



**Alton Coal Development, LLC**

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Div. of Oil, Gas & Mining

November 18, 2015

Daron R. Haddock  
Coal Program Manager  
Oil, Gas & Mining  
1594 West North Temple, Suite 1210  
Salt Lake City, UT 84114-5801

**Subject: North Private Lease MRP stipulations and conditions**

Dear Mr. Haddock,

This letter is provided to summarize and clarify the North Private Lease MRP permit conditions and stipulations that have been proposed by Alton Coal Development ("ACD") in response to the technical review deficiencies provided by the division on September 4, 2015.

Primarily, ACD has committed to perform the following:

- Complete drilling and monitor well installation program prior to disturbance of any ground in Area 2 and/or Area 3
  - Pump tests will be performed and analyzed on the well field
  - Results may indicate that a groundwater model will provide beneficial information. If so, a model will be constructed and submitted for review.
- Complete USACOE permitting (Individual 404 permit) before disturbance of any ground in Area 2 and/or Area 3
- Sage Grouse mitigation will continue as currently stipulated under the Sage Grouse management plan. Yearly mitigation will continue at a 4:1 ratio for planned disturbance.

ACD also proposes to remove erosional scours and arroyos associated with the Western and Central drainages as part of the USACOE permitting process and post-mining land use agreements. Specifically in Chapter 5 of the MRP:

*Of note, erosional scours (center and western drainage) existing prior to mining will be eliminated per the landowner request. This requires coordination with the USACOE for the elimination of wet lands (final landform shown on Drawings 5-74 and 5-75) identified in the Preliminary Jurisdictional Determination SPK-2011-01248 November of 2012 and updated September 2015 (MRP, Volume 10, NPL Wetland Study Report Final). Disturbances within the identified wetlands will not occur until approval of the 404 permit. The 404 permit will allow for*

*take of the wetlands within the center drainage with wetlands being replaced in offsite mitigation under USCOE jurisdiction.*

Further, the following responses to specific deficiencies from the technical review give detailed commitments to what the drilling and monitor well program (and groundwater model if required) will achieve:

33) R645-301-725, R645-301-728 The application does not meet the minimum hydrologic requirements of providing detailed hydrologic and geologic baseline cumulative impact area information on the alluvial aquifer. The application needs to provide a greater in depth analysis of the unconfined aquifer in the alluvial sediments within and adjacent to the Permit area. The Permittee needs to analyze the horizontal and vertical hydraulic conductivity of the aquifer at multiple areal locations in the permit area and at multiple vertical depths within the aquifer. The methodology of the study will be supported with calculations, plan-view and cross-sectional maps, and a detailed narrative of all procedures. A pumping drawdown test will be performed in the alluvial aquifer at multiple locations and at multiple screened interval depths. These results will be used to determine additional baseline information on the alluvial aquifer that includes but is not limited to the following variables: transmissivity (T), hydraulic conductivity (K), storativity (S), and specific yield. The application will need to provide the raw data collected in the field and the analyzed results with supporting graphs and charts of all slug-tests and pumping-tests performed. All analyses must specifically detail any assumptions made to justify the chosen test method for the aquifer tests and detail any assumptions used in the equations for calculating all results. The book Construction Dewatering and Groundwater Control: New Methods and Applications By Powers and Herridge (2007) recommends the piezometer screen intervals should be located in the same stratigraphic horizon as the well screen and where the aquifer is relatively homogeneous for pumping tests. In order to provide long term monitoring data, the wells will be located so they will not be destroyed by mining activities.

*ACD is currently preparing to implement the alluvial groundwater drilling plan and aquifer study in the Kanab Creek valley in the North Private Lease area as requested by the Division. ACD plans to commence those activities shortly. However, the completion of these activities will likely require a substantial amount of time. Therefore, ACD requests that the Division grant approval for mining in proposed mine pits 1-8 and Highwall Trench 1 (which are located in upland areas that will not substantially disturb saturated alluvial sediments in the Kanab Creek Valley), with approval for mining in the subsequent mine pits being granted after successful completion of the drilling program and alluvial groundwater study in the Kanab Creek valley.*

35) R645-301-725; R645-301-728 The total volume of surface and groundwater outflow from the permit area will be calculated at the location of the monitoring well matrix just south of the permit area (See Groundwater Monitoring Plan for a complete description on the well matrix). The surface flow will be combined with the volume of groundwater discharged through the monitoring well matrix (cross-sectional area of alluvial aquifer perpendicular to flow, hydraulic

conductivity, hydraulic gradient, transmissivity, etc.) to determine the total volume water outflow from the permit area. The methodology, calculations, a geologic cross-section(s), and stream cross-section must be given to support how each parameter variable is determined and ultimately used to determine the final outflow variable.

ACD is currently preparing to implement the alluvial groundwater drilling plan and aquifer study in the Kanab Creek valley in the North Private Lease area as requested by the Division. ACD plans to commence those activities shortly. However, the completion of these activities will likely require a substantial amount of time. Therefore, ACD requests that the Division grant approval for mining in proposed mine pits 1-8 and Highwall Trench 1 (which are located in upland areas that will not substantially disturb saturated alluvial sediments in the Kanab Creek Valley), with approval for mining in the subsequent mine pits being granted after successful completion of the drilling program and alluvial groundwater study in the Kanab Creek valley.

36) R645-301-726 The application needs to provide a groundwater model of the unconfined alluvial aquifer within and adjacent to the permit area. The alluvial aquifer will be modeled in three phases: 1) Pre-mining, 2) Active mining, 3) Post-mining reclamation. Baseline data will be used to model the pre-mining groundwater conditions of recharge and discharge zones as well as no-flow boundaries. The pre-mining phase of the alluvial aquifer model will be calibrated to specific criteria, including but not limited to, recharge rates and discharge rates; locations and/or areas of recharge, discharge, and no-flow boundaries; seasonal fluctuations in the water table; and vertical and horizontal heterogeneities that influence/determine flow paths and equipotential lines. The active mining phase will model all associated active mining (pit advancement, highwall mining, etc.) at six month intervals during the planned 4 years of active mining. The model will predict groundwater drawdown in the surrounding alluvial aquifer as pits advance below the water table. The model will show the lateral extent of the radius of influence associated with the maximum expected hydraulic gradient for each six month interval. The active mining model will estimate the volume of water pumped from the alluvium during each six month interval. A post-reclamation groundwater model will be done on the backfilled pits and the surrounding undisturbed alluvial aquifer's response to these mined through areas as the third phase of modeling. The post-reclamation model will calculate the groundwater recharge rate of the backfill and of the undisturbed alluvial aquifer. The model will provide an estimate of the time it will take the alluvial aquifer to reach a pre-mining recharge and discharge equilibrium rate and discuss any potential affect this may have on the flow in Kanab creek in the meantime.

There is nothing in the rule cited that requires the creation of a numeric groundwater model as part of the mine permit application. As indicated in the rule, the applicant may choose to incorporate modeling techniques, interpolation or statistical techniques in the application; however, the rule indicates that the Division may find that the use of actual surface- and groundwater information will be required at each site rather than projections obtained from the use of modeling. ACD will utilize a suitable analytical technique to further refine the probable hydrologic consequences of mining in the Kanab Creek alluvium, which may or may not include the use of a numerical model.

The analysis will utilize the findings of the drilling and aquifer testing program requested by the Division. ACD is currently preparing to implement the alluvial groundwater drilling plan and aquifer study in the Kanab Creek valley in the North Private Lease area as requested by the Division. ACD plans to commence those activities shortly. However, the completion of these activities will likely require a substantial amount of time. Therefore, ACD requests that the Division grant approval for mining in proposed mine pits 1-8 and Highwall Trench 1 (which are located in upland areas that will not substantially disturb saturated alluvial sediments in the Kanab Creek Valley), with approval for mining in the subsequent mine pits being granted after successful completion of the alluvial groundwater study in the Kanab Creek valley and associated PHC refinement for the Kanab Creek alluvium.

37) R645-301-726 For each of the three modeling phases, the application will provide professionally certified plan view maps and cross-sections, a supporting narrative with calculations, and any appropriate and relevant data that was used in order to fully convey the accuracy and precision of the model. Each phase and interval of the groundwater model will must show a West-East A-A' cross-section that includes but is not limited to the parameters: equipotential lines; flow lines; the water table; no-flow boundaries; the radius of influence/cone of depression associated with the maximum hydraulic gradient in the active mining areas; and the location and flow response of Kanab Creek to the Groundwater radius of influence.

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The analysis will utilize the findings of the drilling and aquifer testing program requested by the Division. ACD is currently preparing to implement the alluvial groundwater drilling plan and aquifer study in the Kanab Creek valley in the North Private Lease area as requested by the Division. ACD plans to commence those activities shortly. However, the completion of these activities will likely require a substantial amount of time. Therefore, ACD requests that the Division grant approval for mining in proposed mine pits 1-8 and Highwall Trench 1 (which are located in upland areas that will not substantially disturb saturated alluvial sediments in the Kanab Creek Valley), with approval for mining in the subsequent mine pits being granted after successful completion of the alluvial groundwater study in the Kanab Creek valley and associated PHC refinement for the Kanab Creek alluvium.

39) R645-301-728 The application will provide calculations and a supporting analysis of the cone of depression associated with each open-pit and highwall auger hole within the North Private lease. This analysis must be supported with cross-sectional and plan view maps, tables, and

graphs. The analysis must provide a discussion on the response of flow in Kanab if the cone of depression is expected to extend to and/or beyond the creek. This analysis must also provide a discussion on any stratigraphic units encountered in drill holes that may have a stronger influence on the aquifer's response to drawdown. A discussion must be provided on any interruption of flow along the length of Kanab Creek that may result in material damage to the water resources within and adjacent to the permit area.

The analysis will utilize the findings of the drilling and aquifer testing program requested by the Division. ACD is currently preparing to implement the alluvial groundwater drilling plan and aquifer study in the Kanab Creek valley in the North Private Lease area as requested by the Division. ACD plans to commence those activities shortly. However, the completion of these activities will likely require a substantial amount of time. Therefore, ACD requests that the Division grant approval for mining in proposed mine pits 1-8 and Highwall Trench 1 (which are located in upland areas that will not substantially disturb saturated alluvial sediments in the Kanab Creek Valley), with approval for mining in the subsequent mine pits being granted after successful completion of the alluvial groundwater study in the Kanab Creek valley and associated PHC refinement for the Kanab Creek alluvium.

40) R645-301-724.310, R645-301-731 Additional groundwater monitoring wells must be installed in the alluvial aquifer within and adjacent to the North Private lease and positioned so as not to be destroyed by mining activities. The intent of these wells is to monitor any impact that active mining may have on the quantity and quality of groundwater and surface water in Kanab Creek within and adjacent to the permit area. The alluvial aquifer groundwater must be monitored at multiple vertical depths and multiple areal locations in three zones: 1) just north of the permit area, 2) on both the east and west sides of Kanab Creek in-between the creek and the active mine workings, and 3) just south of the permit area. The methodology of selecting the specific well locations and identifying the screened interval lengths and depths based on relevant well log data must be outlined. When groundwater is measured at multiple vertical depths the wells will be tightly grouped, such as the C- and S-well groups found in the southern permit area. At a minimum the aquifer will be screened: 1) across the current existing water table, 2) roughly mid-depth in the aquifer, 3) at the base of the aquifer, but not within the underlying bedrock. The roughly mid-depth monitoring wells will be screened across gravel lenses with the highest permeability. The specific locations for these monitoring wells are:

ACD is currently preparing to implement the alluvial groundwater drilling plan and aquifer study in the Kanab Creek valley in the North Private Lease area as requested by the Division. ACD plans to commence those activities shortly. However, the completion of these activities will likely require a substantial amount of time. Therefore, ACD requests that the Division grant approval for mining in proposed mine pits 1-8 and Highwall Trench 1 (which are located in upland areas that will not substantially disturb saturated alluvial sediments in the Kanab Creek Valley), with approval for mining in the subsequent mine pits being granted after successful completion of the drilling program and alluvial groundwater study in the Kanab Creek valley.

41) 1) Groundwater monitoring wells must be installed within the alluvial aquifer directly north of the permit area and on the east and west banks of Kanab Creek. The wells will be no more than 100 yards from Kanab Creek and no more than 100 yards north of the permit area.

ACD is currently preparing to implement the alluvial groundwater drilling plan and aquifer study in the Kanab Creek valley in the North Private Lease area as requested by the Division. ACD plans to commence those activities shortly. However, the completion of these activities will likely require a substantial amount of time. Therefore, ACD requests that the Division grant approval for mining in proposed mine pits 1-8 and Highwall Trench 1 (which are located in upland areas that will not substantially disturb saturated alluvial sediments in the Kanab Creek Valley), with approval for mining in the subsequent mine pits being granted after successful completion of the drilling program and alluvial groundwater study in the Kanab Creek valley.

42) 2) Groundwater monitoring wells must be installed on the east and west banks of Kanab Creek. These wells will be installed between active mining and the creek. There will be at a minimum three groundwater monitoring locations that will be roughly equally spaced along the length of the creek through the permit area.

ACD is currently preparing to implement the alluvial groundwater drilling plan and aquifer study in the Kanab Creek valley in the North Private Lease area as requested by the Division. ACD plans to commence those activities shortly. However, the completion of these activities will likely require a substantial amount of time. Therefore, ACD requests that the Division grant approval for mining in proposed mine pits 1-8 and Highwall Trench 1 (which are located in upland areas that will not substantially disturb saturated alluvial sediments in the Kanab Creek Valley), with approval for mining in the subsequent mine pits being granted after successful completion of the drilling program and alluvial groundwater study in the Kanab Creek valley.

43) 3) Groundwater monitoring wells must be installed downstream of the permit area no more than 140 yds downstream of the county road where it crosses Kanab Creek. The monitoring wells will be placed in the gravel alluvium (050 > 1 cm) at point where the quantity of surface flow in Kanab Creek is readily and accurately measured. A minimum of six wells will be installed in the bottom of the Kanab Creek channel floodplain in a 3 x 2 gridded matrix. The matrix will be positioned to have both the three well arrays running along cross-sections that are perpendicular to flow in Kanab Creek. Both three well arrays will be spaced no more than 15 yards apart. The wells will be fully screened from the water-table to the bottom of the alluvial sediments resting on the bedrock. The three wells along the perpendicular array will be equally spaced along the cross-section in the bottom of Kanab Creek's floodplain channel. Both three well arrays will have one well located on the opposite and narrower bank as measured along the cross-section.

ACD is currently preparing to implement the alluvial groundwater drilling plan and aquifer study in the Kanab Creek valley in the North Private Lease area as requested by the Division. ACD plans to commence those activities shortly. However, the completion of these activities will likely

require a substantial amount of time. Therefore, ACD requests that the Division grant approval for mining in proposed mine pits 1-8 and Highwall Trench 1 (which are located in upland areas that will not substantially disturb saturated alluvial sediments in the Kanab Creek Valley), with approval for mining in the subsequent mine pits being granted after successful completion of the drilling program and alluvial groundwater study in the Kanab Creek valley.

48) R645-301-728; R645-301-724.310 The application needs to provide maps, geologic and hydrogeology cross-sections, and a supporting narrative of the probable hydrologic consequences of highwall mining on the alluvial aquifer in the permit area. This includes specifically detailing the alluvial scour zones into the coal seam in the southern portion of the permit area. As well as areas where the alluvial sediments rest on top of the coal seam.

The subsurface geometry of the bedrock basement and overlying alluvial deposits will be further defined using the proposed alluvial drilling program. ACD will utilize this information to produce additional maps, geologic and hydrogeology cross-sections and a supporting narrative of the probable hydrologic consequences of highwall mining beneath saturated Kanab Creek alluvium. ACD is currently preparing to implement the alluvial groundwater drilling plan and aquifer study in the Kanab Creek valley in the North Private Lease area as requested by the Division. ACD plans to commence those activities shortly. However, the completion of these activities will likely require a substantial amount of time. Therefore, ACD requests that the Division grant approval for mining in proposed mine pits 1-8 and Highwall Trench 1 (which are located in upland areas that will not substantially disturb saturated alluvial sediments in the Kanab Creek Valley), with approval for mining in the subsequent mine pits being granted after successful completion of the drilling program and alluvial groundwater study in the Kanab Creek valley.

51) R645-301-724.300 The application must include a plan view map of the Smirl coal seam line boundary, including but not limited to the surficial coal outcroppings and any Quaternary Alluvium scour zones that occur underground.

The Smirl coal seam line boundary is plotted on a plan view map on Figure 6 of Appendix 7-16. The projected locations of Smirl coal seam scoured zones are also plotted on Figure 6. The scour zone locations will be further refined through the proposed Kanab Creek valley alluvium drilling program.

120) R645-301-724.310 There are no maps or a narrative of highwall mining in relation to the alluvial scour zones into the coal seam in the southern portion of the permit area.

ACD will further define the locations of the coal scour zone based on the findings of the alluvial groundwater drilling program. This information will be used to assist in planning the locations of highwall holes that extend beneath saturated Kanab Creek alluvium.

ACD plans to commence the alluvial drilling program shortly. ACD requests that the Division grant approval for mining in proposed mine pits 1-8 and Highwall Trench 1 (which are located in upland areas that will not substantially disturb saturated alluvial sediments in the Kanab Creek

Valley), with approval for mining in the subsequent mine pits being granted after successful completion of the alluvial groundwater study in the Kanab Creek valley and associated PHC refinement for the Kanab Creek alluvium.

Please do not hesitate to contact me if you have any questions: 435-705-3832.

Sincerely

A handwritten signature in blue ink, appearing to read 'A. Christensen', with a long horizontal flourish extending to the right.

Andrew R. Christensen  
Technical Services Manager