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TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

July 27, 2011

TO: Internal File

THRU: Priscilla Burton, Team Lead *PWB km SAS*

FROM: April A. Abate, Environmental Scientist III *AAA 7/28/2011*

RE: Coal Hollow Drainage Control Adjustments, Alton Coal Development, Coal Hollow Mine Permit C/025/0005, Task ID #3862

SUMMARY:

The Division conducted a comprehensive assessment of the drainage control issues that have arose at the Coal Hollow Mine since active operations have commenced in November 2010. A memo detailing these issues was issued on May 3, 2011 (location ref M: Drive). From this memo, a deficiency letter was issued to the Alton Coal Development, LLC (ACD) requiring their response on several drainage control issues.

On June 17, 2011, ACD submitted their response. This memo addresses the adequacy of their response to the deficiencies identified.

[R645-301.732.300]: The MRP has been updated to reflect drainage ditch 2 (DD-2) as divided into two segments: DD-2A and DD-2B and meeting the design criteria for the 100-year, 24-hour storm. Refinements to DD-2A were discussed in the field with the operator on July 20, 2011. The upper segment of DD-2A as shown on Drawing 5-3 begins from the diversion point where DD-2B is directed to LRC. The segment of DD-2A begins north of the top soil haul road and drains a small undisturbed area between DD-2A and where the top soil haul road and the primary haul road intersect. The majority of this area slopes toward DD-2A which will direct runoff from this small undisturbed area to drain to DD-2A and ultimately collect in Sediment Pond #2. A smaller area slopes toward the primary haul road and could cause runoff from this undisturbed area to flow onto the road. The operator has agreed to blade a temporary ditch and direct the flow of runoff into LRC and to update Drawing 5-3 showing the temporary ditch. In addition, DD-2A continues south of the top soil haul road along a natural ephemeral channel. It was discussed previously with the operators to use this ephemeral channel as the logical place to locate DD-2A rather than the original location of the ditch proposed in the initial mine plan application which would have disturbed additional land unnecessarily. The operator agreed to strip the topsoil from this segment of DD-2A and isolate any headcuts in the drainage with sediment controls so as to

of DD-2A and isolate any headcuts in the drainage with sediment controls so as to minimize additional contributions of sediments originating from the undisturbed land surrounding DD-2A. Approval is recommended to proceed with ditch DD-2A reconfiguration.

[R645-301-512.100]: The culverts are now shown to be numbered on Map 5-3, however most of the culverts are located in the surface facilities area and it is difficult to discern the exact locations of where the individually numbered culverts are located due to the scale of the map. The Division suggests that either the operator present the culverts on resubmitted Drawing 5-3 as a larger scale call out, or show them on the Facilities and Structures Drawing 5-4 so that the culverts can more readable on a map. Moreover, one of the culverts servicing the haul road from the top soil pile is incorrectly labeled as a 24' culvert instead of a 24" culvert.

[R645-301.742.220]: The Permittee has submitted an update to drawing 5-20 showing the construction details of the perforated pipe collection system to address groundwater seepage from the natural channel of Lower Robinson Creek. The drawing indicates that a 6 foot earthen berm will make up the margins of the equipment travel path. The MRP does address seepage that was identified in this area between 5-10 gallons per minute (see page 7-6 Section R645.301.721 of the MRP). Please provide a narrative description of the proposed seep collection system for inclusion in the MRP. In the narrative, please indicate that a final as-built of Drawing 5-20 will be provided within one month of completion of the work. Once the narrative is received by the Division, conditional approval will be recommended to proceed with the construction of the seep collection system.

[R645-301.733.100]: Allowable discharges under the Coal Hollow UPDES permit from the ponds have occurred. Please update the language in the MRP that currently states that all ponds are designed for total containment.

[R645-728.320]: The MRP under Section 723.320 was corrected to more accurately reflect that selenium concentrations were detected in low concentrations and explained in further detail in Section 728.332. On page 7-35 of Section 728.320, the Permittee has clarified the language to reflect that neutralization potential greatly exceeded acid potential in all *overburden* and *underburden* samples. Based on the laboratory analytical data presented in Appendix 6-2 samples collected from initial exploration activities found that coal sample data indicated acid potential did exceed neutralization potential in samples CH-03-05, CH-01-05 and composite sample CH-08. The existing monitoring wells in the network that are screened in the coal seam include: Y-36, Y-38, Y-45 and Y-99 (A2). The operational water monitoring protocol for these wells is currently water level only on a quarterly basis. In order to better understand the acid/neutralization

behavior of the groundwater in the coal seam and any overall negative effects to the hydrologic balance, the Division requests that these wells be monitored for acid-base groundwater laboratory analytical parameters quarterly (e.g. pH, acidity, alkalinity) for a minimum period of two years. At that time the data collected can be reevaluated to determine if any further actions are necessary.

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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:

Diversions: Miscellaneous Flows

The principal diversion ditches at the mine are DD-1, DD-2, DD-3 and DD-4. The intent of DD-1 and DD-2 was to primarily route runoff from upland, undisturbed areas away from the planned disturbed areas. DD-3 and DD-4 were intended to direct runoff from disturbed areas into sediment impoundments. According to Section 742.110 in the MRP, all diversions have been designed to meet a 100-year 24-hour storm design criteria. The regulations require that a permanent ditch designed to divert miscellaneous flows only require design criteria meeting a 10-year, 6-hour storm. The regulations require that a temporary ditch be designed for a 2-year, 6-hour storm.

Diversion Ditch 4 (DD-4)

DD-4 was originally designed as a permanent ditch shown on Map 5-3 with a portion of it located within the reclaimed spoils pile. This would imply that the ditch would be installed after a time period when this area was reclaimed. This design flaw did not take into account the drainage needs during mining. The Permittee has since constructed DD-4 and has designated it as a ditch that will be subject to reconfiguration based on the active pit operations and the dynamics of the spoils pile. DD-4 is designed for the 100-year, 24-hour storm which is over and above the requirement for temporary ditches to be designed for the 2 year, 6-hour storm.

Diversion Ditch 2 (DD-2)

The Permittee has resubmitted drawings 5-3, 5-27, and 5-34 showing a reconfiguration of DD-2. The drainage ditch, as originally designed was routing runoff from the undisturbed areas upgradient of the permit boundary in Section 20 T39 S R5W and directing the flow to Sediment Pond #2. The new drainage ditch proposes to be "split" into two segments with segment DD-2B essentially running parallel to Lower Robinson Creek and directing undisturbed flow from the northeastern corner of the permit boundary to an outfall that will connect the drainage ditch to Lower Robinson Creek.

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The second segment DD-2A is intended to route runoff from disturbed areas to Sediment Pond #2. This design proposes to eliminate the issue of excessive drainage from undisturbed portions of the permit boundary, and the upgradient areas from adding excessive amounts of water from undisturbed areas to Sediment Pond #2.

Drawings 5-26 and 5-27 depict the size of the watersheds in and around the permit boundary and the amount of runoff contribution from each watershed that all diversion ditches were designed to route to the sediment ponds. The original calculations used to correctly size and design the sediment ponds and diversion ditches to be capable of conveying the amount of runoff within each individual watershed defined in and around the permit area were based on the Carlson T-55 method. These calculations have been included in Appendix 5-2 of the MRP. DD-2 is shown as being designed to have a capacity to convey runoff calculated for a 48 acre area.

Miscellaneous Temporary Ditches

The Permittee has added additional temporary ditches primarily in the area of active mining and are shown labeled as "Temporary Ditches" on Drawing 5-3. The MRP has been updated with language in Section 732.300 to indicate that all temporary ditches will meet the design criteria for a 100-year, 24-hour storm event. These ditches will be periodically adjusted as needed according to the needs in the active mining area.

Findings:

[R645-301.732.300]: The MRP has been updated to reflect drainage ditch 2 (DD-2) as divided into two segments: DD-2A and DD-2B and meeting the design criteria for the 100-year, 24-hour storm. Refinements to DD-2A were discussed in the field with the operator on July 20, 2011. The upper segment of DD-2A as shown on Drawing 5-3 begins from the diversion point where DD-2B is directed to LRC. The segment of DD-2A begins north of the top soil haul road and drains a small undisturbed area between DD-2A and where the top soil haul road and the primary haul road intersect. The majority of this area slopes toward DD-2A which will direct runoff from this small undisturbed area to drain to DD-2A and ultimately collect in Sediment Pond #2. An even smaller area slopes toward the primary haul road and could cause runoff from this undisturbed area to flow onto the road. The operator has agreed to blade a temporary ditch and direct the flow of runoff into LRC and to update Drawing 5-3 showing the temporary ditch. In addition, DD-2A continues south of the top soil haul road along a natural ephemeral channel. It was discussed previously with the operators to use this ephemeral channel as the logical place to locate DD-2A rather than the original location of the ditch proposed in the initial mine plan application which would have disturbed additional land unnecessarily. The operator agreed to strip the topsoil from this segment of DD-2A and isolate any headcuts in the drainage with sediment controls so as to

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minimize additional contributions of sediments originating from the undisturbed land surrounding DD-2A.

Culverts

During the April 20, 2011 inspection, the culverts were examined. It was determined that all culverts at the site need to be numbered, and the MRP needs to include a drawing with identification numbers for culverts (e.g., C-1, C-2, etc.).

Findings:

[R645-301-512.100]: The culverts are now shown to be numbered on Map 5-3, however most of the culverts are located in the surface facilities area and it is difficult to discern the exact locations of where the individually numbered culverts are located due to the scale of the map. The Division suggests that either the operator present the culverts on Drawing 5-3 as a larger scale call out, or show them on the Facilities and Structures Drawing 5-4 so that the culverts can more readable on a map. Moreover, one of the culverts servicing the haul road from the top soil pile is incorrectly labeled as a 24' culvert instead of a 24" culvert.

Drainage Controls Southwest of Pond 2

Surface and ground water is collecting between Sediment Ponds 2 and 3 and ponding in the overburden where some of it has been pumped to Sediment Pond 3. The April 5th inspection identified this area as needing adequate sediment controls that meet design criteria to route drainage to Sediment Pond 3.

Findings:

[R645-301.742.311]: The Permittee responded to the Divisions request by adding a temporary ditch that will control drainage from these areas as well as additional areas. According to Drawing 5-3, this temporary ditch runs parallel to the old county road (north to south) and turns west just north of the primary haul road where it ultimately reports to Sediment Pond #3. All temporary ditches have been designed in accordance with design criteria meeting or exceeding the required 2-year, 6-hour storm event. The requirements of for temporary ditches have been met in this area. No additional actions are needed.

Lower Robinson Creek Temporary Diversion Outfall

The Permittee was required to submit a plan to implement sediment and drainage controls at the outfall of the natural channel of LRC where it meets the outfall of the temporary diversion ditch for LRC to prevent sediment and run off from exiting the permit area via LRC.

Groundwater seepage emitting from the alluvial material into the original LRC channel has been creating water management issues that required corrective action measures. The additional source of water from the seep within LRC has been reported at an approximate rate of 7.3 gallons per minute. The Permittee has submitted a response proposing to install a perforated pipe collection system in the former natural LRC channel to be buried beneath a temporary equipment travel path. The perforated pipe collection system is designed to collect and route groundwater seepage water through the pipe and eventually discharge excessive groundwater to one of the temporary ditches within the permit area that routes to Sediment Pond #3. Drawing 5-20 was updated to show the perforated pipe collection system details.

Findings:

[R645-301.742.220]: The Permittee has submitted an update to drawing 5-20 showing the construction details of the perforated pipe collection system to address groundwater seepage from the natural channel of Lower Robinson Creek. The drawing indicates that a 6 foot earthen berm will make up the margins of the equipment travel path. The MRP does address seepage that was identified in this area between 5-10 gallons per minute (see page 7-6 Section R645.301.721 of the MRP). Please provide a narrative description of the proposed seep collection system for inclusion in the MRP. In the narrative, please indicate that a final as-built of Drawing 5-20 will be provided within one month of completion of the work. Once the narrative is received by the Division, conditional approval is recommended to proceed with the construction of the seep collection system.

Spillways

The Permittee was required to update the language in their plan to address spillways and outline a decanting protocol for discharging water from the sediment ponds. The Permittee has redesigned the spillways for Ponds 3 and 4 to include a minimum of 6 inches of rip rap. Drawing 5-32 has been updated and the MRP has been updated in Section 742.221.34 to reflect the design changes.

The Permittee has updated section 742.221.32 outlining a protocol to be used when decanting the sediment ponds on page 7-78 of the MRP. Although the rules do not expressly require a decanting protocol for sediment ponds, the rules state that adequate detention time of stored water must be provided to meet Utah and federal effluent limitations. The Permittee has committed to a minimum settling time of 24 hours prior to the beginning of discharge operations under the approved UPDES permit #UTG04027.

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Findings:

[R645-301.743.130]: The redesigned spillways meet the requirements for impoundments under the rule. No further action is necessary.

[R645-301.742.221.320]: The Permittee has committed to providing a decant protocol for allowing solids to settle for a specified time period to meet Utah state and Federal water quality effluent limitations. The protocol meets the requirements under the rule. No further action is necessary.

Drainage from Entry Road to the Mine Facilities

The road leading to the mine office facilities runs in a north-south direction with a gradient that flows to the south. Currently as it is designed, runoff from this road flows to a borrow ditch located alongside the road. Cross culverts are placed along this road so as to divert water to Sediment Pond 1. There are no cross culverts along the southern half of this road. During prior inspections, several drainage issues were identified in the mine surface facility area including diverting additional runoff from the disturbed area and road into Pond 1B via additional cross culverts and constructing a catch basin for the remaining runoff near the entry gate. The other option discussed was redesigning and relocating Sediment Pond 1B in the south west corner of the surface facilities yard and rerouting the haul truck access road.

Findings:

[R645-301.752.200]: To address road drainage issues near the mine yard facilities area, the Permittee has placed straw bales as sediment control measures in the borrow ditch alongside the road at the mine entry gate. The Permittee is allowed to use straw bales under the rules. Regular inspections should check to verify that these road ditches are functional in a storm event and meet the performance standards for road drainage under R645-301-752.200 to control, or prevent additional contributions of runoff outside the permit area. No further action is necessary as long as performance standards are being met.

Additional Road Construction

During the April 5, 2011 inspection, the Division and the Permittee discussed constructing a road that leads to Pond 3 for the purpose of accessing the pond for maintenance and for accessing the associated ditch for regular maintenance. The Permittee was asked to submit a plan to construct an access road in this area.

The Permittee has opted to construct equipment travel paths. Equipment travel paths will be constructed to access Sediment Pond #3 and also provide an access way to the mine pits northwest of Lower Robinson Creek. The Coal Hollow MRP in Section 527.200 addresses

ramps, benches and equipment travel paths within the active surface mining area as temporary in nature and relocated frequently as mining progresses.

Findings:

[R645-527.200]: The Permittee has opted to construct equipment travel paths which fall under the definition of "ancillary roads" as defined in the Utah Coal Rules under R645-301-527.130. Ancillary roads are not individually designed nor engineered and do not fall under any specific regulations since they are not primary roads. No further action is necessary.

Siltation Structures: Sedimentation Ponds

Sediment Pond Design Criteria are found in Appendix 5-2 in the MRP. Carlson 2007 hydrology software was utilized to perform watershed analysis to assist in determining the size capacity of these ponds. The watershed analysis model included runoff flow paths, watershed boundaries, length and average grade for longest flow lines, runoff curve number classification, and time of concentration and peak discharge. All sediment ponds in the permit area have been sized to meet the 100-year, 24-hour duration storm event. According to the Carlson model used, the amount of rainfall from this type of event for the Alton area translates to 3.1 inches.

The Division's May 3, 2011 memo requested that the Permittee provide an additional evaluation of the capability of the existing sediment pond network to adequately manage the amount of groundwater, runoff/precipitation generated at the site. The Permittee retained Petersen Hydrologic LLC to perform an evaluation of the design criteria of all sediment ponds. The report is included as Appendix 7-11 to add to the MRP. The Division also asked the Permittee to update Table 7-9 in the MRP to more accurately reflect the groundwater in-flow rates observed now that mining activity has commenced. The report describes the sediment pond network as each of the four sediment ponds being designed to accommodate the 100-year, 24-hour storm, which is above the Utah Coal Rules requirement of individual sediment ponds being designed for the 10-year, 24-hour storm event. The report states that the reserve capacity of the sediment ponds is 155% above the 10-year, 24-hour precipitation event requirement, but admits that original model used did not explicitly contemplate the storage or discharge of groundwater in-flow into the mine pits. Thus, discharging of appreciate quantities of groundwater was not anticipated.

The report discusses that a plan to divert shallow groundwater away from mine workings and rerouting the uncontaminated alluvial groundwater to discharge points under the UPDES permit was pending a final written authorization from the Utah Division of Water Quality. The report states that this alluvial groundwater *will not* be directed to the existing sediment ponds and therefore, the report concludes that there would be no need to redesign and/or reconstruct the

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existing sediment ponds to account for any storage of appreciable amounts of excess groundwater.

The MRP in Section 728.332 states: *“where this alluvial groundwater is encountered in mining areas, it will be diverted away from mine workings prior to significant interaction with sediments in disturbed areas. Any discharge from the mine pits that does occur will be regulated under a Utah UPDES discharge permit.”*

The estimates of groundwater in-flow rates under Table 7-9 were updated in the MRP. The table was updated to show the inflow estimates to Pit #2 based on a measurement of 13.4 gallons per minute (gpm) from an intercept trench located upgradient of the Pit 2 location. The discharge over 100 linear feet over saturated thickness was estimated to be 1.54 gpm.

Findings:

[R645-301.724.500]: Because groundwater seepage and excessive storm activity have been factors at this site, the design criteria for all ponds were reevaluated. The conclusion reached was that none of the *existing* sediment ponds were required to be redesigned and reconstructed. However, a provision in the MRP on page 7-21 states that *“if excess groundwater were to be encountered during mining operations, such that it could not be adequately managed or discharged in compliance with the Utah UPDES discharge permit, ACD, LLC may (when necessary) and with the approval of the UDOGM construct supplemental containment and settlement ponds in which mine discharge waters may be held for treatment (where necessary) and subsequent discharge through UPDES discharge points in compliance with the UPDES discharge permit.”* The Permittee is in the process of proposing an alternative treatment for alluvial groundwater management. The plan is being submitted to the Utah Department of Water Quality and the Division for review. If approved, then the MRP will need to be updated with a new groundwater management plan to address the diverting of upgradient source groundwater.

[R645-301.733.100]: Allowable discharges under the Coal Hollow UPDES permit from the ponds have occurred. Please update the language in the MRP that currently states that all ponds are designed for total containment.

RECOMMENDATIONS:

The Permittee needs to submit additional information addressing the issues herein. Approval is not recommended at this time.