating based on the conditions at the mine. The Permittee should revise the estimates of groundwater inflows into the pits (Table 7-9) and amend the Probably Hydrologic Consequences in the MRP explaining how groundwater inflows will be managed during the operational phase of mining. In addition, please provide a copy of the written authorization Utah Department of Water Quality (DWQ/DEQ) has issued outlining their policy on mine dewatering.

[R645.731.200]: Due to the acid-potential of the actual coal samples and the high sulfur content found along the face of the coal outcrop in the top three feet, the Permittee should evaluate the need for an additional groundwater monitoring well along the east-west permit boundary in Section 30 T39S R4W. Currently, this area is absent of any means of delineating the groundwater quality from where it leaves the permit boundary that could be a product of the high sulfur coal intermingling with the backfill material in the pits.

RECOMMENDATIONS:

The hydrologic deficiencies do not relate to mine sequencing issues. Therefore, these hydrologic deficiencies should be attached to the drainage control deficiency list associated with Task #3799 so as not to hinder the approval of the mine sequencing amendment under Task #3812.

TECHNICAL ANALYSIS:

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Probable Hydrologic Consequences

Section 728.333 of the MRP states that a relatively small amount of groundwater inflows were expected from the overlying alluvial sediments which were estimated to be between 40 and 50 feet thick in the mine permit boundary. The MRP indicates that the backfill materials will consist of silts, clays and shales, which are considered low permeability. The groundwater seepage originally estimated into the pits on the western side of the permit area was estimated to be tens of gallons per minute. This rate of groundwater inflow combined with the low permeability of this material it was concluded that hydraulic conductivity of groundwater through the backfill would be very low. Page 7-40 of the MRP states that discharge of mine water from the pits is not anticipated. The MRP does outline a contingency plan to manage unanticipated higher inflows of groundwater to the mine pits by constructing settling ponds and eventually discharging water in compliance with the Utah Pollutant Discharge Elimination Systems (UPDES) permit approved for the Coal Hollow mine. The Permittee has indicated that Utah Department of Water Quality (DWQ/DEQ) has issued a written authorization outlining their policy on mine dewatering.

Acid- and Toxic-Forming Materials and Underground Development Waste

Data analyzing the quality of the coal, overburden and underburden and the presence of acid-toxic forming materials are presented in Appendix 6-2 of the MRP. The MRP reports that acid-toxic forming materials were not present based on the laboratory analytical data provided during coal exploration activities in 2006-2007. The MRP incorrectly states that selenium was not detected in any of the original borehole samples tested and also that the neutralization potential exceeded the acid potential in all samples. Several samples indicated that water-extractable selenium was present and acid potential was exceeded in the coal samples analyzed.

Groundwater Monitoring

The regional groundwater flow direction is southwest toward Kanab Creek located approximately 2,800 feet from the western limit of the permit area. The next closest water body

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is an unnamed tributary of Kanab Creek that runs essentially parallel to the mine permit boundary located in Section 30 T39S R5W and approximately 1,600 feet south of the permit boundary.

The potential impacts to the Kanab Creek probable alluvial valley floor (AVF) were evaluated in Appendix 7-7 of the MRP. The conclusion reached was that Kanab Creek is fed by surface water sources that originate upstream to the north and that mining in the Coal Hollow permit area would not have any effect on Kanab Creek. The PHC also determined that groundwater in the Lower Robinson Creek drainage which represents most of the land area that makes up the western portion of the permit boundary was negligible and subject to evapotranspiration. Consequently, there were no groundwater monitoring wells that were established along the east-west permit boundary that is located in Section 30.

Water-Quality Standards and Effluent Limitations

The applicable Utah groundwater quality standards for a coal mine operation would be the dissolved metals list that is published in Table 1 of R317-6-2.1 of the Utah Administration Code. Acceptable pH levels for groundwater range from 6.5-8.5. Mine water from the pit was measured for pH and alkalinity by the Division during a recent field inspection on April 6, 2011. pH readings were reporting at 8.1 and 8.16, which corroborated with the information in the MRP reporting that pH levels at the mine were moderately alkaline (see page 736). A water sample was also collected from the pit on April 13, 2011 and analyzed for total metals via EPA Method 6010C. Barium was the only metal detected at a concentration of 0.067 mg/L. The Utah groundwater standard for barium is 2.0 mg/L.

Findings:

[R645-728.320]: The MRP contains language that states that no selenium was detected in the exploratory boring samples collected from the Coal Hollow mine in 2006-2007. Upon review of the laboratory analytical data found in Appendix 6-2, water extractable selenium was detected in several of the samples. In addition, the MRP also states that the neutralization potential exceeds the acid potential in all samples analyzed. This is a true statement for all overburden and underburden samples analyzed; however, the data show that in most of the coal samples, acid potential did exceed neutralization potential. This language will need to be corrected in the MRP.

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Consequences in the MRP explaining how groundwater inflows will be managed during the operational phase of mining. In addition, please provide a copy of the written authorization Utah Department of Water Quality (DWQ/DEQ) has issued outlining their policy on mine dewatering.

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RECOMMENDATIONS:

The hydrologic deficiencies do not relate to mine sequencing issues. Therefore, these hydrologic deficiencies should be attached to the drainage control deficiency list associated with Task #3799 so as not to hinder the approval of the mine sequencing amendment under Task #3812.