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TECHNICAL MEMORANDUM
Utah Coal Regulatory Program

April 25, 2011

TO: Internal File

THRU: Joe Helfrich, Team Lead

FROM: April A. Abate, Environmental Scientist III 5-2-2011

RE: Permit Application, Carbon Resources LLC, Kinney No. 2 Mine, C/007/0047, Task ID #3779

SUMMARY:

On March 21st, 2011, 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 address deficiencies identified during the previous technical analysis (deficiency letter sent 01/27/11, Task ID #3646).

The application is for coal-mining activities approximately ½ 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 proposed permit area is approximately one square mile in area. The hydrologic setting of the permit and adjacent area is characterized by small ephemeral channels bisecting the permit area in an east to west direction. None of the ephemeral channels have been observed to be flowing since the baseline monitoring period for this project began in 2006. Groundwater data from monitoring well exploration activities have shown that the Hiawatha coal seam to be mined is dry within the permit boundaries. Groundwater has been detected in monitoring wells drilled in Eagle Canyon graben, which lies on the eastern margin of the permit boundary. Eagle Canyon is a fault-block graben that does exhibit some flows from a series of springs in the area. Pleasant Valley is located to the west of the permit area and represents a valley that formed from the fault-block geology that characterizes the region. One perennial stream known as Mud Creek and the Scofield Reservoir are located within this valley. The Hiawatha Coal seam in the permit area is located over two hundred feet above the valley and appears to be hydrologically disconnected from Pleasant Valley. Eagles Canyon has been characterized as a spring-fed ephemeral channel. The source of the water from the springs is believed to be from groundwater transmitting along the faults as well as from recharge from precipitation and snowmelt events.

Another possible source of water is from small, perched aquifer systems that are tied up in the sandstone lenses that characterize the Blackhawk Sandstone in the region.

The application was initially submitted in 2008 and returned deficient in September of 2008 (Task ID #2989). The application was submitted a second time in December of 2010. The application was found deficient and returned in January of 2011. The following is the hydrologic analysis of the third 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 #3779.

The application should not be approved at this time. Prior to Division approval, the following deficiencies were either not adequately addressed or not addressed at all:

Remaining Deficiencies identified by April Abate:

1. **[R645.724.100 and .200,]:** Table 7 should be updated to include water quality parameter sampling for all groundwater monitoring wells in the monitoring well network and ephemeral drainages within the permit area.

Division Response: The applicant committed to sampling all wells containing a static water level where it was feasible to sample. However, according to Table 7 provided on page 7-16, all monitoring well data indicate that they will be gauged for water level only. No changes were made to indicate that all wells will be tested for water quality parameters (??).

Table 7 outlines the operational water monitoring program for the mine. The table only depicts column headers for "water level", "flow", "water quality" and "water presence" measurements. Flow is only one component of the required suite of field parameters which also include at minimum: pH, specific conductivity corrected to 25 deg C, flow or depth to water measurements. These parameters should all be consolidated under a *"Field measurements"* column instead of flow or water level. Furthermore, it would be clearer in the table to label the column *"Laboratory Analytical Parameters"* instead of "Water Quality" since field and laboratory measurements can all be fall under the label of "Water Quality". The Division sees no point in a separate column for "Water Presence", which pertains to the ephemeral channels. Each of these ephemeral channels are included in the table and it is understood they will be monitored for the presence of water on a quarterly basis like all the other sample points. While it is helpful to clarify water sampling points that were initially mislabeled, Table 7 is probably not the appropriate place to include a series of footnotes on what data points were mislabeled in the early stages of the data gathering process. Going forward as the mine becomes operational, all sample nomenclature will be well established and this may confuse future readers of this document. ***Please make the necessary corrections to Table 7 – Operational Water Monitoring Plan are needed to insure that the information presented is clear and concise.***

2. **[R645.724.100 and .200]**: As a result of CR-06-03-ABV being decommissioned, only six months worth of baseline data were collected from this well. If extraction of the Hiawatha seam is expected to make its way eastward right up to fault that delineates the western side of the Eagle Canyon graben, then the Permittee must provide a commitment to install a replacement well in order to measure any possible negative effects that adjacent mining would have on the groundwater found within Eagle Canyon Graben.

Division Response: The applicant has committed to providing an in-mine well to measure the water quality within Eagle Canyon as mining extends eastward towards the western boundary of the western boundary fault. The MRP was updated on page 7-16 to show this commitment. This well is to pierce the gouge zone of the fault and will be equipped with a differential pressure gauge and valve to monitor water levels and water quality parameters. During the Division's meeting with Carbon Resources, the Division requested that a schematic drawing of this proposed in-mine well be provided. This was not provided in the most recent round of review of the application. ***Please provide a well schematic diagram. Furthermore, this well should be added to the operational water monitoring plan.***

3. **[R645.724.100 and .200]**: Eagle Springs 1, Eagle Springs 1A, Eagle Spring 2, Eagle Spring 3 are located within the permit boundary, and should be added to the operational water monitoring plan.

Division Response: More information has come to light in this latest round of review which indicates that Eagle Springs 1, Eagle Springs 1A, Eagle Spring 2, Eagle Spring 3 were only monitored initially when the Spring and Seep Survey of the area was conducted in 2006 by Rock Logic Consulting, LLC. These springs were initially shown to have "estimated" flows of less than 0.5 gallons per minute. Since the survey was completed in 2006, these springs have not been monitored despite the fact that they are within the limits of the permit boundary. ***Additional baseline data of Eagle Springs 1, Eagle Springs 1A, Eagle Spring 2, Eagle Spring 3 all within the permit area is still needed and would be considered critical to monitor and characterize for baseline, such that any negative impacts from coal mining can be evaluated.***

4. **[R645.731.530]**: Monitoring of Aspen Spring began in June 2008 and then resumed in June 2010. The data presented indicates that flow was "not measured or at a trickle". Several dates on the analytical data table were listed but no information was given. Field parameter data were given despite flow measurements not being recorded. How can field parameter data be collected if no water is flowing? If dates are given with no information, the table should note that the spring was monitored but not flowing. Please clarify this information and update the analytical tables accordingly. It is important to note that even if a sample location is dry and not flowing, it is still imperative that it be recorded as data collected. For example, Eagle Spring has been monitored consistently since 2005 yet according to Table 6, it appears that data collection is sporadic because only dates when water quality data were available are shown.

Division Response: The applicant was asked to clarify the monitoring data pertaining to Aspen Spring since it was not clear how analytical parameters could be collected but flow data was not. The applicant addressed this deficiency by indicating that this location is actually a pond otherwise referred to as "Eagle Pond 1" and that the spring feeds a small pond presumably from the bottom where it is not possible to measure a flow. The applicant has indicated that since Aspen Spring is located in the same general region as the cluster of Eagle Springs 1, 1A, 2 and 3, that it can be the spring that is "representative" of all the springs. The problem is that since it has come to light that Aspen Spring is actually a pond, a representative spring sample cannot be obtained without a flow measurement. Furthermore, Eagle Pond 1, aka Aspen Spring would now be considered surface water sampling point and not a groundwater sampling point and any laboratory analytical measurements would not accurately characterize a sample collected from a pond versus a groundwater sample from a spring that would more accurately reflect groundwater geochemistry. To add further to the confusion, during this round of review where the applicant contends that Aspen Spring is also referred to as "Eagle Pond 1". However there is no reference in the 2006 Spring and Seep Survey to Eagle Pond 1. The closest characterization of Aspen Spring in the 2006 report is Eagle Spring 2. Therefore, it is unclear exactly which of the springs and seeps identified in the survey is definitively Aspen Spring. ***Since Aspen Spring is a pond, it cannot be considered the representative spring and will need to be removed from the plan as such. If this pond is confirmed to be tied to the surface water right in the area (see deficiency #5 to follow) then it will require some type of water level monitoring protocol to ensure that there is no water loss to this water right.***

[Greg says these are two separate ponds Eagle Pond 1 – (Aspen Spring) and Eagle Spring 2. He will commit to monitoring these ponds using a staff gauge installed in the ponds. The ponds will be added to the operational monitoring plan and also incorporated into the PHC to document the need to protect them].

5. **[R645-301.731.530]**: Surface water right information needs to be expanded upon to address the surface water rights within the permit boundaries. The application needs to be updated to include updates to Map 31 explaining the "See Note 1" comment next to water right number 91-3588. Additional information about the status and nature of the two individual water rights is needed on page 7-53 of the application.

Division Response: The applicant contends in their deficiency guidance document that the surface water right identified within their proposed permit area is Aspen Spring and is one in the same with the surface water right #91-4026 located at the bottom of Eagle Canyon. However there is no explanation tying this water right to Aspen Spring explained anywhere in the MRP. In fact, on page 7-58, the water right is characterized as a stockwater right on an unnamed spring with no mention of an associated pond. The information on the water right taken directly from the Utah Division of Water Rights database included in Exhibit 13 indicates that water right #91-4026 is an unnamed spring used for stockwatering. The original adjudication map does show the water right as a spring with an associated pond, but again there is no discussion that definitively

concludes that this water right is Aspen Spring, other than what has been discussed in the deficiency guidance document prepared by the applicant. ***Please state in the MRP which sampling point is associated with surface water right No. 91-4026.***

6. **[R645-731.500,]**: Sludge materials that end up in the sediment pond are combinations of underground development waste and non-coal waste as defined in the regulations under R645-100-200 and R645-301-528.331, -542.741 and -747.100. Non-coal wastes include, but are not limited to, grease, lubricants, paints, flammable liquids, garbage, abandoned mining machinery, lumber and other combustible materials generated during mining and reclamation activities. Non-coal waste streams are not an accepted form of waste allowed to be discharged into underground mine workings as per R645-731.511 & 512. ***It is recommended that this sentence be removed and language associated with the applicant's intent to haul sediment pond sludge offsite be inserted.***

Division Response: The applicant indicated in their deficiency response document that no non-coal waste materials would be disposed of in abandoned underground workings. However, the correction was not made to the language in the MRP stated on page 7-114 pertaining to sludge materials from the sediment pond being disposed of in abandoned underground workings. Please remove language in the MRP stating that non-coal waste materials will be disposed of in underground workings.

TECHNICAL ANALYSIS:

GENERAL REQUIREMENTS:

The General Contents section of Chapter 7 Hydrology provides an introduction to the hydrology and geologic resources and potential impacts of mining as per R645-711.100 and 200.

DEFICIENCY: R645-301-711 THRU 720: This section does not address the regulations that detail methods and calculations utilized to comply with hydrologic design criteria, the hydrologic performance standards, and an explanation or a reference to reclamation activities. These requirements are found in R645-301-711.300, 400, 500 and need to be addressed in this section. These requirements can either be addressed in this section or referenced in this section to where they are addressed elsewhere in the MRP.

CERTIFICATION REQUIREMENTS

All hydrology-related maps are required to be certified and stamped by either a Utah-licensed professional engineer or geologist. Map 13 – Surface Facilities was submitted as stamped by a Utah licensed land surveyor and therefore complies with R645-722.500.

DEFICIENCY: R645-301.712: The following maps will require a stamped certification by a Utah-licensed professional engineer or geologist: Map 7 – Regional Hydrology; Cross sections 7A and 7B; Map 8 – Works, Wells, springs, Faults; Map 9 – Groundwater Level Data.

Findings:

The application describes the baseline data collection practices starting on page 7-9 for the Kinney #2 project to date. The section also references design criteria calculations methods used to construct the drainage control structures that are to be installed during the construction of the surface facilities.

The applicant has provided a list of references to the design criteria plans but neglected to add a header to this section (i.e. R645-301-711.300). Exhibit 16 outlines runoff control design details for the Scofield area, where the proposed Kinney #2 mine is to be located.

The applicant has provided a certification stamp for maps 7, 7A, 7B, 8, 9. These maps were certified by Benjamin Grimes, a Registered Professional Land Surveyor within the State of Utah. According to R645-301-512.100, each of these maps are required to be certified by a qualified, registered, professional engineer, a professional geologist; or a qualified, registered , professional land surveyor, with assistance from experts in related fields such as hydrology, geology and landscape architecture.

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.

In the previous round of review, the Table of Contents in Chapter 7 referenced incorrect page numbers for some sections within the Chapter.

Findings:

The applicant has corrected the Table of Contents in Chapter 7 where it now references correct page numbers and provides an index to relevant tables and exhibits as part of the TOC. 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.

CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.18; R645-301-724.400

Analysis:

The applicant provided a discussion on page 7-76 of climatological information. This information included a discussion on climate factors and seasonal variability data that are representative of the proposed permit area. Information on seasonal temperature and precipitation rates were included as well as wind data were illustrated on Tables 13, 14, 15, respectively.

Findings:

The climatological information provided meets the R645-301-724.400 coal rules.

ALLUVIAL VALLEY FLOORS

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

Analysis:

Alluvial Valley Floor Determination

The applicant is not planning to conduct any ***surface*** coal mining activities; however, the regulation does state that if the applicant intends to conduct mining in a location adjacent to a stream, the applicant shall either affirmatively demonstrate the presence of an AVF, or submit the results of a field investigation as per R645-302.321.100. The AVF is discussed in Chapter 9 of the application and a map of its extent is found on Map 32.

The applicant performed a series of field studies consisting of aerial photo and topographic map reviews, soils surveys, geomorphic characteristic evaluations and field visits. Based on this information, the applicant did affirm that Pleasant Valley meets the definition of an AVF from R645-100-200 based on the presence of:

Unconsolidated stream-laid deposits holding streams with water availability sufficient for subirrigation or flood irrigation agricultural activities.

As per R645-302.321.100, the Division is required to make an evaluation regarding the existence of the probable AVF in the proposed permit or adjacent area and to determine which areas, if any require additional studies in order for the Division to make a final determination on the existence of an AVF. In this case, this regulation applies to Pleasant Valley to the west, which would include Mud Creek and the Scofield Reservoir.

The applicant states that underground mining operations are located upgradient of the Pleasant Valley AVF and that there is a possible zone of influence within the underground workings that could possibly contribute groundwater to the AVF. However, as the applicant demonstrated in the PHC, mining is to take place in an area within the permit boundary that has been found to lack groundwater. While there is some indications that a regional water table may exist and may be hydrologically connected to the aquifer system in Pleasant Valley (although there is no data to validate that that is the case) at further depths within the permit area, the elevation where mining of the Hiawatha seam is to take place will be located at an elevation well above that. Moreover, surface water flows that could flow in the direction of the AVF will be managed by the sediment control plans and methods that the applicant has committed to in Chapter 7 of the application. As a result, any surface water discharges to the AVF where water quality effluent limitations could potentially be exceeded will be regulated under the provisions of the Kinney #2 Utah Pollutant Discharge Elimination System (UPDES) permit No. UTG040028 that the Kinney #2 mine has secured from the Utah Department of Environmental Quality.

According to the Office of Surface Mining (OSM) draft guidance document on AVF Study Guidelines, 1983, Section 510 (b) (5) must affirmatively demonstrate that the proposed mining operation will not interrupt, discontinue, or preclude farming on AVF (with two exceptions) and that the proposed operation will not materially damage the water supply of those AVFs not excepted. Section 515 b 10 F requires preservation of the hydrologic functions of all AVF outside the mine area.

According to Carbon County zoning maps, Pleasant Valley directly west of the permit boundary is zoned for Agricultural use. The applicant has also indicated that irrigation water supplied to the AVF originates in areas further upgradient from the permit boundary (to the east) and also from Mud Creek. The applicant has identified one irrigation ditch that bisects the southwest corner of the permit boundary but mentions that it appears to not have been in use for a long period of time judging by it not appearing to be maintained. Nevertheless, the applicant has indicated that the ditch will be culverted and protected from surface water runoff in the disturbed area of the permit boundary. The applicant further demonstrates that mining and reclamation have historically been conducted in this area without any effects on the hydrologic balance of the AVF. Based on Total Maximum Daily Load (TMDL) studies of the Scofield

Reservoir have indicated that the water body is impaired for total phosphorus and dissolved oxygen. A USGS professional paper – Water Resources Investigation Report 96-4020 attempted to evaluate the effects of coal mining and road construction on the Scofield Reservoir. The report concluded that the reservoir during its record high flow water year in 1983-1984 transported significant amounts of sediments and trace metals (that could originate from coal mining activities were not significant enough to constitute a hazard to the reservoir and impair its designated uses. This study supports the assertion that coal mining activities have negligible effects on the water quality of the Pleasant Valley AVF.

Findings:

The Division concurs with the applicant in that impacts to the AVF identified in Pleasant Valley will not be impacted by the Kinney #2 mining operation.

GEOLOGIC RESOURCE INFORMATION

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

Analysis:

Geologic resources as they pertain to hydrologic consequences are discussed in Section 624.310 of the application.

Findings:

The geologic information listed in section 624 is discussed in sufficient detail and meets the Utah coal rules for sufficient geologic information given in accordance with R645.

HYDROLOGIC RESOURCE INFORMATION

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

Analysis:

Sampling and Analysis

The application states that all water quality sampling and analysis will be conducted in accordance with the provisions outlined in R645-301-723 (page 7-7 of the application). Table 6 summarizes the baseline water monitoring stations. Table 7 of the application outlines the operational water monitoring protocol proposed for the Kinney #2 permit and adjacent area and a table of water quality parameters listed in Table 20. The minimum parameters outlined in R645-

731.211 were listed in the proposed water monitoring plan. The application depicts all proposed surface and groundwater monitoring locations on Map 28.

The application states that the water monitoring plan is designed to identify any possible concerns with respect to the surface and groundwater in order to protect the hydrologic balance. Furthermore, the water quality data will be used for the purpose of periodically review in order to determine if any trends arise. The monitoring program will submit samples on a quarterly basis up through the completion of reclamation activities.

The operational water monitoring plan outlined on Table 7 indicates that the monitoring well network consisting of 10 wells will be gauged for water level only in 8 of the 10 wells. The wells drilled within the permit boundaries have been demonstrated to be dry. However, CR will continue to monitor these wells for any changes as the operation progresses. In the event that water is encountered in these wells, then water quality parameters should be collected. Therefore, Table 7 should be updated to indicate that these wells will be sampled for water quality parameters in the event that water is encountered; gauging alone does not provide an adequate amount of data.

The ephemeral drainages within the permit area include: Kinney Draw, Columbine Draw and Jones Draw. These drainages run in a west to east direction with their gradient sloping toward Pleasant Valley. None of these drainages were initially proposed for monitoring in the operational water monitoring plan likely because there has been no evidence of any ephemeral flow observed by the applicant since the baseline monitoring period began. However, since these drainages are located within the permit area, they should still be monitored for flow and water quality parameters if water is present and therefore included in the operational water monitoring plan.

Springs within the Long Canyon area will be considered part of the Cumulative Impact Area and will also require monitoring when/if the mind expands further eastward. Therefore, the water monitoring program should be expanded to include important springs in Long Canyon for operational parameters to determine if these springs exhibit seasonal variability that would indicate that they are susceptible to recharge, or if they represent a confined perched system that discharges on a continuous basis.

DEFICIENCY: [R645.724.100 and .200]: The groundwater and surface water operational sampling plan should be expanded to include additional sampling locations. *All* groundwater monitoring wells should be sampled for water quality parameters. Currently the applicant is stating that they will only be monitored for water level data. The Division recognizes that most of these wells are dry; however, in the event that water is present in the wells during a given quarter, the water should then be sampled for the required operational parameters to help gain a better understanding of the water quality data in the wells when and if it becomes available.

DEFICIENCY: Table 7 should be updated to include water quality parameter sampling for all groundwater monitoring wells in the monitoring well network and ephemeral drainages within the permit area. Table 10 showing the analytical parameter data for the Aspen, Eagle, and Sulfur springs and surface water samples Miller Outlet, Mud Creek, Res -1, and Angle Spring needs to be corrected to show the data for total iron and total manganese in the samples.

DEFICIENCY: The ephemeral drainages within the permit area include: Kinney Draw, Columbine Draw and Jones Draw. None of these drainages were proposed for monitoring in the operational water monitoring plan likely because there has been no evidence of any ephemeral flow since the baseline monitoring period began. However, since these drainages are located within the permit area, they should still be monitored for flow and water quality parameters if water is present. The Division recommends that the operational water monitoring plan be expanded to include quarterly monitoring of the ephemeral drainages within the permit area.

DEFICIENCY: Springs within the Long Canyon area will be considered part of the Cumulative Impact Area and will also require monitoring when/if the mind expands further eastward. Therefore, the applicant should identify the critical springs within Long Canyon and add them to the water monitoring plan for operational parameters. Additional characterization of the springs in Long Canyon is needed to determine if these springs exhibit seasonal variability that would indicate that they are susceptible to recharge, or if they represent a confined perched system that discharges on a continuous basis.

Findings:

The applicant committed to sampling all wells containing a static water level where it was feasible to sample. However, according to Table 7 provided on page 7-16, all monitoring well data indicate that they will be gauged for water level only and subsequently no changes were made to indicate that all wells will be tested for water quality parameters.

Table 7 outlines the operational water monitoring program for the mine. The table only depicts column headers for "water level", "flow", "water quality" and "water presence" measurements. Flow is only one component of the required suite of field parameters which also include at minimum: pH, specific conductivity corrected to 25 deg C, flow or depth to water measurements. These parameters can all be consolidated under a "field measurements" column instead of flow or water level. Furthermore, it would be clearer in the table to label the column "Laboratory Analytical Parameters" instead of "Water Quality" since field and laboratory measurements can all be construed under the label of "Water Quality". The Division sees no point in a separate column for "Water Presence", which pertains to the ephemeral channels. Each of these ephemeral channels are included in the table and it is understood they will be monitored for the presence of water on a quarterly basis like all the other sample points. While it is helpful to clarify water sampling points that were initially mislabeled, Table 7 is probably

not the appropriate place to include a series of footnotes on what data points were mislabeled in the early stages of the data gathering process. Going forward, all sample nomenclature will be well established and this may confuse future readers of this document. Additional changes to Table 7 – Operational Water Monitoring Plan are needed to insure that the information presented is clear and concise.

The applicant has added the ephemeral drainages within the operational monitoring plan with the understanding that water is not likely to be flowing in these channels. However, it is important to emphasize that these stations should be reported to the Division as "dry" when applicable and samples should be collected for laboratory analytical parameters in the event that water is flowing.

The applicant has agreed to conduct a spring and seep survey of Long Canyon during the 2011 field season when Long Canyon is accessible.

Baseline Information

The applicant defines the cumulative impact area as the area where potential hydrologic impacts that could result from proposed mining activities in combination with other unrelated mining activities that may contribute to cumulative impacts in the area. The applicant delineated the boundaries of any baseline cumulative impact area as the permit area and any upgradient area which could be impacted by mining-related drawdown of the groundwater and any downgradient areas which could be impacted by mining-related changes in the groundwater flow volumes or water quality. These areas were limited to Mud Creek to the west, Miller Canyon to the north, Long Canyon to the east and the headwaters of UP Canyon on the south.

During the drilling exploration phase of the Kinney #2 project, groundwater above the coal seam was only found in limited, localized areas. Geologic data indicate that the Hiawatha coal seam to be mined dips to the northeast. Groundwater encountered in the monitoring wells indicates that there are very minimal elevation changes in individual wells, which infers that there is no seasonal influence. Based on these data from the monitoring wells, it does not appear that groundwater at these depths is heavily influenced by recharge from the surface. Therefore it is plausible that the groundwater encountered in monitoring wells is from perched confined systems within the Blackhawk formation.

Currently according to Table 7, the only wells that are slated for water quality parameter testing are CR-10-11 and CR-10-12. These wells are located west of the permit boundary and set within the alluvial sediments in Pleasant Valley adjacent to Highway 96. The only other wells to yield any groundwater were CR-06-03 and CR-06-09. CR-06-03 was originally located in the Eagle Canyon graben and yielded groundwater. Unfortunately, this well has been decommissioned making any additional characterization of groundwater conditions in the Eagle

Canyon graben impossible to assess. The only other well that provided baseline water quality data was CR-06-09. This well has had some of its own logistical challenges in collecting water samples. Data from CR-06-09 would provide an assessment of conditions east of the permit boundary; however the Hiawatha seam is approximately 50 feet higher in elevation at this location and is separated by the Eagle Canyon graben which truncates the Hiawatha seam and drops it down several hundred feet providing a hydrologic barrier for water movement to flow (refer to Cross Section 7A). As a result of this barrier, it is not very likely that groundwater conditions in this well will be representative of those (if any) in the permit area.

As previously mentioned, monitoring well CR-06-03-ABV was located within the Eagle Canyon and produced six months worth of water quality data in 2006 prior to this well being plugged. This well was advanced in Eagle Canyon, a narrow graben approximately 500 feet wide with faults on either side of it. In this graben, the Hiawatha seam has been dropped down and is located approximately 150 feet lower than the corresponding Hiawatha seam in the permit area. Given that water was encountered in well CR-06-03-ABV at an elevation of 7,798 and not encountered at this same elevation in well CR-06-05A, the question is then raised whether or not groundwater is being actively transmitted along the fault system in Eagle Canyon? There is further evidence that a significant amount of groundwater may be transmitting along the fault systems in the area as seen by the amount of year-round flow discharging from Sulfur Spring located 1,300 feet northwest of the permit boundary.

In Section R645-301-624.310, the applicant discusses the nature of the groundwater in Eagle Canyon graben as originating from rain water and snowmelt percolating into the fault gouge zone and migrating into the brecciaed zone of the fault system suggesting that a piezometric surface of groundwater exists in this fault zone. In Long Canyon further to the east, numerous springs have demonstrated springs flowing along the order of 10 to 20 gallons per minute (gpm). Sulfur Spring located to the north/northwest of the permit boundary and at the east boundary of the Pleasant Valley graben averages a year-round discharge of 80 gallons per minute. Clearly, there is an active groundwater system in the area. However, it is difficult to discern if it is coming from a series of perched zones or if it is readily being transmitted in a south-north direction through faults in the area. Based on the data collected from springs and the groundwater monitoring wells, there is evidence that it could be coming from both.

A groundwater monitoring well installed in the Eagle Canyon graben has the highest likelihood of producing water. If the fault is acting as a conduit to the flow of groundwater, being that it is situated immediately adjacent to where mining activities are to take place, it should provide a good characterization of any potential impacts to groundwater from mining activities since the water table in the graben has been shown to be above the Hiawatha seam where mining is to occur. Strictly making an assessment based off the Map 7A, which shows a west to east cross section of the proposed Kinney #2 mine, it is not clear how far eastward mining of the Hiawatha seam is to extend within the permit boundary (?). Judging by the current map, it is implied that mining will occur right up to the Eagle Canyon Graben. If this is the case,

then impacts to groundwater in Eagle Canyon are possible and therefore, the Division recommends that a new well be drilled within the Eagle Canyon graben within the permit boundary to assess groundwater conditions.

According to Map 7 – Regional Hydrology, a total of three monitoring wells were drilled within the permit boundary: CR-06-01, CR-06-02 ABV/CR-06-02, and CR-06-05A with CR-06-03-ABV drilled on the northeast *corner* of the permit boundary line. Of these wells, only CR-06-03-ABV produced six months worth of water quality data in 2006 prior to this well being plugged due to access issues with the property owner. All other wells within the permit boundary area were reported to be dry. Additional wells in the adjacent area include: CR-06-09/CR-06-09-BLW/CR06-09-ABV, a topographically upgradient well, and two topographically downgradient wells: CR-10-11 and CR-10-12 located near Highway 96. Of the adjacent area wells, upgradient well CR-06-09 has produced water level data only and downgradient wells CR-10-11 and CR-10-12 drilled in 2010 have produced water level and water quality data. It should be noted that the ABV and BLW nomenclature denotes the location of a water sample attempted above or below the Hiawatha coal seam.

Baseline data from monitoring well CR-06-09/ABV/BLW were limited to depth to water only. Baseline water quality parameters for this well have not been collected due to limitations in collecting water samples from this well. This well is located further to the west and in an area considered geologically separate from the coal seam to be mined. Therefore, it has been determined that the water quality and quantity data that this well would yield, does not directly effect the current mine plan operation. However, it is recommended that should the mine plan to expand their operation further eastward, redeveloping this well for the collection of water quality parameters is recommended in enough time to establish seasonal variation prior to mine expansion into this area.

Baseline sampling of springs and seeps in and adjacent to the permit area included: Angle Spring, Aspen Spring, and Eagle Spring. Baseline monitoring data collection dates from these springs is reported on Table 6. Analytical data tables for each of the springs are located in Exhibit 10 in the MRP. All of these springs, with the exception of Angle Spring are proposed for operational water monitoring.

Aspen Spring is identified as being within the permit boundary. Angle Spring is located north of the permit boundary. Baseline data from Angle spring was collected beginning in 2005 and ceased in September 2006 due to an access issue. There were several other springs that were identified as being within the permit boundary: Eagle Springs 1, Eagle Springs 1A, Eagle Spring 2, Eagle Spring 3. The applicant has not reported any data on these springs.

Eagle Spring (aka Miller Spring) located over one mile north of the permit boundary has been monitored on a regular basis but does not appear to flow very often. Sulfur Spring located approximately 1,000 feet north of the permit boundary flow year-round at an average rate of 80

gpm. Sulfur Springs discharges near/at the Columbine coal seam and also along the Pleasant Valley fault line, which is located at a lower elevation than the Hiawatha seam. Data indicate that Sulfur Spring has very different water chemistry than the other nearby springs. When comparing Sulfur Springs to the other springs evaluated, the differing water chemistry and its discharge outfall location may be factors to indicate that the groundwater originating from Sulfur Spring may likely represent a different groundwater origin.

Baseline water sampling of the springs indicated that there is a trend of oil and grease detections in the samples. On average, oil and grease were detected on the order of 5 mg/L in the springs. The exception to this was Sulfur Spring, which had a maximum 540 mg/L detection and averaged 21 mg/L. Table 10 units were not specified; it is assumed that all results are in mg/L. The other surface water samples displayed high concentrations of oil and grease Miller Outlet, Mud Creek, and Res-1 had the respective concentrations of 460 mg/L, 360 mg/L, and 340 mg/L. There was no explanation for the oil and grease detections given in the MRP.

Surface water locations that were part of the baseline water monitoring program included: Miller Outlet, Mud Creek, Res-1. All of these locations are outside the permit area and are proposed for operational water monitoring. Baseline data were collected from each of these surface water locations on a regular basis.

DEFICIENCY: As a result of CR-06-03-ABV being decommissioned, only six month worth of baseline data were collected from this well. If extraction of the Hiawatha seam is expected to make its way eastward right up to fault that delineates the western side of the Eagle Canyon graben, then the Permittee must provide a commitment to install a replacement well in order to measure any possible negative effects that adjacent mining would have on the groundwater found within Eagle Canyon Graben.

DEFICIENCY: Baseline data from monitoring well CR-06-09/ABV/BLW were limited to depth to water only. Baseline water quality parameters for this well have not been collected due to limitations in collecting water samples from this well. This well is located further to the west and in an area considered geologically separate from the coal seam to be mined. Therefore, it has been determined that the water quality and quantity data that this well would yield, does not directly effect the current mine plan operation. However, it is recommended that should the mine plan to expand their operation further eastward, redeveloping CR-06-09/ABV/BLW for the collection of water quality parameters is recommended in enough time to establish seasonal variation prior to mine expansion into this area.

DEFICIENCY: Eagle Springs 1, Eagle Springs 1A, Eagle Spring 2, Eagle Spring 3 are located within the permit boundary, and should be added to the operational water monitoring plan.

DEFICIENCY: Monitoring of Aspen Spring began in June 2008 and then resumed in June 2010. The data presented indicates that flow was "not measured or at a trickle". Several dates on the analytical data table were listed but no information was given. Field parameter data were given despite flow measurements not being recorded. How can field parameter data be collected if no water is flowing? If dates are given with no information, the table should note that the spring was monitored but not flowing. Please clarify this information and update the analytical tables accordingly. It is important to note that even if a sample location is dry and not flowing, it is still imperative that it be recorded as data collected. For example, Eagle Spring has been monitored consistently since 2005 yet according to Table 6, it appears that data collection is sporadic because only dates when water quality data were available are shown.

DEFICIENCY: Angle Spring is located approximately 300 feet topographically below the mine permit area and in a downgradient location to any groundwater flow from perched aquifer systems, or any recharge areas within the permit boundary. As such, this spring would be an important point to monitor. The Division asks that every effort to regain access to this sampling point be pursued.

DEFICIENCY: Eagle Spring flow data ranged from Dry to <10 gpm. Normally, any value over 1 gpm is significant and would best be presented as a value, rather than <10 gpm. Eagle Spring has been monitored since May 2005 up to the present time. Baseline data collection requirements for this spring appear to be met. However, the footnote at the bottom of the table in Appendix 10 is an incomplete sentence and needs to be corrected.

Findings:

R645-301.724.100: Baseline data requirements have not been met for groundwater monitoring wells CR-10-11 and CR-10-12. The Division understands that quarterly sampling at these wells is ongoing; however in order to meet the baseline data requirements to demonstrate seasonal variability, an addition round of data collection up through the summer of 2011 is required.

The applicant has committed to providing an in-mine well to measure the water quality within Eagle Canyon as mining extends eastward towards the western boundary of the western boundary fault. The MRP was updated on page 7-16 to show this commitment. This well is to pierce the gouge zone of the fault and will be equipped with a differential pressure gauge and valve to monitor water levels and water quality parameters. During the Division's meeting with Carbon Resources, the Division requested that a schematic drawing of this proposed in-mine well be provided. This was not provided in the most recent round of review of the application. Please provide this diagram and add this well to the operational water monitoring plan.

The quality of the baseline data from CR-06-09/ABV/BLW has been questionable because of sampling issues associated with this well. However, the Division has determined that

the location of this well does not directly effect the proposed mining operation due to the location of this well being further to the west and geologically separate from the coal seam to be mined. However, additional baseline monitoring will be needed east of the permit area should the mine expand in that direction. The applicant has acknowledged that additional monitoring locations will be proposed for baseline data collection.

In the last round of review, the Division requested that the applicant record the no flow data in the MRP showing the dates of monitoring for Eagle Springs 1, Eagle Springs 1A, Eagle Spring 2, Eagle Spring 3 and clarify the nomenclature associated with these springs and seeps and there was some initial conflicts in their nomenclature between what was written in the text and what was shown on the maps of the permit application. Subsequently, the Division found it difficult to make sense of the data and asked the applicant to clarify the information.

Eagle Springs 1, Eagle Springs 1A, Eagle Spring 2, Eagle Spring 3 were all listed in Table 9 but only presents the data as estimated flows. A tabulated data set for ALL springs monitored was recommended and because these springs were all located within the permit boundary, they should be added to the operational water monitoring plan.

More information has come to light in this latest round of review which indicates that Eagle Springs 1, Eagle Springs 1A, Eagle Spring 2, Eagle Spring 3 were only monitored initially when the Spring and Seep Survey of the area was conducted in 2006. These springs were only initially shown to have "estimated" flows of less than 0.5 gallons per minute. Since the survey was completed in 2006, these springs have not been monitored despite the fact that they are within the limits of the permit boundary. Additional baseline data of Eagle Springs 1, Eagle Springs 1A, Eagle Spring 2, Eagle Spring 3 all within the permit area is still needed and would be considered critical to monitor and characterize for baseline, such that any negative impacts from coal mining can be evaluated.

The applicant was asked to clarify the monitoring data pertaining to Aspen Spring since it was not clear how analytical parameters could be collected but flow data was not. The applicant addressed this deficiency by indicating that this location is actually a pond otherwise referred to as "Eagle Pond 1" and that the spring feeds a small pond presumably from the bottom where it is not possible to measure a flow. The applicant has indicated that since Aspen Spring is located in the same general region as the cluster of Eagle Springs 1, 1A, 2 and 3, that it can be the spring that is "representative" of all the springs. The problem with that thinking is that since it has come to light that Aspen Spring is actually a pond, a representative spring sample cannot be obtained without a flow measurement. Furthermore, Eagle Pond 1, aka Aspen Spring would now be considered a surface water sampling point and not a groundwater sampling point and any laboratory analytical measurements would not accurately characterize a sample collected from a pond versus a groundwater sample from a spring that would more accurately reflect groundwater geochemistry. To add further to the confusion, during this round of review where the applicant contends that Aspen Spring is also referred to as "Eagle Pond 1", when referencing the 2006

Spring and Seep Survey, there is no mention of Eagle Pond 1. The closest characterization to Aspen Spring is Eagle Spring 2. Therefore it is unclear exactly which of the springs and seeps identified in the survey is definitively Aspen Spring.

Angle Spring is located approximately one mile north of the permit boundary. The unfortunate incident that caused Angle Spring to be removed from the baseline monitoring plan will not likely allow any additional valuable data to come from this spring for many years to come. The applicant contends that Angle and Aspen spring are separated by approximately 300-500 of elevation and just under a one-mile distance but are part of the same perched fault-system aquifer. The applicant is making an argument that between the amount of baseline data collected from Angle spring prior to its decommissioning with the addition of the data collected from Aspen Spring (aka Eagle Pond 1), that this is sufficient to characterize baseline data. This argument is plausible that groundwater could be from the same perched-fault system; however, there is no conclusive way to prove this since the comparison is being made from a spring (Angle) to a pond (Aspen). Additional characterization of the springs within the permit area would be necessary to be able to come to further conclusions as to the differences or similarities between the springs in the permit area verses the springs downdip (to the north).

The deficiency related to correcting the footnote on the Eagle Spring table within Appendix 10 has been corrected.

BASELINE CUMULATIVE IMPACT AREA INFORMATION

Regulatory Reference: R645-301-725

Analysis:

Groundwater Resources

The applicant identified 4 aquifer systems in the permit/adjacent area:

1. Alluvial/Colluvial aquifer that is associated with surface drainages and primarily identified with the floodplain area in and around Mud Creek.
2. Perched/Isolated aquifer system that is primarily contained within sandstone lenses of the Blackhawk formation.
3. Stored mine water from previous abandoned mine workings
4. Regional groundwater aquifer that is found within the lower Blackhawk and uppermost Starpoint Sandstone.

The alluvial/colluvial aquifer is formed primarily from the surficial sediments deposited in Pleasant Valley. This is considered a shallow aquifer that is readily recharged from surface precipitation and snowmelt that feeds Mud Creek as well as some side channel tributaries.

Perched systems are found throughout the Book Cliffs and Wasatch Plateau areas. These aquifers tend to experience only nominal recharge from the surface and are commonly found during mining activity in the region. These systems tend to be limited in their volume and aerial in extent. In the Kinney #2 permit and adjacent area, faulting also plays a role in observing discharges from springs. Springs found within the permit boundary are believed to be fault controlled and only discharge for a limited time during early spring and drying up by mid-summer indicating they are responding directly to seasonal snowmelt and precipitation.

The application states that there is a possible source of groundwater within the underground reservoirs of stored mine water from abandoned mine workings. These historical workings are from coal extracted from seams that were lower than the Hiawatha seam. The applicant states that the total volume of groundwater storage from the abandoned workings is unknown and is not anticipated to affect proposed operations because this system is below the anticipated active workings. The applicant states that they are unaware of any mine water discharges that are a direct result of the accumulation of groundwater from old workings.

According to geological studies that were done on a regional scale and from other mining operations further west of Pleasant Valley, a regional groundwater system has been identified in the lower portions of the Blackhawk formation and the uppermost portions of the Starpoint sandstone (USGS Prof. Paper No. 2246, Waddell et al. 1983 and Mud Creek and Upper Huntington Cumulative Hydrologic Impact Report, DOGM, July 2010). The coal-bearing seams are found in the lower portions of the Blackhawk formation which may be located near the interface of this regional aquifer. The coal seams in the Blackhawk have typically been reported as saturated by this regional aquifer. However, exploration drilling in the permit and adjacent area has indicated that limited groundwater has been detected above or in the coal seam and no groundwater was detected within the boundaries of the permit area. The region is heavily faulted by a series of North-South-trending faults creating horst and graben topography in the region. The presence or lack of a regional groundwater system is believed to be influenced by this fault-block topography in the area.

The permit application discusses the presence of limited groundwater found above and below the Hiawatha coal seam. It is not well documented in the permit application to what extent the groundwater detected originates from a regional aquifer, or if the water source is mainly from the perched systems. Based on the cross-sections 7A and 7B provided in the application, the regional aquifer was supposedly encountered in some instances, and in others, the wells were advanced just short of encountering the elevation where the regional aquifer was predicted. The application states that points along the perennial stream in Miller Canyon along with Mud Creek and Scofield reservoir were considered as projection points in developing a model of a regional

aquifer. However, as previously mentioned, the regional aquifer that has been studied by other researchers in the area is contained within the lower Blackhawk and Upper Starpoint. It would appear difficult to believe that there is a surface expression of this aquifer that contributes to base flow along the perennial reach of Miller Canyon. The logical sources of groundwater that could contribute to perennial flow would be groundwater from springs (which are likely associated with perched lenses) and seasonal precipitation that produces runoff. Furthermore, using Mud Creek and Scofield Reservoir as downgraident project points of this regional aquifer does not seem to fit since these water bodies are mainly fed by groundwater from alluvial sources, runoff and flow contributions from tributaries. The application uses a model and a series of projected points to extrapolate a regional aquifer in the permit area and associated downgradient areas. It is suggested that the idea of whether or not there is substantial evidence to confirm the presence of a regional aquifer be reevaluated.

Groundwater occurrence and movement are believed to be structurally controlled. The interbedded layers of sandstone and shale horizons within the Blackhawk are believed to limit the movement of groundwater within the region. Groundwater flow direction in and adjacent to the permit area cannot be determined based on the nature of the groundwater and the lack of groundwater data from the monitoring well network. It is possible that any groundwater that flows from the perched systems or from the faults flows in either a down dip direction toward the east or in a vertical direction. This suggests that the groundwater system is contained within isolated systems and is structurally controlled.

Springs and Seeps

A discussion on springs and seeps is found on page 7-18 of the permit application. Field data collected on select springs was presented on pages 7-39, 7-41, 7-43, 7-45. Data was based on information presented in Table 9, which presumably was collected during the 2006 Spring and Seep survey - initially done as part of baseline studies for the Kinney #2 project.

The springs located within the permit boundary are located within the Eagle Canyon drainage that bisects the permit area along its eastern edge. Each of the springs within Eagle Canyon (inside the permit boundary) average less than ½ gallon per minute discharge, if they discharge at all. The next canyon over located 1 ½ miles east is Long Canyon. In Long Canyon there are a multitude of springs. Interestingly, the springs in Long Canyon have significant discharge rates ranging from seeps to 20 gpm and averaging 10 gpm. Additional data collected from the springs discharging from Long Canyon was not provided as part of this application to indicate if these springs exhibit seasonal variability that would indicate that they are susceptible to recharge, or if they represent a confined perched system that discharges on a continuous basis. Several springs in Merrill Canyon approximately one mile further east of Long Canyon exhibited flows ranging from <1 to 10 gpm. Springs located in Jump Canyon approximately 2 miles to the east exhibited flow volumes ranging from <1 to 10 gpm.

Springs that are located north of the permit boundary include: Sulfur Spring, Miller (Eagle) Spring, Angle Spring. Sulfur spring discharges approximately 80 gpm year-round, while Eagle/Miller Spring only discharges 1 gpm and is often dry.

Perennial Streams

There are no perennial surface water resources in the permit area. Perennial surface water resources in the adjacent area include: Mud Creek southwest and approximately 1,500 feet topographically down slope of the permit area and Miller Canyon approximately 2 miles to the north/northeast. Perennial water resources are located on Map -7 Regional Hydrology. Mud Creek is the principal drainage that runs along the central axis of Pleasant Valley and drains into the Scofield Reservoir. Miller Canyon is a small perennial water body that drains into Scofield Reservoir along its eastern flank.

The Price River originates along the eastern flank of the Scofield Reservoir and is a major river system in the region that runs southeast through most of Carbon and Emery Counties and ultimately joins the Green River. The Price River Watershed is listed with the Utah Department of Water Quality as an impaired watershed for total dissolved solids where TDS concentrations measured along various reaches of the Price River have exceeded the Utah water quality standard for TDS of 1,200 mg/L. However, in the upper reaches of the Price River watershed where the permit and adjacent area are located, TDS concentrations have historically been below the 1,200 mg/L standard. TDS measured as part of baseline parameter data collection for the Kinney permit application at the perennial stream sites: Miller Outlet, Mud Creek, and Res 1 have been demonstrated not having exceeded the state standard for TDS.

Ephemeral Streams

Ephemeral drainage resources exist within the permit boundary and include: Eagles Canyon, Kinney Draw, Columbine Draw and Jones Draw. These ephemeral drainages are shown on Figure 2, within Chapter 6 of the permit application. The applicant has reported that no water was present in any of the drainages during the baseline monitoring period.

Surface Water Bodies

Scofield Reservoir is a state park and a man-made water body located in the Pleasant Valley graben and approximately ¾ mile to the north of the Kinney #2 permit boundary. The Utah Division of Water Quality has classified the Scofield Reservoir as a 1C, 2B, 3A and 4 water bodies. The details for each of these classification codes are presented on page 7-35 of the permit application. In short, these classifications indicate that the reservoir and its associated tributaries are protective for treated culinary water use, recreation, cold water non-game fish habitat, irrigation and stock water uses.

Water quality in the Scofield Reservoir is considered fair. The water tends to have high concentrations of nitrogen and phosphorous and low concentrations of oxygen. Concentrations of total phosphorous and dissolved oxygen are two constituents have consistently exceeded the recommended pollution indicators from water samples collected from the reservoir. The reservoir has had historical problems with algal blooms that have been responsible for fish kills due to the depletion of oxygen in the water. None of these pollution indicators are associated with historical mining activities in the region. However, activities such as mining, road and other construction do have negative impacts on the water quality due to excessive sediment loading into the reservoir. These sedimentation issues emphasize the need for diligent sediment controls from the proposed mining operation.

Findings:

The applicant has provided a comprehensive study and discussion in sufficient detail of the hydrologic resources found within and adjacent to the permit area. The applicant has met the hydrologic resources requirements in accordance with R645-725.300.

Water Rights

Groundwater Rights

Groundwater rights are discussed on page 7-44, shown on Map 30 and listed on Table 11 of the permit application. There were no groundwater rights located within the permit boundary. Several groundwater water rights are located within the town of Scofield located approximately one-half mile west of the permit boundary. These water rights are associated mainly with private water wells. The applicant states that all wells are screened in valley alluvium located on the Pleasant Valley graben, which is a fault block that has been dislocated stratigraphicaly from the rock units to the east. There is approximately 223 feet of offset of the Hiawatha coal seam from the permit area to where these water wells are located. There appears to be no direct hydrologic connection to the groundwater water rights located in the Pleasant Valley and the water rights located north the Scofield Reservoir. The Hiawatha seam in the permit area is located between 172 and 223 feet above these water rights and therefore, any impacts to these rights are unlikely. Moreover, the strata in the permit area dip to the northeast further prohibiting any groundwater migration to the west that could potentially affect the water quality in these wells.

Two additional groundwater rights associated with water wells were located approximately two miles north of the permit boundary near Scofield Reservoir – Water Rights a28898 and E1934. These groundwater rights are located in Section 21 T12S R7E. The wells reportedly serve for domestic and irrigation uses and are advanced to depths of 50 feet and 146 feet below ground surface (Div. Of Water Rights – Well Log information). A well log describing the geology was only available for a28898 and reported shale to depths of 80 feet. Sandstone was reported from 80-146 feet. Based on the geologic cross section Map 7B

provided, the Hiawatha seam to be mined is truncated near the northern permit boundary at an approximate elevation of 7,790 feet. The locations of these wells are set off Highway 96 and adjacent to Scofield reservoir at an approximate elevation of 7618. The Pleasant Valley graben drops the Hiawatha seam at Sulfur Spring down to an approximate depth of 7,400 feet. This indicates that these water wells are hydrologically disconnected from the Hiawatha coal seam and are highly unlikely to be affected by mining activities.

Findings:

R645-301.731.800: There appears to be no direct hydrologic connection to the groundwater water rights located in the Pleasant Valley and the water rights located north the Scofield Reservoir. The Hiawatha seam in the permit area is located between 172 and 223 feet above these water rights and therefore, any impacts to them are unlikely.

Surface Water Rights

Surface water rights are discussed on page 7-58 and shown on Map 31 of the permit application. Table 12 on page 7-72 lists the surface water rights within a 4 mile radius of the permit boundary. According to Map 31, two exist: 91-3588 and 91-4026. Surface water right number 91-3588 is listed as a stockwater right located on a stream but is incorrectly mapped in the DWRi database. This water right is shown on the map with a "See Note 1" label on it. Surface water right 91-4026 appears to be a disputed water right on an unnamed spring used for stockwatering. The applicant is claiming that this water right is associated with Aspen Spring (aka Eagle Pond 1). The adjudication maps depicts this water right as a spring and associated stockwatering pond. These locations should be field checked by the Division and the Department of Water Rights to determine if they are being put to beneficial use (i.e. if a developed stockwatering trough is present).

There are other surface water rights found within the adjacent area. Several surface water rights are found along Mud Creek, which is hydrologically disconnected from the permit area. There are also a series of water rights located along Long Canyon and Miller Creek. There are several beaver ponds located in this canyon, which may likely be the sources of these surface water rights. If the mine is to expand eastward, water rights in Long Canyon and along Miller Creek should be field checked by the Division and the Department of Water Rights in order to better establish baseline conditions.

DEFICIENCY: Surface water right information needs to be expanded upon to address the surface water rights within the permit boundaries. The application needs to be updated to include updates to Map 31 explaining the "See Note 1" comment next to water right number 91-3588. Additional information about the status and nature of the two individual water rights is needed on page 7-53 of the application.

DEFICIENCY: Surface water rights in the permit area and within Long Canyon and Miller Creek need to be field checked by the Division and the Department of Water Rights in order to better establish baseline conditions to determine if any of these water rights are being put to beneficial use (i.e. stockwatering troughs). The Division would like to perform this fieldwork weather permitting during the 2011 field season. On Map 28 the surface water sample locations in Long Canyon and in Eagle Canyon that will be monitored as part of the water monitoring program should be updated on the map to show which of these samples have a water right attached to them.

Findings:

The applicant contends in their deficiency guidance document that the surface water right identified within their proposed permit area is Aspen Spring and is one in the same with the surface water right #91-4026 located at the bottom of Eagle Canyon. However there is no explanation tying this water right to Aspen Spring explained anywhere in the MRP. In fact, on page 7-58, the water right is characterized as a stockwater right on an unnamed spring with no mention of an associated pond. The information on the water right taken directly from the Utah Division of Water Rights database included in Exhibit 13 indicates that water right #91-4026 is an unnamed spring used for stockwatering. The original adjudication map does show the water right as a spring with an associated pond, but again there is no discussion that definitively concludes that this water right is Aspen Spring, other than what has been discussed in the deficiency guidance document prepared by the applicant.

A reconnaissance to evaluate locations of the surface water rights in Long Canyon will be performed during the 2011 field season. Until such time, Map 28 cannot be updated with sample locations from Long canyon. The only water right located in Eagle Canyon is Aspen Spring and is shown on Map 28.

Probable Hydrologic Consequences (PHC) Determination

PHC are discussed at length in section 645-301-728. The applicant provides a general discussion of baseline groundwater and surface water conditions in and adjacent to the permit area. In the permit area, groundwater in the area is limited to isolated perched groundwater pockets and springs and seeps primarily found along the margins of localized faults. Off the permit area, the primary beneficial use of groundwater is concentrated around the southeastern portion of Scofield Reservoir. This groundwater is from the shallow alluvial/colluvial system associated with the reservoir and is located west of and downgradient of the permit boundary. Hydrologically, this aquifer system is considered isolated from the east-dipping fault block and graben system that makes up the strata to be mined. Furthermore, the Hiawatha seam truncates on the western side of the permit boundary approximately 223 feet above the level of the Scofield Reservoir isolating the coal seam from the alluvial aquifer system.

The applicant indicates that potential groundwater impacts include: prior underground mining activities that have historically taken place in the region and the draining of localized perched aquifers pockets which is a common occurrence in the Wasatch Plateau/Book Cliffs region from mining activities. These perched systems if drained could result in redirection and redistribution of groundwater flows. Springs and seeps within the permit area could be effected. CR plans to monitor springs and if any interruption of flows are noted causing a diminution of a water right, CR will remedy the loss by instituting water replacement activities including monetary compensation, or other appropriate mitigation measures. Underground workings after they have been mined out are expected to at least partially fill with water.

There is some evidence that faults play a role in both transmitting and inhibiting the flow of groundwater. The applicant makes the case that groundwater is limited by low transmissivities and limited recharge in the area due to the arid conditions and limited outcrop exposures. Given that the drilling investigation demonstrated that the location where the Hiawatha seam to be mined did not produce any groundwater in the area and the isolated nature of the perched systems, it is unlikely that mining operations will effect or disrupt any groundwater flows or impair the water quality of any receiving water bodies identified in the region.

Mining-induced subsidence is considered negligible as the mining methods to be employed are first mining only. No longwalls are planned which have a higher likelihood of producing subsidence effects on the surface. Springs and stockwatering ponds are located in the eastern portion of the permit area but still require characterization in the form of baseline data in the permit area in order to determine if there are any negative consequences that could arise from underground coal mining.

Probable hydrologic consequences for surface water are expected to be negligible since there are no perennial surface water bodies within the permit area. The presence of surface water in the area is considered minimal. Eagle Canyon located within the permit area is the only canyon with an observed ephemeral flow. The applicant contends that the impacts to surface water drainages will likely be from surface water runoff, temporary increases from surface disturbance areas, increased levels of TDS and other constituents. All of these impacts are expected to be negligible due to the implementation of sediment controls.

Findings:

The applicant has provided a comprehensive study and discussion in sufficient detail of the PHC within and adjacent to the permit area. The applicant has met the hydrologic resources requirements in accordance with R645-301.725.300.

OPERATION PLAN

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.

General

Analysis:

A NOAA precipitation frequency chart was provided. According to the chart total precipitation for the 10-year, 24 hour storm event is 1.92 inches per event. The 10 year 6-hour event is 1.28 and the 100 year, 6-hour event is 2.08. Runoff curve numbers were calculated for various subbansins and were produced based on these rainfall estimates.

Ditches and culverts were designed in excess of the 10-year, 24-hour event based on calculations for the diameter of the culverts prepared by Hansen, Allen and Luce in Exhibit 16.

One sediment pond is proposed for the entire facility. The sediment pond is designed to hold a 100-year, 6-hour storm event which is 2.06 acre-feet and shown on Maps 24 and 13. The pond is designed to hold a total volume of 3.15 acre-feet. Pond design details are discussed on pages 5-85 and 86 of the MRP.

Acid- and Toxic-Forming Materials and Underground Development Waste

The applicant refers to Section R645-301-624 to address the acid and toxic characteristics of their coal and mine development waste. The application states that a 12,000 cubic yard pile of coal was buried on the property during prior mining activities that have occurred in the area. The applicant has indicated that this coal will be removed from the property prior to the inception of mining activities. Roof and floor materials will be removed and stored in designated in-mine rock storage areas. The applicant indicates that any emergency storage of this material on the surface will be placed in a temporary stockpile located within the disturbed area boundary and draining to the facility's sediment pond.

Findings:

The requirements for handling acid and toxic materials to prevent any negative effects to surface water or groundwater and overall water quality appears to be addressed in the plan and complies with the R645-731.300 Utah Coal Rules.

Transfer of Wells

During the last round of permit review this regulation was not addressed in the plan.

DEFICIENCY: R645-301-731.400: The Transfer of Wells regulation was not addressed in the application. Please address this regulation.

Findings:

The applicant has added language in this section addressing the transfer of wells regulation. The additional information provided meets the Utah Coal Rules.

In-Mine Water Disposal Options

The flow of mine drainage is anticipated to progress downdip toward the northeast and will be controlled with pumping while the mine is in operation so as to prevent any potential gravity discharge from the mine. The operators anticipate that there may be some flooding of the mine once mining activities cease where water will reach an equilibrium point. CR does not anticipate any post-cessation gravity discharge flow and plans to seal and backfill the mine portals. There are no plans to divert any surface water into underground mine workings.

Sediment Control Measures

The plan discusses under section R645-301-732 on page 7-110 how sediment pond sludge accumulation will be managed once it has collected in the pond. The plan indicates that in order to maintain adequate storage capacity, accumulated sediment will be disposed of within abandoned mine sections.

DEFICIENCY: R645-731.500 CR proposes several alternatives under Section R645-731.500 in the event that a gravity discharge does occur. The first of these options states that discharge will be directed into remote or abandoned underground workings. This practice is permissible under rule R645-731.513 provided that specific additional hydrology requirements are met as stated in the regulation. The applicant should add language as per the regulation making it clear that this provision regarding the diversion of underground from workings to abandoned workings is understood and update this section as wells as the section on page 7-102 of their plan accordingly.

DEFICIENCY: Sludge materials that end up in the sediment pond are combinations of underground development waste and non-coal waste as defined in the regulations under R645-100-200 and R645-301-528.331, -542.741 and -747.100. Non-coal wastes include, but are not limited to, grease, lubricants, paints, flammable liquids, garbage, abandoned mining machinery, lumber and other combustible materials generated during mining and reclamation activities. Non-coal waste streams are not an accepted form of waste allowed to be discharged into underground mine workings as per R645-731.511 & 512. It is recommended that this sentence be removed and language associated with the applicant's intent to haul sediment pond sludge offsite be inserted.

Findings:

The applicant indicated in their deficiency response document that no non-coal waste materials would be disposed of in abandoned underground workings. However, the correction was not made to the language in the MRP stated on page 7-114 pertaining to sludge materials from the sediment pond being disposed of in abandoned underground workings. Deficiency still stands.

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:

Water Rights Maps

The applicant has presented Maps 30 and 31 showing the groundwater and surface water rights, respectively within a 2-mile radius of the permit boundary.

Regional Hydrology Map

The Regional Hydrology Map is presented as Map 7 and shows all the groundwater wells, springs and water bodies in the region.

Cross-Section Maps

The regional geology and the location of the Hiawatha coal seam to be mined relative to the other coal seams in the area are depicted on cross section maps 7A and 7B. Map 7A represents a west - east map beginning near the Scofield Reservoir to the Jump Creek Graben. Map 7B depicts a north – south map beginning near Sulfur Spring and continuing to UP Canyon. These cross-section maps are represented in plan view on Map 7 – Regional Hydrology.

Surface and Groundwater Monitoring Sites Map

The Surface and Groundwater Monitoring Map depicts all the proposed operational sampling locations and is presented as Map 28 in the MRP.

DEFICIENCY: R645-301.722: Maps 30 and 31: Several of the groundwater rights within the search radius are associated with change or exchange applications as noted with an Identification number starting with an A or a E before the number. When discussing water rights in the narrative, these A or E water rights are referred to but they are not shown on Map 30, so it is difficult to cross-reference. In addition to the water right number, please also reference the change or exchange water right numbers on the map for clarity.

DEFICIENCY: Map 7: There are several locations with "Eagle Spring" in the title on Map 7 – Regional Hydrology map: Eagle Spring 1, Eagle Spring 1A, Eagle Spring 2, Eagle Pond 2, and Eagle Seep 3. Furthermore, Table 9 on page 7-18 of the permit application lists Eagle Seep 1, Eagle Seep 1A, Eagle Spring 2, and Eagle Seep 3. Presumably, Eagle Seeps 1 and 1A correspond to Eagle Spring 1 and 1A on Map 7. This requires clarification on both Map 7 and Table 9.

DEFICIENCY: Maps 7A and 7B: There are several letter and number demarcations on these maps which presumably denote the exploratory boreholes that were drilled – but it is not explicitly stated what these letters/numbers represent on the maps. These boreholes should either be explained in the legend or removed altogether. Monitoring wells CR-06-01 and CR-06-02 were not depicted on Map 7B.

DEFICIENCY: Map 28 needs to be updated to show any additional surface and groundwater monitoring locations added to the plan. Groundwater samples locations in Long Canyon and in Eagle Canyon that will be monitored as part of the water monitoring program should be updated on the map to show which of these samples have a water right attached to them.

Findings:

A groundwater rights evaluation was conducted within a 2-mile radius of the proposed Kinney #2 mine site. The applicant describes several water rights associated with domestic water supplies located within an unconfined aquifer in valley alluvium. Similarly, additional

groundwater rights also associated with domestic water supplies are located west of Mud Creek. These water rights are hydrologically disconnected from the water rights east of Mud Creek. The location of these groundwater water rights are within Pleasant Valley which is located to the west and at an elevation approximately 1,000 feet below the mine site. The applicant states that Pleasant Valley is geologically disconnected from the coal seam and given the dry conditions found during drilling exploration activities and the fact that geologic strata dip northward, there is little to no potential impact to the closest groundwater rights in Pleasant Valley to the west.

Additional water rights are located 2 miles to the north associated with domestic irrigation wells adjacent to Scofield Reservoir. These wells were concluded to not be impacted by mining due to their distance from the relatively dry mining area and their primary source of groundwater being the Scofield Reservoir.

Corrections were made in both the narrative on page 7-44 and on map 30 explaining all the groundwater rights within a 4-mile radius of the proposed permit area.

Surface water right information was corrected to show a 2-mile radius search around the proposed permit area. The search determined that surface water right #91-3588 shown as located within the permit boundary was mapped incorrectly by DWRi. The actual location is approximately 6.5 miles to the south. Surface water right #91-4026 is listed within the permit boundary as a stockwater right on an unnamed spring. It is not clear if this is a developed spring or whether or not it was surveyed during the 2006 Spring and Seep Survey conducted by Rock Logic Consulting, LLC. The applicant contends that Aspen Spring is the representative spring for the fault-related perched system.

Information on this spring states that it feeds a pond (Eagle Pond 1) and that flow is impossible to measure because it flows beneath the pond. That being the case, Aspen Spring would not make for a representative spring sampling point because standing water in a pond is not representative of groundwater. An alternate flowing spring needs to be designated for baseline and operational monitoring to be representative of the fault-perched aquifer system in the permit area boundary.

The applicant has made corrections to Table 9 and Map 7 to address nomenclature inconsistencies between the table and the map relating to the Eagle Springs series of springs located on the east boundary of the permit area.

The cross section maps 7A and 7B have been updated with a legend that differentiates an exploration hole from a monitoring well completion yet are still represented by solid lines, not making it explicitly clear but good enough. Monitoring wells CR-06-01 and CR-06-02 are now depicted on Map 7B as requested by the Division.

Applicant states that Map 31 was updated to show water rights on Aspen Spring; however it does not appear that the applicant has identified Aspen Spring as a monitoring point associated with WR 91-4026 in the MRP. The narrative of the MRP still needs to be updated to definitively indentify exactly what sampling location is associated with this surface water right. The applicant is contending that Eagle Pond 1 is another name given to Aspen Spring; however there is no Eagle Pond 1 listed in the 2006 Spring and Survey. The closest point that fits the description of Aspen Spring is called "Eagle Spring 2 and Pond" in the spring and seep survey. This information still needs to be clarified.

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

DEFICIENCY: [R645-301.724.320]: The applicant states the regulation mostly verbatim without any supporting narrative. Additional explanation or references to how reclamation will be accomplished to prevent material damage to the hydrologic balance is needed to meet the requirements of this section.

Findings:

The applicant has subsequently included a narrative in this section that discusses temporary impacts to surface water resources within the permit area that will effect drainages but will be mitigated give then small disturbance footprint of the mine and the sediment control structures to be installed including: ditches, culverts and the sediment pond.

Section 724.320 discusses temporary impacts during reclamation at the site. Reclamation is to be accomplished in stages where interim reclamation will consist of the removal of all surface facilities with the exception of the sediment pond and its associated access road. All drainage control structures will remain in place such that they can accommodate sediment and runoff that are the result of the demolition activities. Final reclamation will consist of the removal of the sediment pond and all other disturbed and undisturbed ditches and culverts. The main access road to the mine is to remain as a private road for landowner access.

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

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 baseline groundwater resources.

Findings:

The application does not meet the Cumulative Hydrologic Impact Assessment requirements of the State of Utah R645-Coal Mining Rules. Several deficiencies were not addressed or inadequately addressed and are summarized at the beginning of this document.

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.

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