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TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

January 26, 2011

TO: Internal File

THRU: Joe Helfrich, Team Lead *JH*

FROM: Steve Christensen, Environmental Scientist III *SC*

RE: Permit Application, Carbon Resources LLC, Kinney No. 2 Mine, C/007/0047, Task ID #3646

SUMMARY:

On October 4th, 2010, the Division of Oil, Gas and Mining (the Division) received a permit application package (the application) from Carbon Resources, LLC (the Permittee). The application was submitted to conduct coal-mining activities approximately 1/2 mile north of Scofield, UT and east of Utah State Highway 96. Previous coal mining operations have occurred within much of the mine plan area. Several mines existed in the area of the proposed surface facilities (Kinney Mine, Columbine Mine and the Jones Mine). The Permittee has named this coal-mining operation Kinney No. 2 Mine.

The proposed permit area is 448 acres. Small un-named ephemeral channels convey area drainage from the portal area. Eagles Canyon is located over the ridge to the east of the mine site and Long Canyon is located east of Eagles Canyon. Eagles Canyon has been characterized as ephemeral and Long Canyon contains a perennial stream. All drainages located within the permit area eventually discharge to Scofield Reservoir.

The application was previously submitted in 2008. A technical review was conducted by the Division and a deficiency letter was issued to the Permittee on September 18th, 2008. The following is the hydrologic analysis of the second application package relative to the State of Utah R645-Coal Mining Rules. For the purposes of tracking, this Division review has been assigned a task review number of #3646.

The application should not be approved at this time. The following deficiencies must be addressed prior to Division approval:

Deficiencies:

R645-301-120: The Permittee should revise the table of contents in Chapter 7 to accurately depict the page numbers of the corresponding sections. For example, the table of contents indicates that the climatological information is located on page 7-68; however, the information is presented beginning on page 7-74.

R645-301-120: The Permittee should revise the application so referenced tables/figures etc., are in ascending chronological order. For example, Table 8 is on page 7-130. Table 12 is on page 7-72. Table 13, is on page 7-34.

R645-301-724.100: The Permittee must revise the application to clearly demonstrate the frequency and dates of monitoring visits that were conducted at Eagle Springs 1, 1A, 2 and 3 and provide the data obtained. Exhibit 10, *Surface and Ground Water Field Measurements* and Figure 17, *Baseline Water Sampling* does not provide any documentation of monitoring activity for these springs. Table 9, *Seep and Spring Flow Summary* does list Eagle Seep 1, Eagle Seep 1A, Eagle Spring 2 and Eagle Seep 3, but it's not possible to determine the frequency and timing of the site visits that were utilized in characterizing the nature and seasonal fluctuation of these groundwater resources. This deficiency was identified in the previous technical analysis. The Permittee has indicated that the springs were visited and that water samples were captured when available. Documentation of the field visits to these springs and the obtained data should be provided in the application.

R645-301-724.100: The Permittee should address the baseline data collection of Aspen Spring. Based upon a review of Table 6, *Kinney #2 Mine Baseline Monitoring Stations* and Exhibit 10, *Surface and Ground Water Field Measurements*, it does not appear that enough data was collected to establish the baseline characterization of that spring. Exhibit 10 shows the spring as having been sampled five times beginning in 2008 (June, August and October), but then not sampled again until June of 2010. The gap in the data must be addressed. If additional field data is available, the Permittee should provide it in the application.

R645-301-724.100: The Permittee must place a footnote in Exhibit 9, *Seep and Spring Survey* that directs the reader to Map 7, *Regional Hydrology* where the seeps and springs identified in the survey are depicted.

R645-301-724.100: The Permittee must address water reading discrepancies obtained from monitoring wells CR 06-01 BLW and CR 06-02. Based upon a review of the data presented in Exhibit 10, *Surface and Ground Water Field Measurements* and the figures in Exhibit 11, *Monitoring Well Completion Details*, it appears that 11 water level readings obtained from CR 06-01 BLW and 7 water level readings from CR 06-02 were obtained from within the

screened interval indicating the presence of groundwater. Based up on the discussion within the text of the application, these monitoring wells are dry. The discrepancy must be addressed.

R645-301-724.100: The Permittee must revise/address the datum elevations presented in Exhibit 10, *Surface and Ground Water Field Measurements*. It appears that the datum elevations utilized to calculate the screened interval elevations and Hiawatha Seam interval elevations were obtained from the top of the PVC riser of the monitoring wells. However; according to the information presented in Exhibit 11, *Monitoring Well Completion Details*, it appears that the elevation of the ground was utilized to calculate these intervals.

R645-301-724.100: The Permittee must address water level readings obtained at monitoring well CR 06-01. Based upon a review of the data presented in Exhibit 10, *Surface and Ground Water Field Measurements* and the figures in Exhibit 11, *Monitoring Well Completion Details*, it appears that 5 water level readings were obtained from below the bottom elevation of the monitoring well's blank.

R645-301-724.100: The Permittee must address the '*static water levels*' reported in Exhibit 10, *Surface and Ground Water Field Measurements* for monitoring wells CR 06-02, CR 06-02 ABV and CR 06-05A. Based upon a review of the data presented in Exhibit 10, *Surface and Ground Water Field Measurements* and the figures in Exhibit 11, *Monitoring Well Completion Details*, numerous water level measurements were obtained from the blank section of the monitoring well. The Permittee should not present these water levels as "Static Water Level Elevations" in Exhibit 10 as they do not represent an actual water level associated with a groundwater system. If a true groundwater level was not obtained, the Permittee should clearly indicate that in Exhibit 10. Additionally, the Permittee should provide a brief discussion as to how water accumulated in the blanks and why they were initially reported as "Static Water Level Elevations".

R645-301-724.100: The Permittee must address the lack of baseline data obtained from monitoring wells CR 10-11 and CR 10-12. Based upon the data presented in the application, these monitoring wells have been sampled two times in July and August of 2010. Two sampling events do not establish seasonal variation in terms of water quality or quantity.

R645-301-724.100: Table 6, *Kinney #2 Mine Baseline Monitoring Stations*, should be revised to reflect the number of sampling events at *each* of the monitoring stations based on the information contained in Exhibit 10, *Surface and Ground Water Field Measurements*. For example, Table 6 appears to depict that Eagle Spring was monitored four times. However; upon review of the field measurement information in Exhibit 10, the site was visited approximately 30 times.

R645-301-724.100: The Permittee should revise discrepancies in the third paragraph on page 7-83. The Permittee states, "*Water measured on May 29th, 2007 within wells CR 06-01, CR*

06-01 BLW and CR 06-02 during and after drilling has noted at a maximum water elevation of 7,898 feet msl, over 100 feet below the lowermost spring elevation.” Based upon the discussion in Chapter 7, monitoring wells CR 06-01, CR 06-01 BLW and CR 06-02 are characterized as being “dry holes”. The sentence is misleading in that it appears to convey that a maximum water level was obtained at 7,898 feet msl. Based upon Map 7A, *W-E X-Section A-A’* it appears the piezometric surface of the regional aquifer is above the coal seam in the location of CR 06-01 and CR 06-02.

R645-301-724.100: The third paragraph on page 7-83 references, “*springs located along the western facing slope...all located south of the mine permit area*”. The spring and seep survey in Exhibit 9 and Map 7 do not depict any springs south of the permit area. As such, its not possible for the reader to determine what springs are being discussed. Please address this discrepancy and provide a figure that depicts the location of the springs being discussed.

R645-301-724.100: The Permittee must provide additional information/clarification as to the regional aquifer and associated water level. Map 7A, *W-E Section A-A’*, depicts the piezometric surface of the regional aquifer. Upon comparison of Map 15, *Mine Plan Layout and Production Schedule*, with Map 7A, it’s unclear as to whether the proposed mine works are above or below the regional groundwater table. The Permittee should:

- Clearly depict the western extent of the Eagle Canyon Graben on Map 7A and Map 15.
- Modify Map 7A or provide another cross-section that depicts the extent of the mine works relative to the piezometric surface.
- Discuss within the text of the application the extent of mine workings (i.e. no mining planned within the Eagle Canyon Graben).
- Adjust the piezometric surface line on Map 7A to account for the lack of encountered groundwater in Monitoring Well CR 06-05A.

R645-301-724.100: The Permittee must provide further discussion as to the groundwater flow direction of the regional aquifer. On page 7-16 of the application, the Permittee discusses how the regional aquifer system flows in a “*general east to west direction toward Mud Creek and Scofield Reservoir*”. Based on the presented geological information, the dip of the regional stratigraphy is to the north, north-east. Additional information/clarification should be provided as to the processes that produce the westerly flow direction of the regional aquifer.

R645-301-724.100: The Permittee should revise the text describing groundwater rights on page 7-30 and surface water rights on page 7-53 with what’s depicted on maps 30 and 31 respectively. The text in each section indicates that a “*4 mile radius of the central mine area*” is depicted. Maps 30 and 31 do not depict a 4 mile radius from the permit boundary.

R645-301-724.200: The Permittee should depict point to point diversions for surface water rights on Map 31. By depicting the extent of a point to-point diversion, a more accurate assessment of potential coal mining related impacts can be assessed.

R645-301-724.100 and -724.200: The Permittee must consult with the Price Division of Water Rights to produce a more accurate listing/depiction of the surface and ground water resources within the permit and adjacent area. Upon consultation with the Division of Water Rights, Price Field Office, ground and surface water resources within 2 miles of the permit boundary were omitted/missed from the information in the application.

R645-301-724.100 and -724.200: The Permittee should revise Table 10, *Surface and Ground Water Quality Summary* to depict the analytical results for total iron and total manganese for Angle Spring, Aspen Spring, Eagle Spring, Sulfur Spring, Miller Outlet, Mud Creek and Res-1. Upon review of Exhibit 12, *Surface and Ground Water Quality Data*, it appears that these analyses were conducted and should be included in Table 10.

R645-301-724.200: The Permittee should address the characterization of intermittent streams within and adjacent to the permit area. On page 7-33, the Permittee states, "several small *intermittent* and ephemeral tributaries are located within and adjacent to the permit area, including UP Canyon to the south and Eagle Canyon to the North." There is no discussion of '*intermittent streams*' on page 7-35. The State of Utah R645-Coal Mining Rules defines ephemeral, intermittent and perennial drainages. If, as the reference suggests, all three drainages are present within the permit and adjacent area, there should be a discussion/characterization for intermittent streams. This deficiency was identified in the previous technical analysis.

R645-301-724.200: The Permittee must address the first sentence of the last paragraph of page 1 of Exhibit 20, *Ephemeral Drainage Determination*. The Permittee states, "*The documented lack of running water alone, at any point in the year, disqualifies all four of these drainages from being classified as Perennial, a stream that flows year round.*" The lack of running water is not documented in the application. A tabulation of the number of times that zero flow was observed in the ephemeral drainages throughout the baseline data collection period would provide documentation to substantiate the statement.

R645-301-725: The Permittee must address the baseline data deficiencies outlined previously in order for the Division to assess the probable cumulative hydrologic impacts from the proposed operation on ground and surface water systems. The Permittee must address the baseline data deficiencies outlined previously in order for the Division to make that assessment.

R645-301-726: The Permittee should provide further discussion/information as to the water modeling that was conducted in analyzing the regional aquifer. The application discusses how SURV CAD was utilized. Please provide a discussion as to how the model was constructed (i.e. assumptions, data points utilized, limitations etc). Additionally, provide any summary

reports or outputs from the model that can be reviewed in determining how the model was applied and constructed.

R645-301-728: In order to accurately assess the PHC Determination provided in the application, the Permittee must first address the baseline data deficiencies outlined in the Baseline Information section. Per R645-301-728, "*The PHC determination will be based on baseline hydrologic, geologic and other information collected for the permit application*". Once the baseline deficiencies have been addressed, the Division will be able to accurately assess the probable hydrologic consequences associated with the proposed mining activity.

R645-301-746: The Permittee should provide a clear and concise discussion as to how generated coal mine waste will be handled. The application discusses the handling of '*mine development rock*', which is not defined by the State of Utah R645-Coal Mining Rules. Depending on the nature of the material, specific hydrologic design criteria must be addressed.

R645-301-731.300 and R645-301-536.320: Provide a sampling plan to identify acid/toxic characteristics of waste stored on the surface. At a minimum, the plan should include a commitment to sample the temporary waste pile during periods of temporary cessation.

R645-301-731.210: The Permittee first address the deficiencies relative to groundwater baseline data, geologic baseline data and the PHC before the Division can make a finding that the proposed operational phase groundwater monitoring plan meets the requirements of the State of Utah R645-Coal Mining Rules. Per R645-301-731.211, the groundwater-monitoring plan must be based upon the PHC determination as well as all baseline hydrologic and geologic information.

R645-301-731.220: The Permittee must address the deficiencies relative to surface water baseline data, geologic baseline data and the PHC before the Division can make a finding that the proposed operational phase surface water-monitoring plan meets the requirements of the State of Utah R645-Coal Mining Rules. Per R645-301-731.220, the surface water-monitoring plan must be based upon the PHC determination as well as all baseline hydrologic and geologic information.

R645-301-731.800: The Permittee must provide a commitment that if significant amounts of groundwater are encountered underground; a water right will be obtained or an existing water right altered by the Utah Division of Water Rights prior to utilizing in-mine ground water encountered during active coal operations. On page 7-102, the potential for discharge of mine water to surface drainages is further discussed. The Permittee states, "*If sufficient quantities of mine drainage are available, stored mine drainage will be utilized to supplement the operational mine water supply.*"

R645-301-731.520: The Permittee must reinstate language from the previous application regarding the potential for discharge of mine water. The previous application had discussed proposed methods for the disposal/handling of any in-mine water that's encountered including: 1) discharging the water into remote or abandoned mine workings, 2) request a new NPDES discharge permit for surface drainage, 3) construct shallow or deep injection wells, 4) treat and discharge the water into Mud Creek or 5) evaporate the discharge with new settling ponds. It appears that the new application has omitted options 2, 3, 4 and 5.

R645-301- 531, -742.300, -760: The Permittee must clarify the diversion language in Section R645-301-742.300. In the third paragraph of the section, the application states, "*As can be seen on Map 29, Mine Surface Facilities Area-Post Mining Topography, the reclaimed channel is in reality short, and thus has little potential for significant alignment variation.*" Upon review of Map 23 and Map 29, there is an irrigation ditch in the area of where undisturbed culvert UDC-1 is located. It's unclear if the text is referring to the irrigation ditch or the ephemeral channel that is being diverted with culvert UDC-1. The paragraph also refers to "*culverted channel USC-1*". It appears that this is a typo that should be revised as it appears there is no drainage feature labeled "USC-1".

R645-301- 531, -742.300, -760: The Permittee should revise Map 29, *Mine Surface Facilities Area-Post Mining Topography*. The third paragraph of page 7-122 states, "*Ditches UDD-1 and UDD-2 remain as permanent structures.*" However; upon review of Map 29, these diversions are not depicted. Based on this statement, these features should also be depicted on the interim drainage map as well.

R645-301- 531, -742.300, -760: The Permittee should revise chapter 5 and 7 to provide a clearer discussion of the temporary and permanent diversion/drainage controls. In the third paragraph on page 7-131, the application states, "*When no longer required for sediment control, all temporary diversions and associated structures will be removed and the affected lands reclaimed, with the exception of permanent diversion ditches UDC-2 and culvert CP-2*". There is no mention of ditches UDD-1 and UDD-2 in this section. In the last paragraph on page 5-39, the application indicates that UDD-1 and UDD-2 are "*permanent collection ditches*". Additionally, the final reclamation information on page 5-84 indicates that UDD-1 and UDD-2 remain as part of final reclamation. Please address this discrepancy.

R645-301- 743: The Permittee must provide a discussion as to how it will be determined when clean-out of the sediment pond is required. On page 5-42, the Permittee states, "*Before sediment accumulations reach the point where they would encroach on stormwater storage capacity, CR will schedule and implement measures to remove the accumulated sediments*". Address how it will be determined when the sediment pond no longer has the capacity to adequately treat/retain the design storm. Typically this is done by establishing an elevation marker within the pond that denotes the sediment clean-out level.

R645-301-731, -760: The Permittee must provide a final reclamation map that depicts the permanent features and final drainage configuration of the site.

R645-301-729- In order for the Division to make a finding that the mine plan has been designed to prevent material damage to the hydrologic balance outside the permit area, the Permittee must provide additional hydrologic information relative to ground and surface water resources located within and adjacent to the proposed permit area.

TECHNICAL ANALYSIS:

GENERAL CONTENTS

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

The application does not meet the Permit Application Format and Contents requirements of the State of Utah R645-Coal Mining Rules.

The table of contents for Chapter 7 is incorrect. The Permittee should revise the table of contents in Chapter 7 to accurately depict the page numbers of the corresponding sections. For example, the table of contents indicates that the climatological information is located on page 7-68; however, the information is presented beginning on page 7-74.

The previous technical analysis had identified a deficiency on several maps. In many instances, a map depicted a feature or item of interest, but did not denote what that feature was in the legend. The Permittee has corrected the problem with the most recent amendment.

The Permittee should revise the application so referenced tables/figures etc., are in ascending chronological order. For example, Table 8 is on page 7-130. Table 12 is on page 7-72. Table 13, is on page 7-34.

Findings:

The application does not meet the Permit Application Format and Contents requirements of the State of Utah R645-Coal Mining Rules. The following deficiency must be addressed prior to Division approval of the application:

R645-301-120: The Permittee should revise the table of contents in Chapter 7 to accurately depict the page numbers of the corresponding sections. For example, the table of contents indicates that the climatological information is located on page 7-68; however, the information is presented beginning on page 7-74.

R645-301-120: The Permittee should revise the application so referenced tables/figures etc., are in ascending chronological order. For example, Table 8 is on page 7-130. Table 12 is on page 7-72. Table 13, is on page 7-34.

COMPLETENESS

Regulatory Reference: 30 CFR 777.15; R645-301-150.

Analysis:

The application meets the Completeness requirements as outlined in the State of Utah R645-Coal Mining Rules.

The previous technical analysis had identified a completeness deficiency. Table 3.7.1, Kinney No. 2 Mine Baseline Monitoring Stations was not included in the previous amendment. The reformatted amendment now contains Table 3.7.1 as Table 6 in Chapter 7 of the application.

Table 6, Kinney #2 Mine Baseline Monitoring Stations, provides a comprehensive list of the baseline monitoring stations and provides a table that shows the sampling dates and available water quality and quantity data available for each of the respective monitoring stations.

Findings:

The application meets the Completeness requirements as outlined in the State of Utah R645-Coal Mining Rules.

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

GENERAL

Regulatory Reference: 30 CFR 783.12; R645-301-411, -301-521, -301-721.

Analysis:

The application meets the General Environmental Resource Information requirements as outlined in the State of Utah R645-Coal Mining Rules.

Beginning on page 7-1 of the application, the Permittee provides a general description and references to the ground and surface water resources that may be affected or impacted by the proposed coal mining and reclamation operation.

Findings:

The application meets the General Environmental Resource Information requirements as outlined in the State of Utah R645-Coal Mining Rules.

CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.18; R645-301-724.

Analysis:

The application meets the Climatological Resource Information requirements as outlined in the State of Utah R645-Coal Mining Rules.

The application provides the climatological information for the proposed permit and adjacent area beginning on page 7-74. The Permittee utilized multiple SNOTEL meteorological reporting stations (Clear Creek #1, Clear Creek #2, Scofield Dam and Price, UT) that were close to the proposed permit area. The Clear Creek stations provided the temperature, precipitation and snowfall data. The Price, UT SNOTEL station provided the wind data. Table 13 provides a summary of temperature data. Table 14 provides a summary of precipitation data collected at the Scofield Dam. Table 15 provides a summary of wind data obtained in Price, UT.

Findings:

The application meets the Climatological Resource Information requirements as outlined in the State of Utah R645-Coal Mining Rules.

ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR 785.19; 30 CFR 822; R645-302-320.

Analysis:

Alluvial Valley Floor Determination

The application meets the Alluvial Valley Floor (AVF) Determination requirements of the State of Utah R645-Coal Mining Rules.

The previous technical analysis identified a deficiency relative to the Alluvial Valley Floor Determination. The applicant was directed to demonstrate, based on available data or field studies, the presence or absence of an alluvial valley floor (AVF).

In Chapter 9 of the application, the Permittee discusses alluvial valley floors. R645-302-321.300 establishes criteria for an alluvial valley floor. Two determinations must be made before a finding can be made that an alluvial valley floor exists: 1) Unconsolidated stream laid deposits holding streams are present; and 2) There is sufficient water to support agricultural activities. A sufficient water source is evidenced by the existence of flood irrigation in the area of question or its historical use; the capability of an area to be flood irrigated and sub-irrigation of the lands in question, derived from the groundwater system of the valley floor.

Beginning on page 9-6 of the application, the Permittee discusses alluvial valley floors. Based upon the two criteria discussed above, an AVF is located within the adjacent area. In addition, the Permittee also discusses areas that exhibit the traits/characteristics of the second criteria (hydrology aspect), but not the first (geologic aspect).

These two areas are depicted on Map 32, *AVF Evaluation Map* and identified as 'AVF AREA' and 'QUASI AVF AREA'. The 'AVF AREA' depicted on Map 32 meets the two criteria. Figure 4, *Regional Surface Geology Map*, depicts alluvium material directly adjacent to Mud Creek on either side of the stream channel. Map 32, *AVF Evaluation Map*, depicts the location of this alluvial material relative to the proposed permit boundary. The area of the alluvial valley floor is relatively small and appears to be limited to within less than 500 feet of the stream channel for Mud Creek.

The 'QUASI AVF AREA' depicted on Map 32 meets the second criteria in making an AVF determination in that there is sufficient water to support agricultural activities. However; the surface geology and soils found in the 'QUASI AVF AREA' are not unconsolidated stream laid deposits holding streams.

The Permittee discusses the potential for mining related impacts to the identified AVF beginning on page 9-12. In summary, the coal seam to be mined is located well above the regional water table. As a result, the possibility that mining activity could interrupt or impact recharge to the identified AVF is minimal. In addition, the irrigation water that supplies the AVF is derived from Mud Creek at a diversion point upstream of the proposed mine site. Based

upon a Utah Department of Environmental Quality TMDL analysis of Scofield Reservoir, 87% of the inflow to the Scofield reservoir comes from Fish and Mud Creek. The proposed mining activity poses a minimal potential for interrupting or impacting these drainages due to its proximity to the drainages and the utilization of first mining practices only (i.e. no planned subsidence).

Findings:

The application meets the Alluvial Valley Floor Determination requirements of the State of Utah R645-Coal Mining Rules.

GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

Analysis:

The application meets the Geologic Resource Information requirements as outlined in the State of Utah R645-Coal Mining Rules.

Detailed geologic information is provided in Chapter 6 of the application. The geologic conditions in the permit and adjacent areas were characterized by utilizing information from studies/reports as well as from previous and ongoing baseline monitoring activities. The geologic data set includes data from 70 drill holes, with 26 of them located within the proposed permit boundary (See Figure 2, *Drill Hole Locations & X-Section Lines*).

Additionally, the application provides a discussion of the primary regional geologic formations beginning on page 6-1. The Hiawatha Coal seam of the Blackhawk formation is the only mineable coal seam within the permit boundary. The discussion lists and describes these stratigraphic units in order beginning with the lowermost stratigraphic unit and working upward. Figure 10, *Hiawatha Overburden Isopachs & Mining Blocks*, provides the overburden thickness above the Hiawatha coal seam. Figure 3, *Stratigraphic Column Kinney Area*, provides a stratigraphic cross-section of the geologic units located within and adjacent to the permit area.

The previous technical analysis had identified a deficiency relative to the nature of the north-south trending fault systems. Additional information was requested as to how the numerous faults located within the permit and adjacent area influenced the groundwater system. The Permittee was directed to address whether the faults serve as confining layers to hydrologic flow or are capable of transmitting water either vertically or laterally.

Beginning on page 6-18 of the application, the Permittee provides a characterization of the material contained within the north-south trending fault systems and the hydrologic properties. The characterization is based upon fault and structural geology in the Eastern Wasatch plateau, specifically the Bear Canyon Graben at the Plateau Mine.

At the Plateau Mine, rock tunnels penetrated and crossed both sides of the graben allowing for close inspection of the fault underground. Moisture differences were observed in the gouge zone underground with more moisture observed on one side only. The Permittee submits that the presence of the moisture was accounted for by downward percolation of terrestrial water and not lateral/horizontal ground water movement into the gouge zone.

An additional example was provided approximately one mile west of the west boundary fault of the Bear Canyon Graben where the southern extension of the Pleasant Valley Graben is exposed on the north wall of Tie Fork Canyon. At this location, the Tie Fork Spring discharges from the east side breccia zone of the Pleasant Valley Graben eastern boundary fault. The spring is perennial, but exhibits seasonal variation with high flows in the spring but reducing significantly by fall. It was determined that a large spring/seep complex from the upper Price River Formation provided the recharge to Tie Fork Spring. The water from the Price River springs/seeps migrated down dip until it encountered the Pleasant Valley Graben east boundary fault and then percolated down the fault and southward to where it discharged at Tie Fork Spring. In this instance, the gouge zone created by the fault served as a vertical conduit for overlying groundwater migration.

The Permittee provides a third example from a fault located off the Pleasant Valley Graben (approximately five miles north of Tie Fork Canyon and 12 miles south of the proposed mine site). A picture of the excavated fault zone depicts rust staining (evidence of oxidized water passing through the zone) inside the breccia/gouge zone and not adjacent to it. The lack of oxidation on either side would suggest that the breccia/gouge zone was transmitting water vertically and not laterally.

The extensive fault system located within the permit and adjacent area impact the ground water system and its characteristics. Due to relatively low permeabilities of the stratigraphy, the steep topography and relatively low amounts of precipitation, vertical ground water movement and recharge is limited. The Permittee discusses on page 7-11 that the north-south fault system is suspected of providing vertical conduits for recharge (as observed at the previously discussed examples). Faults in the Wasatch Plateau can act as aquitards that limit horizontal movement of ground through the fault. However; on page 7-15 the Permittee states, "*the faults do not extend over great distances N-S thus allowing ground water to flow around the ends of these shorter faults.*" Based upon the information presented in the application, the faults allow for the vertical migration of water through the breccia zones of the faults, yet due to relatively short lengths of the faults, water is able to flow around the fault zones where they terminate. As a result, the Permittee discusses the presence of a regional ground water table (See Discussion below). The

faults, though impeding the lateral/horizontal flow of ground water, it does not appear that they produce a complete partitioning of the ground water. The impeding characteristics of the faults to horizontal ground water flow would be expected to produce irregularities (spikes/troughs) in the regional piezometric surface of the regional ground water table, but would not compartmentalize the regional aquifer to a great extent.

Based upon conversations with Carbon Resources representative Greg Hunt, the source of information utilized in depicting the fault system in the permit and adjacent area comes from a variety of sources. Old mine work maps from the area were utilized in mapping various fault and geologic features in the area. Additionally, according to Mr. Hunt, data collected from 35 drill holes in the permit and adjacent area were also utilized in mapping the fault system.

Findings:

The application meets the Geologic Resource Information requirements as outlined in the State of Utah R645-Coal Mining Rules.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Sampling and Analysis

The application meets the Sampling and Analysis requirements as outlined in the State of Utah R645-Coal Mining Rules.

The previous technical analysis identified a deficiency relative to the collection and analysis of water monitoring data/samples. The Permittee was directed to provide a commitment to conduct all water quality analyses according to the methodology in the current edition of "Standard Methods for the Examination of Water and Wastewater" or the methodology in 40 CFR Parts 136 and 434.

On page 7-7 of the application, the Permittee states, "*All water quality samples will be analyzed according to the most current copy of the Standard Methods for the Examination of Water and Wastewater, a joint publication of the American Public Health Association, the American Water Works Association and the Water Pollution Control Federation.*"

Additionally, the Permittee was previously directed to provide a commitment to submit water quality data electronically to the Division's Utah Coal Mining Water Quality Database. On page 7-8, the Permittee indicates that quarterly lab water quality results will be submitted to the Division within 90 days of the end of the quarter and that an annual hydrologic review and summary of data will be submitted on or before June 1st.

Baseline Information

The application does not meet the baseline information requirements as required by the State of Utah R645-Coal Mining Rules.

The application presents baseline ground and surface water information in Chapter 7 of the application beginning on page 7-9. The hydrologic characterizations are based on available regional information as well as ongoing water monitoring. Exhibit 9 contains a spring and seep survey conducted in the permit and adjacent area. Exhibit 10 contains field measurements obtained from both ground and surface water resources in the permit and adjacent area. Exhibit 12 contains the analytical lab reports generated from the baseline data collection.

The previous technical analysis had directed the Permittee to provide paper copies of the analytical reports generated from all ground and surface water monitoring activities. The analytical reports generated from the baseline data collection process are provided in Exhibit 12 in Volume 3 of the application.

Groundwater

Beginning on page 7-9 of the application, the Permittee presents the baseline information utilized in characterizing the nature of the groundwater systems in the permit and adjacent area.

The baseline groundwater data indicates that there are limited groundwater resources within the permit and adjacent area. The information in the application indicates that the general lack of groundwater is due to the semi-arid conditions of the area, limited outcrop exposures for direct infiltration and steep slopes that produce accelerated runoff volumes thus limiting the amount of direct infiltration.

The Permittee provides a discussion of the regional stratigraphy of the permit and adjacent area on page 7-12 of the application. The geologic formations in the permit and adjacent area are contained within the Blackhawk Formation. Figure 3, *Stratigraphic Column Kinney Area*, provides a cross-sectional view of the local geology. The geology is an important factor in determining the characteristics of the groundwater systems in the area. The Blackhawk formation is a characterized by a sequence of alternating sandstone, mudstone and coal units. In ascending order, the major units of the Blackhawk Formation include the Panther Sandstone, Flat Canyon coal seam, Spring Canyon sandstone, Hiawatha coal seam, McKinnon coal seam and

Haley Coal Seam. The sandstones are characterized as fine to medium-grained and are typically well cemented resulting in relatively low permeabilities. Groundwater can be present in all of the major stratigraphic units in the permit and adjacent area; however, all are considered to be poor to moderate aquifers.

On page 7-13 of the application, the Permittee identifies four aquifer systems within the proposed permit and adjacent area. The four-aquifer systems that define the groundwater environment include the: alluvial/colluvial aquifer system, perched/isolated ground water systems, stored mine water system and the regional ground water system and provides a discussion of each as they relate to the proposed permit and adjacent area.

The Permittee is basing their groundwater characterization upon the completion of a seep and spring survey in June of 2006 (See Exhibit 9), exploratory well drilling and baseline data collection and field observations. Table 6, *Kinney #2 Mine Baseline Monitoring Stations*, provides a depiction of the monitoring/sampling events conducted at the groundwater monitoring sites. Table 20, *Hydrologic Monitoring Schedule*, provides a list of the water quality parameters that were analyzed during the baseline data collection period. The list of parameters meets the requirements of the State of Utah R645-Coal Mining Rules.

The seep and spring survey identified limited groundwater resources within the permit and adjacent area. Six active seeps and 27 active springs were identified within the permit and adjacent area. Map 7, *Regional Hydrology*, depicts the locations of these groundwater resources. Table 9, *Seep and Spring Flow Summary*, provides a flow summary from the June 2006 spring and seep survey. The Seep and Spring survey (the Survey) identified very few springs and seeps within the permit boundary. Eagle Springs 1, 1A, 2 and 3 as well as Aspen spring are the only springs identified within the permit boundary. However, the Survey identified many seeps and springs within Long Canyon (approximately $\frac{3}{4}$ of a mile from the eastern permit boundary), Miller Canyon and the UP Canyon moving east to west from the proposed permit area.

As part of the baseline data collection process, four springs were monitored (Angle Spring, Aspen Spring, Eagle Spring and Sulfur Spring). Figure 17 provides flow and conductivity graphs for each of the baseline springs that were monitored. The springs exhibit seasonal flow characteristics indicative of discharges from perched groundwater systems in that the maximum discharges were recorded following spring snowmelt followed by a decline in discharge. The exception to this is Sulfur Spring which flows year round. The source of recharge to Sulfur Spring is unknown at this point. One explanation is that the historic mine works that underlie the Hiawatha Seam may be flooded and supplying the recharge to Sulfur Spring. The Permittee has provided adequate baseline data for Sulfur Spring that characterizes the seasonal variation in water quantity and flow.

The previous technical analysis had identified a deficiency relative to baseline data collection for Eagle Springs 1A, 2 and 3. Specifically, the Permittee was asked to discuss why

the minimum groundwater quality samples were not obtained for the springs. The Permittee must revise the application to clearly demonstrate the frequency and dates of monitoring visits that were conducted at Eagle Springs 1, 1A, 2 and 3 and provide the data obtained. Exhibit 10, *Surface and Ground Water Field Measurements* and Figure 17, *Baseline Water Sampling* does not provide any documentation of monitoring activity for these springs. Table 9, *Seep and Spring Flow Summary* does list Eagle Seep 1, Eagle Seep 1A, Eagle Spring 2 and Eagle Seep 3, but it's not possible to determine the frequency and timing of the site visits that were utilized in characterizing the nature and seasonal fluctuation of these groundwater resources. This deficiency was identified in the previous technical analysis. The Permittee has indicated that the springs were visited and that water samples were captured when available. Documentation of the field visits to these springs and the obtained data should be provided in the application.

Similarly, Aspen Spring (also located within the permit boundary) appears to have been sampled/monitored sporadically. Exhibit 10, *Surface and Ground Water Field Measurements*, indicates that Aspen Spring was sampled five times beginning in 2008, but then not monitored again until June of 2010. The Permittee should address the baseline data collection of Aspen Spring. Based upon a review of Table 6, *Kinney #2 Mine Baseline Monitoring Stations* and Exhibit 10, *Surface and Ground Water Field Measurements*, it does not appear that enough data was collected to establish the baseline characterization of that spring. Exhibit 10 shows the spring as having been sampled five times beginning in 2008 (June, August and October), but then not sampled again until June of 2010. The gap in the data must be addressed. If additional field data is available, the Permittee should provide it in the application.

The previous technical analysis identified a deficiency relative to the spring and seep inventory and the figure that depicted the findings of the study. Due to the scale of the figure in the spring and seep survey, it was not possible to identify the springs. The Permittee has addressed the deficiency by providing the locations of the springs and seeps on Map 7, *Regional Hydrology* and Map 8, *Works-Wells-Springs-Faults*. The Permittee must place a footnote in Exhibit 9, *Seep and Spring Survey* that directs the reader to Map 7, *Regional Hydrology* where the seeps and springs identified in the survey are depicted.

WELLS

In preparing the groundwater baseline characterization of the area, the Permittee installed eleven monitoring wells at eight different locations within and adjacent to the permit area. The monitoring wells were completed above, within and below the Hiawatha coal seam:

- *Above the coal seam:* CR-06-02 ABV, CR 06-03 ABV, CR-06-09 ABV, CR 10-11 and CR 10-12
- *Within the coal seam:* CR 06-01, CR 06-02, CR 06-05A and CR 06-09
- *Below the coal seam:* R 06-01-BLW and CR 06-09 BLW

Based upon groundwater availability discussion in the application, the Permittee asserts that the Hiawatha coal seam is “*high and dry*” with measurable groundwater encountered only within monitoring wells CR 06-03 ABV, CR 06-09 ABV, CR 06-09, CR 06-09 BLW, CR 10-11 and CR 10-12. Wells CR 10-11 and CR-12 are installed within the Pleasant Valley Graben. As a result, the Hiawatha Seam is approximately 600’ below the monitoring wells due to the extensive displacement of the fault in this area. As this section of the coal seam is not slated for mining, there is no potential for groundwater interception/impacts in this location.

Monitoring wells CR 06-03 ABV, CR 06-09 ABV, CR 06-09 and CR 06-09 BLW require further consideration. Based upon Map 7A, *W-E Section A-A’*, the water levels obtained at these wells indicates that the Hiawatha Coal Seam is within the regional water table. However; based upon discussions with the Carbon Resources, LLC representative Mr. Greg Hunt, the Permittee has no plans of mining into the Eagle Canyon Graben where monitoring wells CR 06-03 ABV, CR 06-09 ABV, CR 06-09 and CR 06-09 BLW are located. Due to the vertical displacement produced by the fault at the western boundary of the Eagle Canyon Graben and the subsequent lowering of the Hiawatha Seam in this area, it’s not economical for mining activity to occur in this area. As a result, the potential for impact of the groundwater table in this location is minimal. However; if mining activity was to be conducted east of the Eagle Canyon Graben, additional monitoring well installation and baseline data collection would need to be conducted.

The previous technical analysis had identified a deficiency relative to baseline data collection from the water monitoring wells. The deficiency directed the Permittee to address why the minimum groundwater quality samples were not obtained from all monitoring wells that reported a water level (with the exception of CR 06-03ABV). The previous application had provided documentation of several field visits to these wells where water levels were obtained from below, within and above the coal seam.

It appears that with the exception of monitoring wells CR 10-11, CR 10-12 (See Discussion Above), CR 06-03 ABV, CR-06-09 ABV, CR 06-09 CR 06-09 BLW, the remaining monitoring wells did not encounter groundwater and appear to be dry.

However; upon review of Exhibit 10, *Surface and Ground Water Field Measurements* and Exhibit 11, *Monitoring Well Completion Details*, several deficiencies were identified that must be addressed.

The Permittee must address water reading discrepancies obtained from monitoring wells CR 06-01 BLW and CR 06-02. Based upon a review of the data presented in Exhibit 10, *Surface and Ground Water Field Measurements* and the figures in Exhibit 11, *Monitoring Well Completion Details*, it appears that 11 water level readings obtained from CR 06-01 BLW and 7 water level readings from CR 06-02 were obtained from within the screened interval indicated

the presence of groundwater. Based up on the discussion within the text of the application, these monitoring wells are dry. The discrepancy must be addressed.

The Permittee must revise/address the datum elevations presented in Exhibit 10, *Surface and Ground Water Field Measurements*. It appears that the datum elevations utilized to calculate the screened interval elevations and Hiawatha Seam interval elevations were obtained from the top of the PVC riser of the monitoring wells. However; according to the information presented in Exhibit 11, *Monitoring Well Completion Details*, it appears that the elevation of the ground was utilized to calculate these intervals.

The Permittee must address water level readings obtained at monitoring well CR 06-01. Based upon a review of the data presented in Exhibit 10, *Surface and Ground Water Field Measurements* and the figures in Exhibit 11, *Monitoring Well Completion Details*, it appears that 5 water level readings were obtained from below the bottom elevation of the monitoring well's blank.

The Permittee must address the 'static water levels' reported in Exhibit 10, *Surface and Ground Water Field Measurements* for monitoring wells CR 06-02, CR 06-02 ABV and CR 06-05A. Based upon a review of the data presented in Exhibit 10, *Surface and Ground Water Field Measurements* and the figures in Exhibit 11, *Monitoring Well Completion Details*, numerous water level measurements were obtained from the blank section of the monitoring well. The Permittee should not present these water levels as "Static Water Level Elevations" in Exhibit 10 as they do not represent an actual water level associated with a groundwater system. If a true groundwater level was not obtained, the Permittee should clearly indicate that in Exhibit 10. Additionally, the Permittee should provide a brief discussion as to how water accumulated in the blanks and why they were initially reported as "Static Water Level Elevations".

The Permittee must address the lack of baseline data obtained from monitoring wells CR 10-11 and CR 10-12. Based upon the data presented in the application, these monitoring wells have been sampled two times in July and August of 2010. Two sampling events do not establish seasonal variation in terms of water quality or quantity.

Table 6, *Kinney #2 Mine Baseline Monitoring Stations*, should be revised to reflect the number of sampling events at *each* of the monitoring stations based on the information contained in Exhibit 10, *Surface and Ground Water Field Measurements*. For example, Table 6 appears to depict that Eagle Spring was monitored four times. However; upon review of the field measurement information in Exhibit 10, the site was visited approximately 30 times.

The Permittee should revise discrepancies in the third paragraph on page 7-83. The Permittee states, "*Water measured on May 29th, 2007 within wells CR 06-01, CR 06-01 BLW and CR 06-02 during and after drilling has noted at a maximum water elevation of 7,898 feet msl, over 100 feet below the lowermost spring elevation.*" Based upon the discussion in Chapter 7,

monitoring wells CR 06-01, CR 06-01 BLW and CR 06-02 are characterized as being “*dry holes*”. The sentence is misleading in that it appears to convey that a maximum water level was obtained at 7,898 feet msl. Based upon Map 7A, *W-E X-Section A-A'* it appears the piezometric surface of the regional aquifer is above the coal seam in the location of CR 06-01 and CR 06-02.

Additionally, the third paragraph on page 7-83 references, “*springs located along the western facing slope...all located south of the mine permit area*”. The spring and seep survey in Exhibit 9 and Map 7 do not depict any springs south of the permit area. As such, its not possible for the reader to determine what springs are being discussed. Please address this discrepancy and provide a figure that depicts the location of the springs being discussed.

REGIONAL AQUIFER:

The previous technical analysis had identified a deficiency relative to the presentation of a regional aquifer system within the permit and adjacent area. The Permittee was directed to provide a more clear and concise presentation as to the groundwater characterization relative to the regional aquifer.

On page 7-16, the Permittee discusses the presence of a regional groundwater aquifer that displays an “*east to west movement towards Mud Creek and Scofield Reservoir*”. The Permittee utilized the perennial portions of Long and Miller Canyon as points in developing a water table surface projection for the regional aquifer. Additionally, points along Mud Creek and Scofield Reservoir were also used as additional points of contact in defining the western boundary of the regional aquifer.

Map 7A, *W-E Section A-A'*, depicts the piezometric surface of the regional groundwater aquifer. Although the piezometric surface line is depicted as a straight line, it is expected that local irregularities in the piezometric surface would occur in the areas associated with the faults.

The Permittee must provide additional information/clarification as to the regional aquifer and associated water level. Map 7A, *W-E Section A-A'*, depicts the piezometric surface of the regional aquifer. Upon comparison of Map 15, *Mine Plan Layout and Production Schedule*, with Map 7A, it's unclear as to whether the proposed mine works are above or below the regional groundwater table. The Permittee should:

- Clearly depict the western extent of the Eagle Canyon Graben on Map 7A and Map 15.
- Modify Map 7A or provide another cross-section that depicts the extent of the mine works relative to the piezometric surface.
- Discuss within the text of the application the extent of mine workings (i.e. no mining planned within the Eagle Canyon Graben).
- Adjust the piezometric surface line on Map 7A to account for the lack of encountered groundwater in Monitoring Well CR 06-05A.

The Permittee must provide further discussion as to the groundwater flow direction of the regional aquifer. On page 7-16 of the application, the Permittee discusses how the regional aquifer system flows in a “*general east to west direction toward Mud Creek and Scofield Reservoir*”. Based on the presented geological information, the dip of the regional stratigraphy is to the north, north-east. Additional information/clarification should be provided as to the processes that produce the westerly flow direction of the regional aquifer.

The previous technical analysis had identified a deficiency as to the origin of recharge to seeps and springs identified within the permit and adjacent area. On page 7-16, the application discusses the recharge to the perched groundwater systems that the seeps and springs discharge from. Recharge to these systems occurs primarily higher elevation areas where outcrops are exposed to direct precipitation and surface infiltration of snowmelt. However, due to steep slopes and relatively small outcrop areas, the recharge to these springs is limited. The flow data presented for the springs in the permit and adjacent area supports this. With the exception of Sulfur Spring, the seeps and springs exhibit their greatest flows in late spring early summer during snowmelt. By mid to late summer, the discharges from these springs has either reduced significantly or stopped completely.

The previous technical analysis identified a deficiency relative to groundwater rights within and adjacent to the permit area. The previous application did not provide a listing or map identifying groundwater rights within the permit and adjacent area. The Permittee discusses groundwater rights on page 7-30. Map 30, *Ground Water Rights* depicts the location of the groundwater rights. Table 11, *Ground Water Rights*, lists the groundwater rights depicted on Map 30.

The Permittee provides surface water right information beginning on page 7-53. Map 31, *Surface Water Rights* depicts the locations of the water rights listed in Table 12, Surface Water Rights.

Based upon a consultation with Marc Stillson of the Division of Water Rights Price Field office, there are deficiencies that must be addressed relative to the water right presentation in the application (for both ground and surface water).

The Permittee should revise the text describing groundwater rights on page 7-30 and surface water rights on page 7-53 with what’s depicted on maps 30 and 31 respectively. The text in each section indicates that a “*4 mile radius of the central mine area*” is depicted. Maps 30 and 31 do not depict a 4 mile radius from the permit boundary.

The Permittee should depict point to point diversions for surface water rights on Map 31. By depicting the extent of a point to point diversion, a more accurate assessment of potential coal mining related impacts can be assessed.

The Permittee must consult with the Price Division of Water Rights to produce a more accurate listing/depiction of the surface and ground water resources within the permit and adjacent area. Upon consultation with the Division of Water Rights, Price Field Office, ground and surface water resources within 2 miles of the permit boundary were omitted/missed from the information in the application.

The previous technical analysis had identified a deficiency relative to seeps and springs. The previous application had indicated that “*No seeps and springs were found within the permit area itself*”. However; Eagle and Aspen spring are located within the permit area. The discrepancy has been addressed. Eagle Spring and Aspen Spring are located within the permit boundary.

R645-301-724.100 establishes the minimum water quality descriptions required for baseline data. At a minimum, the water quality descriptions will include total dissolved solids or specific conductance, pH, total iron and total manganese. Table 10, *Surface and Ground Water Quality Summary*, provides a summary of the water quality data obtained during the baseline data collection operation. Analytical results for total iron and total manganese are not tabulated for Angle Spring, Aspen Spring, Eagle Spring, Sulfur Spring, Miller Outlet, Mud Creek and Res-1. However, upon review of Exhibit 12, *Surface and Ground Water Quality Data*, it appears that total iron and total manganese were analyzed for the aforementioned monitoring sites.

The Permittee should revise Table 10, *Surface and Ground Water Quality Summary* to depict the analytical results for total iron and total manganese for Angle Spring, Aspen Spring, Eagle Spring, Sulfur Spring, Miller Outlet, Mud Creek and Res-1. Upon review of Exhibit 12, *Surface and Ground Water Quality Data*, it appears that these analyses were conducted and should be included in Table 10.

Surface Water

Beginning on page 7-32, the Permittee provides the surface water information for the permit and adjacent area. Figure 7, *Regional Hydrology* depicts the surface water resources within the permit and adjacent area. Map 31, *Surface Water Rights*, depicts the locations of the surface water rights within the permit and adjacent area. Exhibit 13, *Water Rights*, provides the written documentation of the water rights as provided by the Utah Division of Water Rights. Table 10, *Surface and Ground Water Quality Summary*, provides a basic statistical summary of the water quality information obtained during the baseline data collection. The permit and adjacent areas are located within the Upper Price River basin.

Surface water in the permit and adjacent areas is limited to Scofield Reservoir, perennial flows within Mud Creek, Miller and Long Canyon and ephemeral flows from various side drainages. The permit and adjacent area fall within the Upper Price River watershed. Perennial

streams within the area adjacent to the mine site are Mud Creek and Miller Canyon. These drainages are tributary to Scofield Reservoir.

Baseline data was collected at three surface water monitoring points: Miller Outlet, Mud Creek and Res-1. Figure 7, *Regional Hydrology* depicts the location of these surface water monitoring points. Map 10, *Regional Water Quality* provides a depiction of the permit and adjacent area with corresponding water quality diagrams for the baseline water monitoring stations.

Perennial Streams

No perennial streams are located within the permit boundary. Miller Canyon and Mud Creek are the only perennial streams located in the adjacent area of the permit boundary. Significant variation in flows has been recorded within these drainages. The baseline data presented in the application for Miller Canyon has noted variability from zero flow (in winter months when the stream is frozen) to 1.21 cubic feet per second (cfs) in the spring. Similarly, Mud Creek has produced flow variability's ranging from 11.0 cfs to 131.1 cfs.

The water quality data for these two drainages is presented in Table 10, *Surface and Ground Water Quality Summary*, Exhibit 12, *Surface and Ground Water Quality Data* and Figure 17, *Field Data*.

Intermittent Streams

The Permittee should address the characterization of intermittent streams within and adjacent to the permit area. On page 7-33, the Permittee states, "several small *intermittent* and ephemeral tributaries are located within and adjacent to the permit area, including UP Canyon to the south and Eagle Canyon to the North." There is no discussion of '*intermittent streams*' on page 7-35. The State of Utah R645-Coal Mining Rules defines ephemeral, intermittent and perennial drainages. If, as the reference suggests, all three drainages are present within the permit and adjacent area, there should be a discussion/characterization for intermittent streams. This deficiency was identified in the previous technical analysis.

Ephemeral Drainages

The previous technical analysis had identified a deficiency relative to the characterization of the ephemeral drainages within and adjacent to the permit area. The previous application had discussed how when runoff occurs, it is either sheet flow or small concentrated flow within '*ephemeral channels*'. The Permittee was directed to clearly identify and characterize the drainages that intersect the surface facilities and additionally, provide additional baseline information to address all drainages within and adjacent to the permit area (i.e. ephemeral, intermittent and perennial).

On page 7-35, the Permittee discusses the ephemeral drainages within the permit and adjacent area. Seven ephemeral drainages were identified. Of the seven, four are within or cross a portion of the permit boundary (from North to South): Eagle Canyon, Kinney Draw, Columbine Draw and Jones Draw. The remaining three ephemeral drainages are located outside the permit boundary (from North to South): Monay Draw, Blue Seal Draw and UP Canyon.

On page 7-36, the Permittee state, "Baseline surface water data were NOT collected from these seven drainages simply because there was no water to collect." In Exhibit 20, the Permittee characterizes these drainages by utilizing photographs, analyses of the drainages 3D geometry, alluvial and vegetative material as well as their position relative to the water table.

The Permittee must address the first sentence of the last paragraph of page 1 of Exhibit 20, *Ephemeral Drainage Determination*. The Permittee states, "*The documented lack of running water alone, at any point in the year, disqualifies all four of these drainages from being classified as Perennial, a stream that flows year round.*" The lack of running water is not documented in the application. A tabulation of the number of times that zero flow was observed in the ephemeral drainages throughout the baseline data collection period would provide documentation to substantiate the statement.

Baseline Cumulative Impact Area Information

The application does not meet the Baseline Cumulative Impact Area Information requirements of the State of Utah R645-Coal Mining Rules. The Permittee must address the baseline data deficiencies outlined previously in order for the Division to assess the probable cumulative hydrologic impacts from the proposed operation on ground and surface water systems. The Permittee must address the baseline data deficiencies outlined previously in order for the Division to make that assessment.

Modeling

The application does not meet the Modeling requirements of the State of Utah R645-Coal Mining Rules.

The Permittee should provide further discussion/information as to the water modeling that was conducted in analyzing the regional aquifer. The application discusses how SURV CAD was utilized. Please provide a discussion as to how the model was constructed (i.e. assumptions, data points utilized, limitations etc). Additionally, provide any summary reports or outputs from the model that can be reviewed in determining how the model was applied and constructed.

In order to design the collection system ditches and culverts, the Permittee utilized Hydrologic Modeling Software (HEC-HMS) 3.1.0 developed by the Army Corps of Engineers using the Soil Conservation Service (SCS) curve number loss method and the SCS unit hydrograph transform method.

Drainage basins were delineated in AutoCAD by utilizing existing and proposed elevation contour data and the location of proposed pads and storm drainage facilities. Drainage basins were modeled in HEC-HMS using the SCS unit hydrograph transform method.

Probable Hydrologic Consequences Determination

The application does not meet the Probable Hydrologic Consequences (PHC) requirements of the State of Utah R645-Coal Mining Rules.

In order to accurately assess the PHC Determination provided in the application, the Permittee must first address the baseline data deficiencies outlined in the Baseline Information section. Per R645-301-728, "*The PHC determination will be based on baseline hydrologic, geologic and other information collected for the permit application*". Once the baseline deficiencies have been addressed, the Division will be able to accurately assess the probable hydrologic consequences associated with the proposed mining activity.

Water Monitoring Plan

The application meets the Groundwater Monitoring Plan requirements of the State of Utah R645-Coal Mining Rules.

On page 7-106 of the application, the Permittee discusses the water monitoring plan. Table 20, Hydrologic Monitoring Schedule, lists the water quality parameters that will be analyzed for the operational and post-mining phases. The table notes that lab water quality results will be submitted within 90 days following the end of the quarter. Additionally, a hydrologic review and summary of data will be submitted on or before June 1st. Table 7, *Kinney Mine Operational Monitoring Stations*, lists the sites that will be monitored during the operational phase. Map 28, *Surface & Ground Water Monitoring Sites*, depicts the locations of the proposed monitoring sites.

The previous technical analysis had identified deficiencies relative to the water monitoring plan. The Permittee was directed to provide a table that clearly identified the monitoring schedule and sample parameters for each individual water-monitoring site. Additionally, the Permittee was directed to provide a clear presentation as to what sites are to be monitored. The previous application had identified CR 06-03 ABV and Angle Spring as water monitoring sites. However; due to access issues and well sealing, these sites could not be monitored. The aforementioned tables and maps have adequately addressed the deficiencies.

The previous technical analysis had also identified a deficiency relative to monitoring well CR 06-03 ABV. The Permittee had stated, "*The first of these wells is located in Eagle Canyon and has been ordered to be abandoned by DOGM.*" The Permittee has removed this sentence as it was not the Division who ordered the abandoning of the well, but rather the landowners.

A deficiency had also been identified relative to the sampling of Eagle and UP Canyons. Based upon the Ephemeral Drainage Determination information presented in Exhibit 20, these drainages are ephemeral and flow only in response to direct precipitation and snowmelt events. As such, sampling these drainages would not provide useful data.

Findings:

The application does not meet the Hydrologic Resource Information Requirements as required by the State of Utah R645-Coal Mining Rules. The following deficiencies must be addressed prior to Division approval: (21 deficiencies)

R645-301-724.100: The Permittee must revise the application to clearly demonstrate the frequency and dates of monitoring visits that were conducted at Eagle Springs 1, 1A, 2 and 3 and provide the data obtained. Exhibit 10, *Surface and Ground Water Field Measurements* and Figure 17, *Baseline Water Sampling* does not provide any documentation of monitoring activity for these springs. Table 9, *Seep and Spring Flow Summary* does list Eagle Seep 1, Eagle Seep 1A, Eagle Spring 2 and Eagle Seep 3, but it's not possible to determine the frequency and timing of the site visits that were utilized in characterizing the nature and seasonal fluctuation of these groundwater resources. This deficiency was identified in the previous technical analysis. The Permittee has indicated that the springs were visited and that water samples were captured when available. Documentation of the field visits to these springs and the obtained data should be provided in the application.

R645-301-724.100: The Permittee should address the baseline data collection of Aspen Spring. Based upon a review of Table 6, *Kinney #2 Mine Baseline Monitoring Stations* and Exhibit 10, *Surface and Ground Water Field Measurements*, it does not appear that enough data was collected to establish the baseline characterization of that spring. Exhibit 10 shows the spring as having been sampled five times beginning in 2008 (June, August and October), but then not sampled again until June of 2010. The gap in the data must be addressed. If additional field data is available, the Permittee should provide it in the application.

R645-301-724.100: The Permittee must place a footnote in Exhibit 9, *Seep and Spring Survey* that directs the reader to Map 7, *Regional Hydrology* where the seeps and springs identified in the survey are depicted.

R645-301-724.100: The Permittee must address water reading discrepancies obtained from monitoring wells CR 06-01 BLW and CR 06-02. Based upon a review of the data presented in Exhibit 10, *Surface and Ground Water Field Measurements* and the figures in Exhibit 11, *Monitoring Well Completion Details*, it appears that 11 water level readings obtained from CR 06-01 BLW and 7 water level readings from CR 06-02 were obtained from within the screened interval indicating the presence of groundwater. Based up on the discussion within the text of the application, these monitoring wells are dry. The discrepancy must be addressed.

R645-301-724.100: The Permittee must revise/address the datum elevations presented in Exhibit 10, *Surface and Ground Water Field Measurements*. It appears that the datum elevations utilized to calculate the screened interval elevations and Hiawatha Seam interval elevations were obtained from the top of the PVC riser of the monitoring wells. However; according to the information presented in Exhibit 11, *Monitoring Well Completion Details*, it appears that the elevation of the ground was utilized to calculate these intervals.

R645-301-724.100: The Permittee must address water level readings obtained at monitoring well CR 06-01. Based upon a review of the data presented in Exhibit 10, *Surface and Ground Water Field Measurements* and the figures in Exhibit 11, *Monitoring Well Completion Details*, it appears that 5 water level readings were obtained from below the bottom elevation of the monitoring well's blank.

R645-301-724.100: The Permittee must address the 'static water levels' reported in Exhibit 10, *Surface and Ground Water Field Measurements* for monitoring wells CR 06-02, CR 06-02 ABV and CR 06-05A. Based upon a review of the data presented in Exhibit 10, *Surface and Ground Water Field Measurements* and the figures in Exhibit 11, *Monitoring Well Completion Details*, numerous water level measurements were obtained from the blank section of the monitoring well. The Permittee should not present these water levels as "Static Water Level Elevations" in Exhibit 10 as they do not represent an actual water level associated with a groundwater system. If a true groundwater level was not obtained, the Permittee should clearly indicate that in Exhibit 10. Additionally, the Permittee should provide a brief discussion as to how water accumulated in the blanks and why they were initially reported as "Static Water Level Elevations".

R645-301-724.100: The Permittee must address the lack of baseline data obtained from monitoring wells CR 10-11 and CR 10-12. Based upon the data presented in the application, these monitoring wells have been sampled two times in July and August of 2010. Two sampling events do not establish seasonal variation in terms of water quality or quantity.

R645-301-724.100: Table 6, *Kinney #2 Mine Baseline Monitoring Stations*, should be revised to reflect the number of sampling events at *each* of the monitoring stations based on the information contained in Exhibit 10, *Surface and Ground Water Field Measurements*. For example, Table 6 appears to depict that Eagle Spring was monitored four times. However; upon

review of the field measurement information in Exhibit 10, the site was visited approximately 30 times.

R645-301-724.100: The Permittee should revise discrepancies in the third paragraph on page 7-83. The Permittee states, “*Water measured on May 29th, 2007 within wells CR 06-01, CR 06-01 BLW and CR 06-02 during and after drilling has noted at a maximum water elevation of 7,898 feet msl, over 100 feet below the lowermost spring elevation.*” Based upon the discussion in Chapter 7, monitoring wells CR 06-01, CR 06-01 BLW and CR 06-02 are characterized as being “*dry holes*”. The sentence is misleading in that it appears to convey that a maximum water level was obtained at 7,898 feet msl. Based upon Map 7A, *W-E X-Section A-A’* it appears the piezometric surface of the regional aquifer is above the coal seam in the location of CR 06-01 and CR 06-02.

R645-301-724.100: The third paragraph on page 7-83 references, “*springs located along the western facing slope...all located south of the mine permit area*”. The spring and seep survey in Exhibit 9 and Map 7 do not depict any springs south of the permit area. As such, its not possible for the reader to determine what springs are being discussed. Please address this discrepancy and provide a figure that depicts the location of the springs being discussed.

R645-301-724.100: The Permittee must provide additional information/clarification as to the regional aquifer and associated water level. Map 7A, *W-E Section A-A’*, depicts the piezometric surface of the regional aquifer. Upon comparison of Map 15, *Mine Plan Layout and Production Schedule*, with Map 7A, it’s unclear as to whether the proposed mine works are above or below the regional groundwater table. The Permittee should:

- Clearly depict the western extent of the Eagle Canyon Graben on Map 7A and Map 15.
- Modify Map 7A or provide another cross-section that depicts the extent of the mine works relative to the piezometric surface.
- Discuss within the text of the application the extent of mine workings (i.e. no mining planned within the Eagle Canyon Graben).
- Adjust the piezometric surface line on Map 7A to account for the lack of encountered groundwater in Monitoring Well CR 06-05A.

R645-301-724.100: The Permittee must provide further discussion as to the groundwater flow direction of the regional aquifer. On page 7-16 of the application, the Permittee discusses how the regional aquifer system flows in a “*general east to west direction toward Mud Creek and Scofield Reservoir*”. Based on the presented geological information, the dip of the regional stratigraphy is to the north, north-east. Additional information/clarification should be provided as to the processes that produce the westerly flow direction of the regional aquifer.

R645-301-724.100: The Permittee should revise the text describing groundwater rights on page 7-30 and surface water rights on page 7-53 with what’s depicted on maps 30 and 31

respectively. The text in each section indicates that a “4 mile radius of the central mine area” is depicted. Maps 30 and 31 do not depict a 4 mile radius in any direction from the permit boundary.

R645-301-724.200: The Permittee should depict point to point diversions for surface water rights on Map 31. By depicting the extent of a point to point diversion, a more accurate assessment of potential coal mining related impacts can be assessed.

R645-301-724.100 and -724.200: The Permittee must consult with the Price Division of Water Rights to produce a more accurate listing/depiction of the surface and ground water resources within the permit and adjacent area. Upon consultation with the Division of Water Rights, Price Field Office, ground and surface water resources within 2 miles of the permit boundary were omitted/missed from the information in the application.

R645-301-724.100 and -724.200: The Permittee should revise Table 10, *Surface and Ground Water Quality Summary* to depict the analytical results for total iron and total manganese for Angle Spring, Aspen Spring, Eagle Spring, Sulfur Spring, Miller Outlet, Mud Creek and Res-1. Upon review of Exhibit 12, *Surface and Ground Water Quality Data*, it appears that these analyses were conducted and should be included in Table 10.

R645-301-724.200: The Permittee should address the characterization of intermittent streams within and adjacent to the permit area. On page 7-33, the Permittee states, “several small *intermittent* and ephemeral tributaries are located within and adjacent to the permit area, including UP Canyon to the south and Eagle Canyon to the North.” There is no discussion of ‘*intermittent streams*’ on page 7-35. The State of Utah R645-Coal Mining Rules defines ephemeral, intermittent and perennial drainages. If, as the reference suggests, all three drainages are present within the permit and adjacent area, there should be a discussion/characterization for intermittent streams. This deficiency was identified in the previous technical analysis.

R645-301-724.200: The Permittee must address the first sentence of the last paragraph of page 1 of Exhibit 20, *Ephemeral Drainage Determination*. The Permittee states, “*The documented lack of running water alone, at any point in the year, disqualifies all four of these drainages from being classified as Perennial, a stream that flows year round.*” The lack of running water is not documented in the application. A tabulation of the number of times that zero flow was observed in the ephemeral drainages throughout the baseline data collection period would provide documentation to substantiate the statement.

R645-301-725: The Permittee must address the baseline data deficiencies outlined previously in order for the Division to assess the probable cumulative hydrologic impacts from the proposed operation on ground and surface water systems. The Permittee must address the baseline data deficiencies outlined previously in order for the Division to make that assessment.

R645-301-726: The Permittee should provide further discussion/information as to the water modeling that was conducted in analyzing the regional aquifer. The application discusses how SURV CAD was utilized. Please provide a discussion as to how the model was constructed (i.e. assumptions, data points utilized, limitations etc). Additionally, provide any summary reports or outputs from the model that can be reviewed in determining how the model was applied and constructed.

R645-301-728: In order to accurately assess the PHC Determination provided in the application, the Permittee must first address the baseline data deficiencies outlined in the Baseline Information section. Per R645-301-728, "*The PHC determination will be based on baseline hydrologic, geologic and other information collected for the permit application*". Once the baseline deficiencies have been addressed, the Division will be able to accurately assess the probable hydrologic consequences associated with the proposed mining activity.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Monitoring and Sampling Location Maps

The application meets the Monitoring and Sampling Location Maps requirements of the State of Utah R645-Coal Mining Rules. Map 7, *Regional Hydrology*, depicts the ground and surface water monitoring locations that were utilized obtaining baseline ground and surface water data.

Subsurface Water Resource Maps

The application meets the Subsurface Water Resource map requirements of the State of Utah R645-Coal Mining Rules.

The previous technical analysis identified a deficiency with the Spring and Seep Survey map. Due to the scale of the map, it was not possible to identify the seeps and springs identified in the survey. The Permittee has placed the seeps and springs identified in the survey (See Exhibit 9) on Map 7, *Regional Hydrology*.

The previous technical analysis identified a deficiency relative to groundwater rights located within the permit and adjacent area. A map depicting the location of the groundwater rights had not been included with the previous application. The Permittee provides the requested information in Map 30, *Ground Water Rights Locations*.

The previous technical analysis had also identified a deficiency relative to a cross-sectional map that depicted the relationship between the coal seam to be mined and the groundwater levels encountered during the baseline data collection period. The Permittee has provided the information on Map 7A, *W-E Section A-A*.

Surface Water Resource Maps

The application meets the Surface Water Resource maps requirements of the State of Utah R645-Coal Mining Rules.

Map 7, *Regional Hydrology*, depicts the surface water resources within the permit and adjacent area. In addition, Map 31, *Surface Water Right Locations*, depicts the surface water rights located within the permit and adjacent area.

The previous technical analysis identified a deficiency relative to the depiction of the ephemeral and perennial streams on Map 7, *Regional Hydrology*. The Permittee was directed to depict the ephemeral drainages within the permit and adjacent area (specifically the UP and Eagle Canyon drainages). Additionally, it was requested that the perennial drainages be depicted as such with a continuous blue line.

The Permittee has revised Map 7, *Regional Hydrology* to depict both the ephemeral and intermittent drainages.

Well Maps

The application meets the Well Maps requirements of the State of Utah R645-Coal Mining Rules.

The previous technical analysis identified a deficiency relative to the depiction of water wells within the permit and adjacent area. Map 30, *Ground Water Rights Locations* depicts the locations of the wells with associated water rights within the permit and adjacent area. Based upon a review of the water right information by the Division of Water Rights, there are wells that were missed/omitted from the application. A deficiency has been identified directing the Permittee to revise the ground water right information. As a result of that deficiency, Map 30, *Ground Water Rights* will be revised.

Exhibit 13, *Water Rights*, provides the information associated with the identified ground and surface water rights located within the permit and adjacent area. The water right information contains the locations and depths of the water wells in the area.

Findings:

The application meets the Maps, Plans and Cross Sections of Resource Information requirements of the State of Utah R645-Coal Mining Rules.

OPERATION PLAN

SUBSIDENCE CONTROL PLAN

Regulatory Reference: 30 CFR 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

Analysis:

Renewable Resources Survey

The application meets the Renewable Resources Survey requirements of the State of Utah R645-Coal Mining Rules.

No secondary mining, or pillar extraction, or longwall mining that would result in subsidence is planned for the Kinney No. 2 Mine. With the absence of such methods, no subsidence is anticipated. As a result, a renewable resources survey is not required at this time.

If at some point in the future, the Permittee proposes to implement any form of secondary mining/pillar extraction, a renewable resources survey will be required at that time.

The application provides ground and surface water right information in Exhibit 13, *Water Rights*. In addition, the application provides maps that depict the ground and surface water rights in the permit and adjacent area on Maps 30 and 31 respectively.

Subsidence Control Plan

The application meets the Subsidence Control Plan requirements of the State of Utah R645-Coal Mining Rules.

In chapter 5 of the application, the Permittee discusses the mining techniques to be utilized. No secondary mining, or pillar extraction, or longwall mining that would result in subsidence is planned for the Kinney No. 2 Mine. With the absence of such methods, no subsidence is anticipated.

The mine plan is based on the retention of barrier pillars and first mining only, with no pillar extraction. This design, combined with the mining depth, should minimize fracture

propagation at or near the ground surface in areas overlying the underground workings. As a result, the potential for drainage of overlying perched aquifer systems and alteration of surface infiltration characteristics is minimal.

Findings:

The application meets the Subsidence Control Plan requirements of the State of Utah R645-Coal Mining Rules.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 784.24, 817.150, 817.151; R645-301-521, -301-527, -301-534, -301-732.

Analysis:

Plans and Drawings

The application meets the Plans and Drawings requirements of the State of Utah R645-Coal Mining Rules for Road Systems and Other Transportation Facilities.

The application discusses the roads to be constructed on page 7-122 of the hydrology chapter. Details of the road ditch designs are provided in section R645-301-731.110-112. Maps 20, 21 and 22 provide the profile views for the proposed roads to be utilized during the operational phase of mining.

Figure 25, *Typical Primary Road Configuration*, provides cross-sectional views of the primary road design to be implemented at the site. Map 13, *Surface Facilities*, depicts the locations of all 7 roads to be utilized. The locations for all associated drainage ditches are provided on Map 24, *Drainage and Sediment Control Plan Disturbed Drainage Areas*. Map 27, *Runoff Control Details* provides detailed design and installation information for the components of the road drainage system. Table 18, *Ditch Design Details*, provides a table of the dimensions and design criteria for all diversion ditches. Table 19, *Culvert Design Details* provides the design information/criteria for all disturbed and undisturbed drainage culverts to be constructed on the site. Exhibit 16, *Runoff Control Design Details*, provides the hydrologic and hydraulic calculations that were utilized in designing and sizing the surface runoff control plan and associated components.

The application provides detailed road construction and design on page 5-78 of the application. The application proposes the utilization of 7 primary roads.

Utah Highway SR 96 will require modifications prior to coal mining activity. The Utah Department of Transportation (UDOT) requires a standard intersection design that provides turn lanes into the mine site from both directions as well as through lanes and acceleration and deceleration lanes. The Permittee has committed (See page. 5-37) to present the Division with UDOT approval prior to the commencement of any highway work.

Performance Standards

The application meets the Performance Standards for Road Systems as required by the State of Utah R645-Coal Mining Rules.

As required by R645-301-742.423.1, the primary roads have been designed to safely pass the 10-year, 6-hour storm event. Exhibit 16, *Runoff Control Design Details*, provides the hydrologic and hydraulic calculations that were utilized in designing and sizing the surface runoff control plan and associated components.

In order to the design the collection system ditches and culverts, the Permittee utilized Hydrologic Modeling Software (HEC-HMS) 3.1.0 developed by the Army Corps of Engineers using the Soil Conservation Service (SCS) curve number loss method and the SCS unit hydrograph transform method. Drainage basins were delineated in AutoCAD by utilizing existing and proposed elevation contour data and the location of proposed pads and storm drainage facilities. Drainage basins were modeled in HEC-HMS using the SCS unit hydrograph transform method. The sub-basins peak flows were then calculated in order to properly size the culverts and diversion ditches.

Findings:

The application meets the Road Systems and Other Transportation Facilities requirements of the State of Utah R645-Coal Mining Rules.

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Disposal of Noncoal Mine Wastes

The application meets the Disposal of Noncoal Mine Wastes as required by the State of Utah R645-Coal Mining Rules.

On page 5-67 and 7-117, the Permittee discusses the generation and disposal of noncoal waste. The application discusses that used oil and lubricants, garbage, paper waste, machinery parts, tires, cable, wood waste and other miscellaneous debris will be generated by the proposed mining activity. Smaller sized noncoal solid wastes will be stored in dumpsters. Larger solid waste materials (i.e. used equipment, machinery parts, tires etc.) will be temporarily stored in designated storage yards as located on Map 13, *Surface Facilities*.

A contract disposal service will regularly collect and haul the smaller noncoal solid wastes from the dumpsters to the permitted Carbon County municipal landfill, or to the East Carbon Development Corporation facility.

Depending on market conditions for used machinery, scarp, metal etc., the larger noncoal solid waste will be collected periodically either by a salvage contractor or by a contract disposal firm which will haul these materials off-site to a permitted disposal site.

Any waste other than used oil/lubricants that don't meet applicable EPA requirements will be collected and stored in either closed drums or in the waste oil storage tank located in the maintenance shop building. The temporary storage areas for this waste will provide for full containment in order to prevent an accidental release of petroleum products to flow into the sites surface drainage system.

Coal Mine Waste, Refuse Piles, Return of Coal Processing Waste to Abandoned Underground Workings

The application does not meet the Coal Mine Waste requirements of the State of Utah R645-Coal Mining Rules.

The previous technical analysis identified a deficiency relative to the potential coal mine waste. Surface facility item number 9 on Map 13, *Surface Facilities*, is listed as a screening and crushing building. If screening is to occur at the mine site, it's assumed that some form of residual material (i.e. coal mine waste) will be produced as a result of that process.

On page 5-68 and 7-116, the Permittee discusses 'mine development rock' which is not a defined term per the State of Utah R645-Coal Mining Rules. The Permittee discusses how during mine development, mining operations and ancillary operations, 'mine development rock' will be produced. The application discusses how, when feasible, the material will be separated and handled separately from the coal.

The Permittee should provide a clear and concise discussion as to how generated coal mine waste will be handled. The application discusses the handling of '*mine development rock*', which is not defined by the State of Utah R645-Coal Mining Rules. Depending on the nature of the material, specific hydrologic design criteria must be addressed.

Impounding Structures

The application meets the Impounding Structures requirements of the State of Utah R645-Coal Mining Rules. The application does not propose constructing an impound structure out of coalmine waste.

Excess Spoil:

The application meets the Excess Spoil requirements of the State of Utah R645-Coal Mining Rules.

The State of Utah R645-Coal Mining Rules define 'spoil' as overburden that has been removed during coal mining and reclamation operations. This material is generally associated with surface mining operations. As the proposed Kinney No. 2 mine site is an underground operation, the excess spoil regulations don't apply.

Acid and Toxic Forming Materials:

The application does not meet the Acid and Toxic forming materials regulations of the State of Utah R645-Coal Mining Rules.

Provide a sampling plan to identify acid/toxic characteristics of waste stored on the surface. At a minimum, the plan should include a commitment to sample the temporary waste pile during periods of temporary cessation.

Findings:

The application does not meet the Spoil and Waste Materials and Acid and Toxic Forming Materials requirements of the State of Utah R645-Coal Mining Rules. The following deficiencies must be addressed prior to Division approval:

R645-301-746: The Permittee should provide a clear and concise discussion as to how generated coal mine waste will be handled. The application discusses the handling of '*mine development rock*', which is not defined by the State of Utah R645-Coal Mining Rules. Depending on the nature of the material, specific hydrologic design criteria must be addressed.

R645-301-731.300 and R645-301-536.320: Provide a sampling plan to identify acid/toxic characteristics of waste stored on the surface. At a minimum, the plan should include a commitment to sample the temporary waste pile during periods of temporary cessation. (PWB)

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:

General

The application meets the General Hydrologic Information requirements of the State of Utah R645-Coal Mining Rules. Chapter 7 of the application provides an extensive discussion and presentation of general ground and surface water resources within the permit and adjacent area.

Groundwater Monitoring

The application does not meet the Groundwater Monitoring requirements of the State of Utah R645-Coal Mining Rules.

The Permittee first address the deficiencies relative to groundwater baseline data, geologic baseline data and the PHC before the Division can make a finding that the proposed operational phase groundwater monitoring plan meets the requirements of the State of Utah R645-Coal Mining Rules. Per R645-301-731.211, the groundwater-monitoring plan must be based upon the PHC determination as well as all baseline hydrologic and geologic information.

Surface Water Monitoring

The application does not meet the Surface Water Monitoring requirements of the State of Utah R645-Coal Mining Rules.

The Permittee must address the deficiencies relative to surface water baseline data, geologic baseline data and the PHC before the Division can make a finding that the proposed operational phase groundwater monitoring plan meets the requirements of the State of Utah R645-Coal Mining Rules. Per R645-301-731.220, the surface water-monitoring plan must be based upon the PHC determination as well as all baseline hydrologic and geologic information.

Transfer of Wells

The application meets the Transfer of Wells requirements of the State of Utah R645-Coal Mining Rules.

Beginning on page 7-124 of the application, the casing and sealing of wells is discussed. The Permittee commits to plugging and sealing all exploration boreholes and any boreholes which have been converted to monitoring wells during mining reclamation.

On page 6-27, the Permittee outlines the methods to be utilized in plugging any water monitoring wells/boreholes. The boreholes or casing will be sealed with cement to form a plug from the bottom of the hole to at least 20 feet above any zone of completion or water bearing rock strata. The remainder of the hole will be filled with concrete to within 20 feet of the ground surface and then filling the remainder of the hole to the ground surface with cement to form a surface plug. In addition, the Permittee commits to placing a steel fence post in the center of the surface plug before the cement sets up in order to provide a permanent marker of the hole location.

Discharges Into an Underground Mine

The application meets the Discharges Into an Underground Mine requirements of the State of Utah R645-Coal Mining Rules.

The previous technical analysis identified a deficiency regarding the potential for discharges into the underground mine Per R645-301-731.510. On page 5-93, the application discusses the mine portal area where surface water could potentially enter into the mine. Map 17, *Mine Surface Facilities Area Pre-Mining, Mining & Post Mining Cross Sections*, shows a typical cross section of the portals. The portal pad will be graded to prevent surface runoff water from entering the mine.

Gravity Discharges from Underground Mines

The application does not meet the Gravity Discharges From Underground Mines requirements of the State of Utah R645-Coal Mining Rules.

On page 5-37 of the application, the Permittee states, "potential mine inflows are expected to be minimal and there will be sufficient storage capacity in both the existing abandoned underground mine workings and in inactive working areas".

The Permittee must provide a commitment that if significant amounts of groundwater are encountered underground; a water right will be obtained or an existing water right altered by the Utah Division of Water Rights prior to utilizing in-mine ground water encountered during active

coal operations. On page 7-102, the potential for discharge of mine water to surface drainages is further discussed. The Permittee states, "*If sufficient quantities of mine drainage are available, stored mine drainage will be utilized to supplement the operational mine water supply.*"

The Permittee must reinstate language from the previous application regarding the potential for discharge of mine water. The previous application had discussed proposed methods for the disposal/handling of any in-mine water that's encountered including: 1) discharging the water into remote or abandoned mine workings, 2) request a new NPDES discharge permit for surface drainage, 3) construct shallow or deep injection wells, 4) treat and discharge the water into Mud Creek or 5) evaporate the discharge with new settling ponds. It appears that the new application has omitted options 2, 3, 4 and 5.

Upon completion of mining activity, the Permittee commits to sealing and backfilling all mine openings to prevent any potential for ground water discharge or surface water inflows in mine portal areas or boreholes.

Water-Quality Standards and Effluent Limitations

The application meets the Water-Quality Standards and Effluent Limitations requirements of the State of Utah R645-Coal Mining Rules.

The Permittee has obtained a Utah Pollutant Discharge Elimination System (UPDES) permit. The Utah Division of Water Quality issued the Permittee a UPDES permit on June 15th, 2010. Exhibit 4 contains the UPDES permit.

The UPDES permit authorizes the Permittee to discharge from Outfall 001 (lone sedimentation pond) to Mud Creek and Scofield Reservoir. The permit expires on April 30th, 2013. The Permittee will be required to sample for flow, oil and grease, total iron, total suspended solids and pH every month.

Diversions: General

The application does not meet the Diversions: General requirements of the State of Utah R645-Coal Mining Rules.

The Permittee discusses the diversions to be utilized at the site on page 7-121. Map 23, *Drainage and Sediment Control Plan* depicts the undisturbed drainage areas. Map 24, *Drainage and Sediment Control Plan* depicts the disturbed drainage areas and all temporary diversions. Map 25, *Sedimentation Pond 1 Sections and Details*, depicts the diversions from the primary detention pond. Map 26, *Drainage and Sediment control Plan Disturbed Drainage Sub-Basins* depicts the sub-watersheds utilized to calculate the peak storm flow and sizing of the disturbed area diversions. Map 29, *Mine Surface Facilities Area Post Mining Topography and Interim Drainage Control* depicts the diversions to be utilized following reclamation. Design

calculations for temporary and permanent diversions are provided in Exhibit 16, *Runoff Control Design Details*. The surface facilities will be constructed to intercept and divert surface runoff flows from undisturbed up gradient areas around the mine surface facilities areas.

The Permittee must clarify the diversion language in Section R645-301-742.300. In the third paragraph of the section, the application states, "*As can be seen on Map 29, Mine Surface Facilities Area-Post Mining Topography, the reclaimed channel is in reality short, and thus has little potential for significant alignment variation.*" Upon review of Map 23 and Map 29, there is an irrigation ditch in the area of where undisturbed culvert UDC-1 is located. It's unclear if the text is referring to the irrigation ditch or the ephemeral channel that is being diverted with culvert UDC-1. The paragraph also refers to "*culverted channel USC-1*". It appears that this is a typo that should be revised as it appears there is no drainage feature labeled "USC-1".

The Permittee should revise Map 29, *Mine Surface Facilities Area-Post Mining Topography*. The third paragraph of page 7-122 states, "*Ditches UDD-1 and UDD-2 remain as permanent structures.*" However; upon review of Map 29, these diversions are not depicted. Based on this statement, these features should also be depicted on the interim drainage map as well.

The Permittee should revise chapter 5 and 7 to provide a clearer discussion of the temporary and permanent diversion/drainage controls. In the third paragraph on page 7-131, the application states, "*When no longer required for sediment control, all temporary diversions and associated structures will be removed and the affected lands reclaimed, with the exception of permanent diversion ditches UDC-2 and culvert CP-2*". There is no mention of ditches UDD-1 and UDD-2 in this section. In the last paragraph on page 5-39, the application indicates that UDD-1 and UDD-2 are "*permanent collection ditches*". Additionally, the final reclamation information on page 5-84 indicates that UDD-1 and UDD-2 remain as part of final reclamation. Please address this discrepancy.

Diversions: Perennial, Intermittent Streams and Miscellaneous Flows

The application meets the Diversions: Perennial and Intermittent Streams requirements of the State of Utah R645-Coal Mining Rules.

The previous technical analysis identified a deficiency relative to the diversions proposed at the site. The Permittee was directed to provide more information to characterize the drainages that intersect the site. The Permittee has indicated that several small ephemeral drainages intersect the permit area. The drainages are characterized and discussed in Exhibit 20. Map 24, *Drainage and Sediment Control Plan Disturbed Drainage* areas depicts the drainage control plan for the surface facility. Undisturbed drainage will be routed around the site with culvers (UDC-1

and UDC-2 respectively). The drainages reporting to these culverts have been characterized as ephemeral.

No perennial or intermittent streams are located within the area of the proposed surface facility.

Stream Buffer Zones

The application meets the Stream Buffer Zone requirements of the State of Utah R645-Coal Mining Rules.

A stream buffer zone will not be required with the proposed mining operation. No intermittent or perennial streams are located within the proposed disturbed area.

Sediment Control Measures

The application meets the Sediment Control Measure requirements of the State of Utah R645-Coal Mining Rules.

Erosion and sediment control measures are discussed on page 7-118. Runoff generated on the site during mining operations will be contained and controlled by utilizing a network of ditches, culverts, a sedimentation pond and alternate sediment control methods. The network will be comprised of diversion ditches which route undisturbed runoff around or through the disturbed area, collection ditches which intercept disturbed area runoff and route it to the sedimentation pond and the sediment pond.

The Permittee commits to utilizing various drainage control measures to prevent or mitigate excessive erosion and sediment transport. These measures include: the placement of straw bales, sediment fence, erosion netting, mulch berms, stilling basins, sumps and other small structures to control and surface runoff and limit erosion.

Map 27, *Runoff Control Details*, provides the design drawings for various components of the sediment control measures to be implemented at the site. The drawings include typical silt fence and straw bale installations, headwall protection measures, channel designs and drainage berm details.

Siltation Structures: Sedimentation Ponds

The application does not meet the Siltation Structures: Sedimentation Ponds requirements of the State of Utah R645-Coal Mining Rules.

The primary sediment control measure to be implemented at the mine site is a sole sediment pond. Map 25, *Sedimentation Pond 1 Section & Details*, provides the design drawings for Sediment Pond 1. Map 24, *Drainage And Sediment Control Plan Disturbed Drainage Areas* depicts the location of the sediment pond relative to the undisturbed drainage areas east of the mine site.

Exhibit 16, *Runoff Control Design Details*, provide the design calculations and methodology utilized in designing the sediment pond. As required by R645-301-742.221.33, the sediment pond has been designed to retain the surface runoff volume produced a 10-year, 24-hour storm event. The runoff generated from the adjacent undisturbed areas are to be diverted around the mine site and as such, were not considered in the sediment pond design.

The Permittee must provide a discussion as to how it will be determined when clean-out of the sediment pond is required. On page 5-42, the Permittee states, "*Before sediment accumulations reach the point where they would encroach on stormwater storage capacity, CR will schedule and implement measures to remove the accumulated sediments*". Address how it will be determined when the sediment pond no longer has the capacity to adequately treat/retain the design storm. Typically this is done by establishing an elevation marker within the pond that denotes the sediment clean-out level.

On page 5-42, the application discusses the sediment pond maintenance procedures. The sediment pond maintenance procedures include: ongoing sampling and discharge monitoring under applicable provisions of the UPDES permit, quarterly inspections of pond embankments, impoundment areas, discharge structures and inlet/outlet structures as well as reporting any hazardous conditions, maintenance and repair of any problems noted during the inspections as well as the periodic removal of accumulated sediment. Control of potential water quality impacts from pond discharge will be monitored through the compliance with the UPDES permit. During the quarterly inspections, the depth and elevation of any impounded water will be measured and based on those measurements, the storage capacity will be estimated as well. If the inspections identify any potential public hazard, the Permittee will promptly notify the Division.

On page 5-39, the application discusses the sediment pond design. The application states, "Sedimentation Pond 1 has been designed to contain or treat the runoff from the 10-year, 24-hour storm event and total design capacity includes storage for at least five years accumulation of sediment. The pond spillway structures have been designed to safely pass the runoff from the 100-year, 6-hour storm event.

Discharge Structures

The application meets the Discharge Structure requirements of the State of Utah R645-Coal Mining Rules.

On page 5-43, the application discusses the discharge structures for the primary sediment pond. The pond has been designed with vertical risers for both the primary and emergency spillways. The primary spillway is set at an elevation of 7,683.80 feet. The primary spillway will be used to dewater the pond and discharge stormwater inflows. The invert of the emergency spillway will be set at an elevation of 7,686.9 feet. The spillways have been over-designed to safely pass the 100-year, 6-hour event (as opposed to the 25-year, 6-hour event as required by rule). The principal and emergency spillways were over designed to provide additional safety due to the proximity of the sediment pond to SR 96.

Findings:

The application does not meet the Hydrologic Information requirements of the State of Utah R645-Coal Mining Rules. The following deficiencies must be addressed prior to Division approval:

R645-301-731.210: The Permittee first address the deficiencies relative to groundwater baseline data, geologic baseline data and the PHC before the Division can make a finding that the proposed operational phase groundwater monitoring plan meets the requirements of the State of Utah R645-Coal Mining Rules. Per R645-301-731.211, the groundwater-monitoring plan must be based upon the PHC determination as well as all baseline hydrologic and geologic information.

R645-301-731.220: The Permittee must address the deficiencies relative to surface water baseline data, geologic baseline data and the PHC before the Division can make a finding that the proposed operational phase groundwater monitoring plan meets the requirements of the State of Utah R645-Coal Mining Rules. Per R645-301-731.220, the surface water-monitoring plan must be based upon the PHC determination as well as all baseline hydrologic and geologic information.

R645-301-731.800: The Permittee must provide a commitment that if significant amounts of groundwater are encountered underground; a water right will be obtained or an existing water right altered by the Utah Division of Water Rights prior to utilizing in-mine ground water encountered during active coal operations. On page 7-102, the potential for discharge of mine water to surface drainages is further discussed. The Permittee states, "*If sufficient quantities of mine drainage are available, stored mine drainage will be utilized to supplement the operational mine water supply.*"

R645-301-731.520: The Permittee must reinstate language from the previous application regarding the potential for discharge of mine water. The previous application had

discussed proposed methods for the disposal/handling of any in-mine water that's encountered including: 1) discharging the water into remote or abandoned mine workings, 2) request a new NPDES discharge permit for surface drainage, 3) construct shallow or deep injection wells, 4) treat and discharge the water into Mud Creek or 5) evaporate the discharge with new settling ponds. It appears that the new application has omitted options 2, 3, 4 and 5.

R645-301- 531, -742.300, -760: The Permittee must clarify the diversion language in Section R645-301-742.300. In the third paragraph of the section, the application states, "*As can be seen on Map 29, Mine Surface Facilities Area-Post Mining Topography, the reclaimed channel is in reality short, and thus has little potential for significant alignment variation.*" Upon review of Map 23 and Map 29, there is an irrigation ditch in the area of where undisturbed culvert UDC-1 is located. It's unclear if the text is referring to the irrigation ditch or the ephemeral channel that is being diverted with culvert UDC-1. The paragraph also refers to "*culverted channel USC-1*". It appears that this is a typo that should be revised as it appears there is no drainage feature labeled "USC-1".

R645-301- 531, -742.300, -760: The Permittee should revise Map 29, *Mine Surface Facilities Area-Post Mining Topography*. The third paragraph of page 7-122 states, "*Ditches UDD-1 and UDD-2 remain as permanent structures.*" However; upon review of Map 29, these diversions are not depicted. Based on this statement, these features should also be depicted on the interim drainage map as well.

R645-301- 531, -742.300, -760 : The Permittee should revise chapter 5 and 7 to provide a clearer discussion of the temporary and permanent diversion/drainage controls. In the third paragraph on page 7-131, the application states, "*When no longer required for sediment control, all temporary diversions and associated structures will be removed and the affected lands reclaimed, with the exception of permanent diversion ditches UDC-2 and culvert CP-2*". There is no mention of ditches UDD-1 and UDD-2 in this section. In the last paragraph on page 5-39, the application indicates that UDD-1 and UDD-2 are "*permanent collection ditches*". Additionally, the final reclamation information on page 5-84 indicates that UDD-1 and UDD-2 remain as part of final reclamation. Please address this discrepancy.

R645-301- 743: The Permittee must provide a discussion as to how it will be determined when clean-out of the sediment pond is required. On page 5-42, the Permittee states, "*Before sediment accumulations reach the point where they would encroach on stormwater storage capacity, CR will schedule and implement measures to remove the accumulated sediments*". Address how it will be determined when the sediment pond no longer has the capacity to adequately treat/retain the design storm. Typically this is done by establishing an elevation marker within the pond that denotes the sediment clean-out level.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Monitoring and Sampling Location Maps

The application meets the Monitoring and Sampling Location Maps requirements of the State of Utah R645-Coal Mining Rules.

Map 28, Surface & Ground Water Monitoring Sites, depicts the locations of the ground and surface water monitoring sites.

Findings:

The application meets the Monitoring and Sampling Location Maps requirements of the State of Utah R645-Coal Mining Rules.

RECLAMATION PLAN

MINE OPENINGS

Regulatory Reference: 30 CFR Sec. 817.13, 817.14, 817.15; R645-301-513, -301-529, -301-551, -301-631, -301-748, -301-765, -301-748.

Analysis:

The application meets the Mine Opening requirements of the State of Utah R645-Coal Mining Rules.

On page 5-92 of the application, the Permittee discusses the sealing all mine openings. On completion of mining and related activities, all mine openings including portals, shafts, raises, boreholes and wells will be stabilized and sealed unless they are utilized for ongoing monitoring. The portals will be sealed by constructing a concrete block wall a minimum of 25' in-by the portal openings (See Figure 37).

On page 7-132, the Permittee discusses the casing and sealing of wells. The Permittee commits to sealing and backfilling the monitoring wells once the Division has made a finding that they are no longer needed for monitoring. The application discusses how the monitoring wells will be sealed. The boreholes or well casings will be sealed by filling them with cement to form a plug from the bottom of the hole to at least 20 feet above any zone of completion or

water-bearing zone. The remainder of the hole will be filled with cement to within 20 feet of the ground surface and then the remainder of the hole will be filled with cement to the ground surface to form a surface plug. A steel fence post will be placed in the center of the surface plug in order to provide a permanent marker of the hole location.

Findings:

The application meets the Mine Opening requirements of the State of Utah R645-Coal Mining Rules.

ROAD SYSTEMS AND OTHER TRANSPORTATION FACILITIES

Regulatory Reference: 30 CFR Sec. 701.5, 784.24, 817.150, 817.151; R645-100-200, -301-513, -301-521, -301-527, -301-534, -301-537, -301-732.

Analysis:

Reclamation

The application meets the Roads Systems and Other Transportation Facilities requirements of the State of Utah R645-Coal Mining Rules.

On page 7-131 of the application, the Permittee states, "*Roads that will not be retained for use under an approved postmining land use will be reclaimed immediately after they are no longer needed for coal mining and reclamation activities*". The reclamation of the roads will be accomplished by reshaping all cut and fill slopes to be compatible with the post-mining land use and to compliment the drainage pattern of the surrounding topography.

Map 29, *Mine Surface Facilities Area Post Mining topography & Interim Drainage Control*, depicts the mine site post-mining and reclamation. As depicted on Map 29 sections of road will remain on the site permanently after reclamation efforts. The roads provide access to private property in the mining area and the area east of the mining area as well as to private property north of the mine area.

Findings:

The application meets the Road Reclamation requirements of the State of Utah R645-Coal Mining Rules.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Hydrologic Reclamation Plan

The application does not meet the General Reclamation Plan requirements of the State of Utah R645-Coal Mining Rules.

The Permittee must clarify the diversion language in Section R645-301-742.300. In the third paragraph of the section, the application states, "*As can be seen on Map 29, Mine Surface Facilities Area-Post Mining Topography, the reclaimed channel is in reality short, and thus has little potential for significant alignment variation.*" Upon review of Map 23 and Map 29, there is an irrigation ditch in the area of where undisturbed culvert UDC-1 is located. It's unclear if the text is referring to the irrigation ditch or the ephemeral channel that is being diverted with culvert UDC-1. The paragraph also refers to "*culverted channel USC-1*". It appears that this is a typo that should be revised as it appears there is no drainage feature labeled "USC-1".

The Permittee should revise chapter 5 and 7 to provide a clearer discussion of the temporary and permanent diversion/drainage controls. In the third paragraph on page 7-131, the application states, "*When no longer required for sediment control, all temporary diversions and associated structures will be removed and the affected lands reclaimed, with the exception of permanent diversion ditches UDC-2 and culvert CP-2*". There is no mention of ditches UDD-1 and UDD-2 in this section. In the last paragraph on page 5-39, the application indicates that UDD-1 and UDD-2 are "*permanent collection ditches*". Additionally, the final reclamation information on page 5-84 indicates that UDD-1 and UDD-2 remain as part of final reclamation. Please address this discrepancy.

In Section R645-301-760 the application discusses the hydrologic restoration plans to be implemented during the reclamation phase of the mining operation. On page 7-128, the application states, "CR has incorporated specific control and mitigation measures in mining, processing and reclamation plans in order to prevent any significant impacts on surface or ground water quality." The reclamation plan involves backfilling and regarding disturbed areas, replacement of soil, re-establishment of pre-mining drainage patterns and establishing a vegetative community. A component of the reclamation plan includes the removal of some temporary operational drainage structures, establish designed permanent post-mining drainage structures, and modify some of the existing temporary drainage structures to provide for effective drainage and sediment control.

When no longer needed for sediment control, all temporary diversions will be removed and the affected lands reclaimed. The Permittee proposes to fill the diversion ditches with material from adjacent areas. Grading will blend the temporary ditch areas with the surrounding topography.

Sediment pond reclamation will include the removal of the man-made discharge structures, removal and disposal of any riprap, concrete and bedding materials which will not be utilized in conjunction with the reestablishment of post-mining drainages. On page 7-128, the application states, "*CR will continue to operate and maintain sedimentation ponds and associated drainage structures until contributing drainage areas are effectively restored through application of the reclamation activities.*" Effective restoration will be established once re-vegetation success has been accomplished and the surface drainage has been restored such that contributions of suspended solids from untreated disturbed area runoff are within applicable water quality standards.

The Permittee proposes to control erosion and sediment transport during reclamation of the interim drainage and sediment control structures with a combination of silt fences, hay bales and other appropriate alternative sediment control measures. On page 5.4-5, the Permittee commits to installing these temporary controls prior to "any reclamation activities." The alternative sediment controls are to remain in place during backfill/regarding operations, placement of soil material, reseeding and re-establishment of vegetation. The structures will be removed once vegetation has been reestablished on the site.

The Permittee discusses the restoration of drainage patterns at the mine site. The application states, "In conjunction with final backfilling and regarding activities, permanent drainage features, designed to pass the peak flows from the 100-year, 6-hour event, will be established to effectively pass natural drainage through the reclaimed areas and provide for effective control of runoff from reclaimed areas while minimizing the potential for any significant erosion." The application continues that "some temporary drainage structures may be retained and modified as necessary to carry disturbed area drainage flows from permanent drainages to the sedimentation pond which will also be retained to provide ongoing sediment control through the extended liability period." The Permittee must provide additional detail as to what drainage features are part of what phase of the hydrologic reclamation plan (i.e temporary, interim or permanent).

In order to demonstrate that pre-mining drainage patterns have been restored, the Permittee will provide documentation to the Division with one of two methods or by a combination of: 1) Comparing pre- and post-mining water monitoring data as well as analyzing applicable effluent standards and 2) Providing runoff and sedimentation modeling results by utilizing measured reclamation vegetation cover values and calculated sediment contributions with that of modeling results developed using baseline pre-mining vegetative cover values.

Findings:

The application does not meet the Hydrologic Reclamation Plan requirements of the State of Utah R645-Coal Mining Rules. The following deficiencies must be addressed prior to Division approval:

R645-301- 531, -742.300, -760: The Permittee must clarify the diversion language in Section R645-301-742.300. In the third paragraph of the section, the application states, "*As can be seen on Map 29, Mine Surface Facilities Area-Post Mining Topography, the reclaimed channel is in reality short, and thus has little potential for significant alignment variation.*" Upon review of Map 23 and Map 29, there is an irrigation ditch in the area of where undisturbed culvert UDC-1 is located. It's unclear if the text is referring to the irrigation ditch or the ephemeral channel that is being diverted with culvert UDC-1. The paragraph also refers to "*culverted channel USC-1*". It appears that this is a typo that should be revised as it appears there is no drainage feature labeled "USC-1".

R645-301- 531, -742.300, -760: The Permittee should revise chapter 5 and 7 to provide a clearer discussion of the temporary and permanent diversion/drainage controls. In the third paragraph on page 7-131, the application states, "*When no longer required for sediment control, all temporary diversions and associated structures will be removed and the affected lands reclaimed, with the exception of permanent diversion ditches UDC-2 and culvert CP-2*". There is no mention of ditches UDD-1 and UDD-2 in this section. In the last paragraph on page 5-39, the application indicates that UDD-1 and UDD-2 are "*permanent collection ditches*". Additionally, the final reclamation information on page 5-84 indicates that UDD-1 and UDD-2 remain as part of final reclamation. Please address this discrepancy.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

Reclamation Monitoring and Sampling Location Maps

The application meets the Reclamation Monitoring and Sampling Location Map requirements of the State of Utah R645-Coal Mining Rules.

Table 20, Hydrologic Monitoring Schedule provides the parameters to be analyzed for during post-mining. Map 28, Surface and Ground Water Monitoring Sites depicts the water monitoring sites that will be monitored during the reclamation liability period.

Reclamation Plan Maps

The Permittee should revise Map 29, *Mine Surface Facilities Area-Post Mining Topography*. The third paragraph of page 7-122 states, “*Ditches UDD-1 and UDD-2 remain as permanent structures.*” However; upon review of Map 29, these diversions are not depicted. Based on this statement, these features should also be depicted on the interim drainage map as well.

The Permittee must provide a final reclamation map that depicts the permanent features and final drainage configuration of the site.

Findings:

The application does not meet the Maps, Plans and Cross Sections of Reclamation Operations requirements of the State of Utah R645-Coal Mining Rules. The following deficiencies must be addressed prior to Division approval:

R645-301- 531, -742.300, -760: The Permittee should revise Map 29, *Mine Surface Facilities Area-Post Mining Topography*. The third paragraph of page 7-122 states, “*Ditches UDD-1 and UDD-2 remain as permanent structures.*” However; upon review of Map 29, these diversions are not depicted. Based on this statement, these features should also be depicted on the interim drainage map as well.

38 R645-301-731, -760: The Permittee must provide a final reclamation map that depicts the permanent features and final drainage configuration of the site.

REQUIREMENTS FOR PERMITS FOR SPECIAL CATEGORIES OF MINING

OPERATIONS IN ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR Sec. 822; R645-302-324.

Analysis:

Essential Hydrologic Functions

The application meets the Operations in Alluvial Valley Floors requirements of the State of Utah R645-Coal Mining Rules.

The application meets the Alluvial Valley Floor (AVF) Determination requirements of the State of Utah R645-Coal Mining Rules.

The previous technical analysis identified a deficiency relative to the Alluvial Valley Floor Determination. The applicant was directed to demonstrate, based on available data or field studies, the presence or absence of an alluvial valley floor (AVF).

In Chapter 9 of the application, the Permittee discusses alluvial valley floors. R645-302-321.300 establishes criteria for an alluvial valley floor. Two determinations must be made before a finding can be made that an alluvial valley floor exists: 1) Unconsolidated stream laid deposits holding streams are present; and 2) There is sufficient water to support agricultural activities. A sufficient water source is evidenced by the existence of flood irrigation in the area of question or its historical use; the capability of an area to be flood irrigated and sub-irrigation of the lands in question, derived from the groundwater system of the valley floor.

Beginning on page 9-6 of the application, the Permittee discusses alluvial valley floors. Based upon the two criteria discussed above, an AVF is located within the adjacent area. In addition, the Permittee also discusses areas that exhibit the traits/characteristics of the second criteria (hydrology aspect), but not the first (geologic aspect).

These two areas are depicted on Map 32, *AVF Evaluation Map* and identified as 'AVF AREA' and 'QUASI AVF AREA'. The 'AVF AREA' depicted on Map 32 meets the two criteria. Figure 4, *Regional Surface Geology Map*, depicts alluvium material directly adjacent to Mud Creek on either side of the stream channel. Map 32, *AVF Evaluation Map*, depicts the location of this alluvial material relative to the proposed permit boundary. The area of the alluvial valley floor is relatively small and appears to be limited to within less than 500 feet of the stream channel for Mud Creek.

The 'QUASI AVF AREA' depicted on Map 32 meets the second criteria in making an AVF determination in that there is sufficient water to support agricultural activities. However, the surface geology and soils found in the 'QUASI AVF AREA' are not unconsolidated stream laid deposits holding streams.

The Permittee discusses the potential for mining related impacts to the identified AVF beginning on page 9-12. In summary, the coal seam to be mined is located well above the regional water table. As a result, the possibility that mining activity could interrupt or impact recharge to the identified AVF is minimal. In addition, the irrigation water that supplies the

AVF is derived from Mud Creek at a diversion point upstream of the proposed mine site. Based upon a Utah Department of Environmental Quality TMDL analysis of Scofield Reservoir, 87% of the inflow to the Scofield reservoir comes from Fish and Mud Creek. The proposed mining activity poses a minimal potential for interrupting or impacting these drainages due to its proximity to the drainages and the utilization of first mining practices only (i.e. no planned subsidence).

Findings:

The application meets the Operations in Alluvial Valley Floors requirements of the State of Utah R645-Coal Mining Rules. The following deficiency must be addressed prior to Division approval:

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

Analysis:

The application does not meet the Cumulative Hydrologic Impact Assessment requirements of the State of Utah R645-Coal Mining Rules. In order for the Division to make a finding that the mine plan has been designed to prevent material damage to the hydrologic balance outside the permit area, additional hydrologic information is required of the Permittee relative to ground and surface water resources.

Findings:

The application does not meet the Cumulative Hydrologic Impact Assessment requirements of the State of Utah R645-Coal Mining Rules. The following deficiency must be addressed prior to Division approval:

In order for the Division to make a finding that the mine plan has been designed to prevent material damage to the hydrologic balance outside the permit area, the Permittee must provide additional hydrologic information relative to ground and surface water resources located within and adjacent to the proposed permit area.

RECOMMENDATIONS:

The application should not be approved at this time.