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TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

June 11, 2012

TO: Internal File 

THRU: Daron Haddock, Title V Coal Program Manager, Team Lead
Steve Christensen, En Sci III, Task Manager

FROM: Peter Hess, En Sci III, Co-review, Engineering *PHH by SOS*

RE: DRAINAGE CONTROL ADJUSTMENTS, Alton Coal Development, LLC, Coal Hollow Mine, C/025/005, Task ID # 4101

SUMMARY:

The Permittee submitted a combined response to address Division deficiencies identified in Task ID # 3991, Drainage Control Adjustments and Task ID # 3998, Alluvial Groundwater Management Plan on May 21, 2012. The Division's review will be addressed and identified as Task ID #4101, Drainage Control Adjustments.

A review of the C-2 form submitted with the application indicates that all of the responses submitted should be reviewed under the requirements of Hydrology, R645-301-700 through R645-301-765.

However, in the list of deficiencies generated for Task ID # 3998, numerous requirements under the Engineering regulations of the R645 Coal Mining Rules are listed. Those rules, as listed under the R645 Coal Mining Rules and referred to in the TID # 3998 response will be addressed within this memo.

TECHNICAL ANALYSIS:

OPERATION PLAN

Exclusion Berm / **R645-301.532; 742.122**

Analysis:

The documented deficiency in Task ID # 3998 states the following; “the applicant states that the trench impoundment is not intended or designed to convey surface runoff waters and that surface water exclusion berms will keep surface water (save direct precipitation) from entering the trench impoundment”...”The plan does not include designs for berm construction or stability, a description of the material used for berm construction, information of the amount of surface water the exclusion berm will re-direct, where that water will be re-directed to, or how the re-directed water will be treated”.

The applicant has changed the design of the approach established in the original alluvial ground water treatment system design by discontinuing the approach to use open collection trenches. A French drain style collection system will be implemented instead.

Basic Concept of French Drain System

All topsoil material will be collected and stored according to the approved mine plan from the area where the French drain is to be implemented.

The following information comes from Appendix 7-9, “Coal Hollow Alluvial Groundwater Management Plan” as submitted in the Task ID # 4101, Drainage Control Adjustments submittal.

A trench having a maximum depth of thirty feet will be excavated, but the trench depth will never go beneath the tropic shale horizon. The width of the proposed design appears to be 6.75 feet, although this is not stated in the design. There is no length depicted for the drain field excavation depicted or stated on Figure 1. The submitted Figure 1 is submitted as a “NOT TO SCALE” drawing, although the Division has asked for detailed calculations and drawings within the Task ID # 3998 deficiency list.

A bed of gravel will be laid along the trench bottom, establishing the 2 % or less grade upon which one or two six inch FABRIC WRAPPED gated pipes will be laid. The gated pipe will be capped on one end; a gate valve will be installed on the discharge end of the pipe after it is passed through a 36 inch vertical stand pipe (CMP). More gravel will be added until the level reaches the upper horizon of the alluvial ground water system. The remainder of the trench will be filled with native material. No open trenches will exist within the permit, except where ground water interception ditches are under construction.

Since no open trenches or impounding structures will exist with this new plan, there is no need for the Permittee to address the following R645 Coal Mining Rules;

1) **R645-301.532; Exclusion Berm;** there will be no berms constructed with the intent of diverting surface water away from the French drain mechanism. Soil volumes will be excavated and placed immediately adjacent to the French drain excavation for replacement as soon as the gravel, gated pipe and 36 inch stand pipe are installed. The proposal does not need a design for a berm, a description of the material to be used (all extracted native material will be replaced as completion of the French drain occurs), information on the amount of surface water to be re-directed. The French drains may intercept some surface water from direct precipitation, but surface flow from the watershed reporting to the area where the alluvial French drain has been installed is the more likely volume. It is unlikely that the French drain installation will impede any surface flow to any great degree. The topsoil removal from the area would have a greater affect on surface drainage than the installation of these new French drains. Any surface area where vegetation is removed must treat overland surface flow by some means approved by the Division. The approved mine plan has already addressed this.

2) **R645-301.533.110; Trench Impoundment;** this water collection method is no longer being considered by the Permittee, as the original open trench proposal has been replaced with a French drain collection system. There will no longer be any open impoundments; the sump pond has been eliminated as it will no longer be needed to treat the intercepted alluvial ground water flow. Each French drain will be purged prior to discharging the water to Robinson Creek and/or Sink Valley. Otherwise, any non-compliant water volume will be used for roadway watering.

The Task ID # 4101 application does not contain any design dimensions for the French drain design. We know the depth of the bottom of the drain, which is based on the length of the digging arm of the on-site track-hoe (**30 feet** (See Page 3, paragraph one of the newly proposed Alluvial Groundwater Management Plan)). A 2% grade will be set in the bottom of the drain. The Division can only guess to what length or width each French drain will be constructed. This is a deficiency.

The Division previously stated in the Task ID # 3998 deficiency list that:

- 1) The drain would need to be appropriately designed;
- 2) The Permittee needs to clearly state how a French drain varying in depth from 5 feet to thirty feet will be constructed (including P.E. certified cross-sections, See R645-301-512.140) ; the construction description must clearly state
 - a. How trench wall stability be addressed;
 - b. How the workmen will be protected?
 - c. How will the six inch pipe be coupled? On the surface? In the trench?
 - d. Will trench walls be laid back on an angle?
- 3) Expected capacity of a one pipe drain;
- 4) Explain what factors will be used to appropriately design the drain, (i.e., what size gravel or drain rock is to be used, etc.?)

The Permittee has stated that the designs of the trenches may vary, however no design criteria have been submitted to the Division as requested. The Division needs criteria from which to determine whether the field installation is in compliance with the approved plan.

Pumping System

3) In order to de-water the French drain, a suction line from a pump will be connected to the gate valve located in the 36 inch then from the pump to an over-surface pumpline to an existing UPDES outfall. "The discharge location in lower Robinson Creek is at UPDES discharge permit outfall 005." There will be no need for a settling / sediment pond, as the line will have been purged of contaminants inserted by the construction process prior to full force discharge of the alluvial drain water.

"Development water not suitable for direct discharge at UPDES 005 will be routed to a sediment pond for treatment or used as mine process water."

The Permittee has submitted a new drawing 5-30, Sediment Impoundment Pond 3 Details to address the potential need for a mine water treatment pond. The pond has a capacity of eleven acre feet at the spillway elevation (6811 feet). The design event for the 100 year 24 hour event (6.3 acre/feet). Therefore, the new Pond 3 design is at least 40 % over capacity.

Based on the submitted application, the Sediment Impoundment Pond 3 will only be used to store and treat non-UPDES compliant water until it can be safely discharged from UPDES outfall 005 (located on Robinson Creek). A copy of the current UPDES permit for the Coal Hollow Mine site (which includes the approval of UPDES 005) is included in this application.

Findings:

The implementation of the French drain collection system design eliminates the need for the Permittee to address the requirements previously noted relative to open impoundment type trenches.

The Task ID # 4101 application contains what appears to be an acceptable pond design having an open channel spillway whose intended purpose is to treat non-compliant water prior to discharge off the approved mine permit area.

The Permittee **has not provided adequate design information** for the proposed French drain collection system. This is a deficiency. In accordance with the requirements of **R645-301-741, "Each permit application will include site specific plans that incorporate minimum design criteria as set forth in R645-301-740 for the control of drainage from disturbed and undisturbed areas."**

In accordance with the requirements of **R645-301-741, the Permittee will address the following prior to receiving a recommendation for approval;**

- 1) The French drain will need to be appropriately designed including length and width dimensions of the drain excavation;
- 2) Trench wall stability and the drain cross section design will be addressed.
 - a. How will the six inch pipe be coupled? On the surface? In the trench?
 - b. How will the workmen be protected?
 - c. Will trench walls be laid back on an angle?
 - d. Anticipated flow capacity in these ditches;
- 3) Explain what factors will be used to appropriately design the drain, (i.e., what size gravel is to be used?) Where are the collection trenches to be located? These locations need to be shown on a map.

The Division cannot approve a drain design based on “carte blanche” criteria or a design “as you go” methodology.

PIT WATER MANAGEMENT

The proposal lists three ways in which the Permittee intends to deal with alluvial ground water which flows into the mining area;

- 1) Utilizing a French drain collection system, the Permittee intends to intercept ground water flows upgradient of the mining areas, collect those flow volumes, and either treat the volumes in a sediment pond, or directly discharge them to undisturbed channels reporting away from the permit area.
- 2) Water in the newly proposed Pond 3 may be used for roadway dust suppression for the mining activities.
- 3) “Minor quantities of groundwater that could potentially be encountered within the Smirl coal seam or from the overlying Tropic Shale bedrock may be managed within the mine pits, (i.e., utilized as dust suppression water, buried in the mine pits with the backfill material, or when necessary pumped from the pit areas and discharged through sediment ponds in compliance with the mine’s UPDES permit”.

RECLAMATION PLAN

Analysis:

The alluvial ground water collection system “will eventually be mined through and removed by the mining process. If any of the interceptor drains are constructed in disturbed areas that are not to be mined, these drains will be closed by removing the discharge structure, plugging the discharge end(s) of the plastic pipe(s) and backfilling with native low permeability clayey materials.”

This commitment to reclaim the "French drain" collection system which may have been constructed within the coal recovery area or in the adjacent area (area between coal recovery disturbance and the permit boundary) is not adequate.

In accordance with the requirement of;

R645-301-800, Bonding and Insurance

The Permittee must post an additional bond amount for each French drain collection system which is to be constructed in disturbed areas which are not to be mined, or show that adequate bond is provided within the existing posted bond amount.

Areas where drains are installed where mining will occur (will be reclaimed and re-vegetated) as part of the backfill process need not be provided with additional bonding.

Hydrologic Reclamation Plan / Hydrologic Balance Protection

A review of the RECLAMATION PLAN, Chapter 7, pages 7-101-104, Sections 763.100, 765, in the MRP reveals a discussion to reclaim the siltation structures / sediment impoundments in operation at the mine at the time of cessation of coal recovery, as well as the closure and reclamation of wells constructed for the monitoring of groundwater conditions for the Mine's permit area.

There is no discussion in the Reclamation Plan of Chapter 7 (MRP) as to the following;

- 1) Will groundwater wells be monitored post-mining to determine if reporting alluvial flows continue to flow toward the backfilled areas where coal recovery occurred?**
- 2) Will the moisture content of the backfill be monitored to ensure the stability of the fill (Plasticity) in the reclaimed areas?**

At this time, there does not appear to be a deficiency in Section 553, Chapter 5, **BACKFILLING AND GRADING** of the MRP which states that "material will be placed in the in-pit backfill in lifts, until the approximate final elevation is reached" (See Page 5-67). Section 542-100 through 600 in the MRP gives a more detailed description of how the coal recovery areas will be reclaimed.

There is no description in Chapter 5, Engineering or Chapter 7, Hydrology of how future alluvial ground water flows will be monitored adjacent to the reclaim area, or whether a contingency plan to divert the alluvial ground water flows away from the reclamation area has been developed. (Appendix 7-1 and Table 7-9 provide data on the alluvial ground water systems located in and adjacent to the Mine permit area). This is a deficiency.

In accordance with the requirements of:

R645-301-542; Reclamation Plan for the Proposed Permit Area, and R645-301-750; Prevention of Material Damage to Hydrologic Balance Outside the Permit Area, the Permittee must;

1) Develop and submit an approvable plan to the Division to monitor adjacent area alluvial ground water flows to within an acceptable distance (to be determined by the Division) from the coal recovery / reclamation area to determine if the ground water volumes are intercepting the back fill area;

2) **If it is determined** that alluvial ground water is intercepting any backfilled areas post-mining, the Permittee **must monitor the moisture content of the fill** in those areas to determine if the inflow water volume is affecting the fill consistency. A deleterious effect on the tilling and stability characteristics of the fill is probable.

The Division will require this based on:

- 1) **The requirement to place fill such that it is stable and ensures mass stability;**
and
2) **The potential for de-watering of the Sink Valley alluvial ground water system by interruption of the pre-mining subsurface flow path.**

If the coal recovery spoil fills (the reclamation area) are affected by alluvial ground water in-flows, the Permittee will be required to develop a plan to intercept the alluvial in-flows up gradient of the mine reclamation area and divert that flow to the alluvium north of the Sink Valley ground water system, restoring the flow quantity of that system.

Findings:

R645-301-542; Reclamation Plan for the Proposed Permit Area, and R645-301-750; Prevention of Material Damage to Hydrologic Balance Outside the Permit Area,

The Permittee must develop and submit an approvable plan to the Division to monitor adjacent area alluvial ground water flows to within an acceptable distance (to be determined by the Division) from the coal recovery / reclamation area to determine if the ground water volumes are intercepting the back fill area;

R645-301-800, Bonding and Insurance

3) The Permittee must post an additional bond amount for each French drain collection system which is to be constructed in disturbed areas which are not to be mined, or show that adequate bond is provided within the existing posted bond amount.

RECOMMENDATION:

The Task ID # 4101 application is deficient and should be returned until the Permittee addresses the deficiencies previously identified.

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