

TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

May 3, 2011

TO: Internal File

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

FROM: April A. Abate, Environmental Scientist III *AA*
5-9-2011

RE: Coal Hollow Drainage Control Adjustments, Alton Coal Development, Coal Hollow Mine Permit C/025/0005 and Project #3799

SUMMARY:

The Division has conducted numerous inspections at the Coal Hollow mine since the mine became operational beginning in November 2010. The results of a several inspections conducted by Joe Helfrich and April Abate on February 23rd and March 2nd and April 5th identified several drainage control adjustments that need to be implemented at the mine. A Notice of Violation #N10078 was issued to Alton Coal Development (the Permittee) as a result of the inspection for a failure to maintain sediment control in an area of the permit boundary where snow was overtopping the silt fences placed along a tributary to Lower Robinson Creek (LRC) in the western section of the permit area. A second violation NOV #10084 pertaining to a discharge of water from an unpermitted outfall at the natural channel of LRC where it meets up with the outfall of the temporary diversion was issued on May 2, 2011.

The Division submitted a letter to the Permittee on March 9, 2011 detailing the drainage issues that required attention at the mine. A response letter was submitted by the Permittee on March 22, 2011.

The following items represent a compilation of the issues that were identified in the Division's March 9, 2011 letter, how they were addressed by the Permittee in their March 21, 2011 response letter and whether or not any deficiencies remain. Additional inspections at the mine and a review of the hydrology section of the MRP (Chapter 7) have identified additional drainage control issues at the mine that require corrective actions and will be outlined in this memo.

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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.

Diversion Ditch 4 (DD-4)

During the permitting process, there was a lack of clarity as to the appropriate timing of installing DD-4. The permit application did not explicitly state when this diversion would be constructed and as such was not constructed prior to the start of operational activities. DD-4 as shown on Map 5-3 was shown to be built as a permanent ditch 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. Upon inspection, it was determined that the area required a drainage ditch that would route water from a large disturbed area that makes up the southeast corner of Section 19 T39S R5W and needed to be routed to Pond 3.

Findings:

[R645-301.742.311]: The Permittee was required to submit the following pertaining to the construction or lack of DD-4:

- Submit a corrective action plan for the existing sediment controls and a plan to extend sediment and drainage controls along the northwestern permit boundary that parallels LRC.

The Permittee responded that a temporary ditch was constructed meeting the same design criteria of the "permanent diversion ditch 4". The Permittee has agreed to update the narrative of the MRP - Section 732.300 to include a discussion on all temporary diversion ditches that are currently in place. The Permittee has agreed to continually relocate and adjust the grade on these ditches when needed.

The design of this ditch meets the design criteria for the 100-year, 6-hour storm, which is more than adequate since the rules require that temporary ditches are required to meet a 2-year, 6-hour design storm standard. Please add all temporary diversion ditches to Map 5-3 with a footnote indicating ditch configurations are subject to change based on mining activity.

Diversion Ditch 2 (DD-2)

The intent of DD-2 presented in the permit application was to route undisturbed drainage from the ephemeral upstream drainages located primarily in the southwest section of Section 20 T39S R5W away from the disturbed area in the vicinity of the top soil pile in the permit boundary. However, a design flaw on Map 5-3 shows DD-2 reporting to sediment pond 2. Subsequently, the drainage ditch was constructed according to the MRP and now routes undisturbed drainage to Sediment Pond 2.

Findings:

[R645-301.742.311]: During the April 5, 2011 inspection, DOGM personnel and the Permittee examined DD-2 to identify the appropriate segment of the ditch that incorrectly routes undisturbed drainage to Sediment Pond 2. The consensus reached was that DD-2 needs to be reclaimed from where it crosses under the haul road to the topsoil stockpile #2 upstream to its origin. This area was inspected on April 5, 2011 and found to be vegetated with predominantly juniper trees with the topography of the land gently sloping toward LRC. This reclaimed portion of DD-2 will route undisturbed drainage to LRC.

The Permittee has also proposed to cut a ditch alongside the topsoil pile to route disturbed area drainage from the pile to Sediment Pond 2. *The Permittee needs to amend the MRP to include a narrative that discusses the modification plan for drainage control from the topsoil haul road to sediment pond #2. An update to Map 5-3 is also required showing the reconfigured DD-2.*

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.).

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Findings:

Please update the MRP to include a numbering system for the culverts and provide the numbered culverts on Map 5-3 and any other maps where culverts are listed.

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 was required to submit the following pertaining to drainage control measures southwest of Sediment Pond 2:

- Submit a plan to implement sediment and drainage controls in the area southwest of Pond 2

The Permittee responded that a diversion ditch has been installed to help manage sediment and drainage from the area downgradient of Pond 2. The Permittee noted that the configuration of this ditch will vary over time as the pits located in the SW1/4 of the SE1/4 of Section 19 T39S R5E would be developed. The regulations require that a permanent ditch designed to divert miscellaneous flows only require design criteria meeting a 10-year, 6-hour storm. Pond 2 is located approximately 3,000 feet northeast of Sediment Pond 3. The Division is concerned that a ditch covering this much distance would not have an effective enough gradient to transmit water over a distance of 3,000 feet. *The Permittee should evaluate and propose a location for an additional sediment pond to address the drainage in the area between Sediment Ponds 2 and 3, or propose a viable equivalent solution to treat the drainage area between the two ponds. The Permittee will have to include information that this pond, like all other impoundments are designed to meet the 100-year, 24-hour storm design criteria. A water management plan for any discharge, will also be required.*

Lower Robinson Creek Temporary Diversion Outfall

Section 742.311 of the MRP discusses a planned temporary diversion of LRC in the northwest section of the permit area. The purpose of this diversion was to aid in the maximum recovery of an estimated 400,000 tons of coal as stated in Section 742.321 which was located beneath a segment of LRC. This segment of the channel was relocated and rerouted around the former channel of LRC. A plan view map showing the temporary diversion of LRC is shown on

Map 5-20. The newly constructed temporary diversion is shown on Map 5-3 and is designed to pass a 100-year, 6-hour storm event.

Design drawing 5-20 of the temporary diversion in the MRP showed the inlet of the LRC channel as an area of rip rap and an associated berm where the segment of the natural channel was essentially "sealed off". However, at the *outlet* of the original channel, the design details only showed a rip rap area with no earthen dike that would essentially serve to seal off any undisturbed runoff that the channel would carry while it was still in place (prior to construction of the mine pit in this area).

Findings:

[R645-301.742.220]: The Permittee was required to submit the following action item pertaining to addressing water impounding in the natural channel of LRC:

- 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;

The Permittee has submitted a response indicating that a 5 foot earthen berm installed at the outfall of the natural channel would sufficiently contain a volume of water in the natural channel that is the result of direct precipitation in an area devoid of topsoil and vegetation during a 100-year, 24-hour storm event (equivalent to 3.1 inches per year).

The design plan submitted by the Permittee for the earthen berm was based on a 100-year, 24-hour storm event; however, an additional source of water has been reported from springs that originate in the alluvial material within the natural channel that are producing water at an approximate rate of 7.3 gallons per minute.

The MRP does address seepage that was identified in this area; however the seepage was estimated at 0.05 gallons per minute (see page 7-6 Section R645.301.721 of the MRP). The design criteria submitted by the Permittee for the earthen dike did not provide any backup as to how these calculations were derived. Furthermore, the seeps were not accounted for in the initial characterization of designing this berm. *The Permittee should consider the following options:*

1. *Permitting this outfall under their existing UPDES permit so that discharge from this area may be allowed,*
2. *be pumped and used for dust suppression or,*
3. *build an additional sediment pond between ponds 2 and three to handle the flow.*

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If the Permittee chooses to design an impoundment, please submit modeling calculations used to arrive at the redesign of the earthen berm. A collection ditch could be placed between Sediment Ponds 2 and 3 for the purposes of diverting water from the ponds in order to better facilitate pond cleanouts. A submitted update to Appendix 5-2 of the MRP will be required to include a design of an appropriately designed impoundment structure in accordance with the R645-743.100 rules relating to impoundments. A water management plan for any discharge will also be required.

Spillways

The MRP states in Section 742.223 (p. 7-79) that each sedimentation pond will be constructed with a spillway that will function as both the emergency and principle spillway. Each of these spillways will safely discharge a 25 year, 6 hour precipitation event. The existing design plan in the MRP shows a one drop-inlet spillway depicted as a “primary and emergency spillway” both in the plan and on design drawings for Sediment Ponds 1, 1B, and 2. Open channel spillways were designed for Sediment Ponds 3 and 4. Each of the ponds was designed for total containment of impounded water. Discharges were not anticipated in the plan.

Findings:

[R645-301.743.130]: This regulation clearly requires impoundments to be designed with a combination of primary and emergency spillways – two separate structures, or an open channel spillway for all impoundments. *Ponds 1, 1B and 2 will require an additional spillway to be retrofitted such that each of these ponds has a primary and emergency spillway as required by the rule.*

[R645-301.742.224]: Water removal in the pond will be conducted according to “current, prudent, engineering practices....”The MRP does not address any type of water decanting procedure under this regulation on page 7-80 of the MRP. This is likely because there was no anticipated discharging from the ponds. A component of designing the ponds for discharging would be to amend the MRP. *Please adopt a decant protocol such as the following:*

1. *Description of the pump and power supply system*
2. *Include a calculation demonstrating that dewatering at a pumping rate used to dewater the 10-year, 24-hour runoff volume*
3. *Commitment to discharge the decant water into the primary spillway and perform the discharge in accordance with the UPDES permit conditions.*

4. *Provide a drawing and design for a floating decant intake and associated oil skimmers*
5. *Provide a discussion in the narrative to indicate at what elevation will the decant operation cease (for example, one foot above the sediment level)*
6. *Commit to retain all storm water for a minimum of 24 hours to allow time for solids to settle out, or until effluent limitations have been met prior to decanting*

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:

[R645-301.442.400]: To address road drainage issues near the mine yard facilities area, the Permittee was required to submit the following action items:

- Sediment and drainage controls need to be put in place along the upper portion of the road leading to the office trailer. The ditch along the western side of the road appeared to have been removed due to snow plowing

The Permittee has committed to maintain roadside ditches in such a manner that will facilitate runoff flowing to sediment impoundments. Regular inspections should check to verify that these road ditches are functional in a storm event. *Deficiency addressed no further action.*

- Submit a plan to implement sediment and drainage controls in the area southwest of Pond 1B (adjacent to the mine entrance);

The Permittee has proposed to treat this area, which they have estimated to be 33,400 square feet with straw bales “just prior to discharge”. In accordance with R645-301.731, this plan is not acceptable. Water discharging off the permit area is prohibited unless an outfall can be permitted. The Permittee will need to reevaluate this area for a more permanent drainage control

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structures. Several options were discussed with the Permittee during the April 5th and 6th site visits including:

1. Construction of a sump or a French drain used to collect water.
2. The addition of more cross culverts along the southern portion of the road will reduce the amount of surface area square footage needed to be treated by a French drain/sump structure.
3. Relocating Sediment Pond 1B and realigning the access road so it enters the yard above the pond.

Please resubmit a plan to treat drainage in the area southwest of Pond 1B.

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. This item was not on the initial punch list because it came up during a subsequent inspection. The Permittee should submit a plan to construct an access road in this area.

Findings:

[R645-534.100]: If an additional road is constructed leading to Sediment Pond 3, the road shall be designed in accordance with the R645-534 regulations for roads and updates to the Facilities and Structures Map 5-3 will be required and in compliance with R645.301.742.410 regulations. *Please submit a plan to design a road to access Sediment Pond 3 and its associated ditch.*

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 sedimentation ponds are small enough that they do not need to meet the requirements of MSHA, 30 CFR 77.216(a). The applicant commits that should any impoundments and

sedimentation ponds that meet the size or other qualifying criteria of MSHA, 30 CFR 77.216(a) be built, the ponds will meet those criteria.

Sediment Ponds 1 and 1B

Disturbed area drainage from the surface facilities reports to sediment ponds Pond 1 and 1B. Pond 1B was designed to collect water from a 5-acre watershed which represents a small disturbed area of the mine yard. Apparently there were design limitations that prohibited the construction of a larger sediment pond that could drain the entire upper mine yard disturbed area. The mine is limited by the locations of LRC and the County Road which prohibits the design of a larger all-inclusive sediment pond. The Division and the Permittee discussed relocating Pond 1B further west. The advantage would be to ease the turning radius for the trucks exiting and entering the permit area and to alleviate the use of cross culverts for road runoff drainage control.

Sediment Pond 2

Pond 2 is located further south of Pond 1B and is designed to capture drainage from DD-2. Based on the past few inspections at the site, it became apparent that much of the drainage from DD-2 represented undisturbed runoff that was being directed to Pond 2. A segment of DD-2 needs to be reclaimed from where it crosses under the haul road to the topsoil stockpile #2 upstream to its origin. The Permittee needs to amend the MRP to include a narrative and plans to modify the drainage control from the topsoil haul road to sediment Pond #2.

An area to the north of Pond 2 was identified that appeared to be within the disturbed area; however, drainage from this area was essentially by-passing Pond 2 on its northern boundary. This area runs alongside the natural channel of LRC. The Division discussed with the Permittee the addition of installing sediment control structures that would ultimately route this drainage toward sediment Pond 2. In addition, the buffer zone between LRC and the disturbed area should be bermed.

Sediment Pond 3

Pond 3 is the largest pond on the site to date and is used to serve as the principal impoundment for drainage from the mine pit areas. This pond is currently has a design storage capacity of 7.7 acre/feet and is located close to the furthest northwest corner of the permit boundary. A temporary ditch has been bladed to direct water to this impoundment. This pond as are all ponds have been designed for total containment and was not intended to discharge. A very wet season with heavy precipitation events along with seepage issues has produced a larger than anticipated volume of water at the mine. As a result, this pond has been at capacity and has been discharging, despite the fact that the pond was designed to not discharge.

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The watershed analysis model in addition to the 100-year, 24-hour storm event for Alton of 3.1 inches, 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. This model does not appear to take into account the seepage factor from groundwater seeping out of the alluvium. Springs located in the LRC drainage have been monitored by the Permittee and have been reported to be flowing at an approximate rate of 7.3 gallons per minute.

To use an example for the 100-year, 24-hour design criteria formulated for Pond 3:

Storage Required ac/ft	Design Storage ac/ft	Additional Storage ac/ft
6.3	7.7	1.4

The purpose for the “additional storage” was to account for standing water and sediment accumulation in the pond. To account for the addition of contribution of groundwater that seepage from the alluvium would add and based on the estimate of 7.3 gallons per minute, recognizing that flow rates of this groundwater vary widely at this site:

7.3 gallons/min = 10,512 gallons/day
10,512 gallons/day = 52 cubic yards
52 yd³ = 0.03 acre/ft
90 days = 2.7 acre/feet additional storage capacity needed

Assuming retention time for this water in the pond would only be for 90 days before it is pumped or cleaned out, the pond would need an additional 2.7 acre-feet to accommodate this groundwater from the seeps. The MRP does state that sediment ponds will be surveyed annually for sediment level in the ponds (see page 7-77, Section 742.221).

Sediment Pond 4

Pond 4 located at the extreme southeastern end of the permit boundary has a designed capacity of 7.5 acre/feet. This pond has not been built as of yet since it is intended to drain disturbed areas planned for years 2 and 3.

Findings:

[R645-301.728.333]: A provision in the MRP on page 7-21 states that if excess groundwater is encountered where it cannot be managed or discharged in compliance with the standards required by the Utah Pollutant Discharge and Eliminations System (UPDES) permit

issued by the Utah Department of Water Quality, than additional containment ponds and settlement ponds must be constructed.

Since seepage and excessive storm activity have been factors at this site, the design criteria for all ponds should be reevaluated. Consideration should be given to add additional sediment ponds to the permit area in order to facilitate pond cleanouts and any unanticipated groundwater inflows.

[R645-301.733.100]: *Since seepage and excessive storm activity have been factors at this site, the Permittee needs a qualified hydrologist to reevaluate the design criteria of all sediment ponds to account for excess groundwater that is being encountered at the site. Any redesign or additional sediment ponds proposed at the site should be performed by a qualified consultant in hydrologic design.*

Language in the MRP currently states that the ponds are designed for total containment. If the Permittee opts to discharge from the pond which is permissible under the Coal Hollow UPDES Permit, the language in the MRP will require updating. *One option discussed during the April 5, 2011 inspection was permitting the area of the ephemeral channel where NOV #N10078 occurred to include it in the disturbed area boundary. Currently as the plan is laid out, this area will come within 25 feet of the toe of the spoils pile. This channel serves as a small tributary to LRC and does not report any water to the main LRC channel. This location should be evaluated as an additional sediment pond.*

The MRP currently provides estimates of groundwater in-flow rates under Table 7-9. However, *given the unanticipated amounts of groundwater that have been seeping into the pits and the open channels in the permit area, these estimates should be revisited by a qualified hydrologist and updates to Table 7-9 should be made.*

RECOMMENDATIONS:

The Permittee needs to submit additional information addressing the issues herein and to modify the drainage control plan in their MRP by June 17, 2011.