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TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

April 23, 2012

TO: Internal File

THRU: Ingrid Campbell, Team Lead

FROM: Steve Christensen, Environmental Scientist

RE: Midterm Permit Review, West Ridge Resources, Inc., West Ridge Mine, Permit C/007/0041, Task ID #4046

SUMMARY:

On September 29, 2011, the Division of Oil, Gas and Mining (the Division) notified West Ridge Resources (the Permittee) of the commencement of the Midterm Permit Review for West Ridge Mine. The Division outlined the following items to be reviewed:

A. Review of the Plan to ensure that the requirements of all permit condition, division orders, notice of violation (NOV), abatement plans, and permittee-initiated Plan changes approved subsequent to permit approval or renewal (whichever is the most recent) are appropriately incorporated into the Plan document.

B. Ensure that the Plan has been updated to reflect changes in the Utah Coal Regulatory Program which have occurred subsequent to permit approval or renewal.

C. Review applicable portions of the permit to ensure that the Plan contains commitments for application of the best technology currently available (BTCA) to prevent additional contributions of suspended solids to stream flows outside of the permit area.

D. Evaluate the compliance status of the permit to ensure that all unabated enforcement actions comport with current regulations for abatement; verify the status of all finalized penalties levied subsequent to permit issuance or permit renewal, and verify that there are no demonstrated patterns of violation (POV). This will include an AVS check to ensure that Ownership and Control information is current and correct.

E. Evaluate the reclamation bond to ensure that coverage adequately addresses permit changes approved subsequent to permit approval or renewal, and to ensure that the bond amount is appropriately escalated in current-year dollars.

F. Evaluate the permit for compliance with variances or special permit conditions.

G. Optional for active mines, mandatory for reclamation only sites: conduct a technical site visit in conjunction with the assigned compliance inspector to document the status and effectiveness for operational, reclamation, and contemporaneous reclamation practices undertaken on predetermined portions of the disturbed area to minimize, to the extent practicable, the contribution of acid or toxic materials to surface or groundwater, and to otherwise prevent water pollution.

A site visit was conducted by Division personnel on October 25th, 2011. At the time of the site inspection, the components of the surface facilities drainage network appeared to be functioning as designed. The outfall of UPDES discharge point 002 was also observed during the inspection. No evidence of additional contributions of suspended solids to stream flow outside the permit area was observed.

The initial mid-term review identified one deficiency relative to hydrology. The Permittee was directed to update Appendix 7-10, UPDES Permit with the up to date Utah Pollution Discharge Elimination System permit (No. UT0025640). The Permittee has provided the current UPDES permit in Appendix 7-10.

TECHNICAL ANALYSIS:

OPERATION PLAN

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:

Water-Quality Standards and Effluent Limitations

The Utah Division of Water Quality (DWQ) has issued UPDES (Utah Pollution Discharge Elimination System) Permit No. UT0025640 for the West Ridge Mine. The permit specifies the reporting and self-monitoring requirements for two UPDES points: UPDES 001 – discharge from the sediment pond to 'C' Canyon ephemeral drainage; and UPDES 002 – discharge from the underground workings to the 'C' Canyon ephemeral drainage. Effluent limitations set by the permit include total suspended solids (TSS) limits of 70.0 mg/L for a daily maximum discharge, 35 mg/L for a 7-day average discharge, and 25 mg/L for a 30-day average discharge. Total dissolved solids (TDS) limitations are set at one ton (2,000 lbs) per day from grab samples collected twice per month. The Permittee provides the UPDES permit in Appendix 7-10, *UPDES Permit*.

The Permittee has updated Appendix 7-10, *UPDES Permit* with the current Utah Pollution Discharge Elimination System permit (No. UT0025640).

Since the West Ridge Mine began discharging mine water in February 2003, average daily flow is approximately 622 gallons per minute (gpm). The maximum recorded flow value for the mine water discharge is 1,481 gpm. Calculated TDS concentrations have exceeded the one-ton per day limit for many of the months since discharge began. To mitigate the repeated TDS exceedence, DWQ allows the mine to participate in a salinity offset program.

Diversions: General

All diversions (drainage controls) within the permit area are located at the main surface facility area, and consist of culverts and ditches. Map 7-1, *Drainage Area Map* and Map 7-2,

Mine Site Drainage Map identify drainages and disturbed and undisturbed area diversions. With the exception of the alternative sediment control areas (ASCAs), all disturbed area drainage is routed to the primary sedimentation pond. All the diversions are temporary and will be removed during reclamation. The diversions consist of undisturbed area bypass culverts, disturbed area culverts, and undisturbed and disturbed area ditches.

Tables 1 through 4 of Appendix 7-4 describe the hydrologic characteristics of the drainages. The information in the tables is used to calculate the flow capacity for each structure. To calculate drainage peak flows and ditch capacities, the Permittee used the computer program by the "Office of Surface Mining Watershed Model" Storm Version 6.20. To calculate culvert capacities, the Permittee used the computer program Haestad Methods, Flowmaster I, Version 3.43. Computer calculations are provided at the end of Appendix 7-4.

Upon review of the MRP, all diversions have been designed, located, constructed, and used to prevent, to the extent possible, additional contributions of suspended solids to stream flow outside the permit area.

Diversions: Perennial and Intermittent Streams

'C' Canyon Creek is the only stream within the permit area. 'C' Canyon has been characterized as an ephemeral drainage. No perennial or intermittent streams are located near the disturbed area boundary. As a result, there are no diversions of perennial or intermittent streams associated with the West Ridge Mine. The 'C' Canyon stream channel is diverted beneath the mine site through bypass culverts and discharges onto a protective rip-rap slope within the natural 'C' Canyon channel downstream of the disturbed area.

Diversions: Miscellaneous Flows

Besides the intermittent stream bypass culverts, The MRP identifies 33 diversions within the mine's disturbed area: two undisturbed area culverts (UC-PP and UC-RR), 13 disturbed area culverts (DC-2, DC-4a, DC-5 through DC-AR, and DC-10 through DC-13), two undisturbed area ditches (UD-Z and UD-15), and 16 disturbed area ditches (DA-1 through DA-15). Design calculations and construction diagrams are presented for each of the diversions in Appendix 7-4. The layout of the drainages and diversions are depicted on Map 7-2. Calculation methods and descriptions of culverts and ditches are presented in Sections 2.9 and 2.10 of Appendix 7-4, respectively. All diversions are temporary and will be removed upon final reclamation.

Undisturbed Area Ditches

Ditches UD-15 and UD-Z are designed to divert runoff from undisturbed drainages at the south end of the mine site within ASCAs W and Z, respectively. The ditch design summaries are

shown in Table 5 of Appendix 7-4. Designs are shown from calculations based on the peak flows from a 10-year/24-hour precipitation event (Table 5 and Figure 3). The ditches designs are triangular with 2:1 side slopes and minimum freeboards of 0.5 feet. The ditch designs exceed the required design to handle peak flows of a 2-year/6-hour precipitation event for a temporary diversion (R645-301-742.333). According to the MRP, the ditches are to be protected by rip-rap or concrete if the flow velocity exceeds 6 fps. Calculated flow velocities are below 6 fps and do not require additional erosion protection.

Disturbed Area Ditches

Thirteen ditches (DD-1 through DD-13, and DD-4A) divert disturbed drainage to the sedimentation pond. Drainages and ditches contributing to each respective ditch are presented in Table 10 of Appendix 7-4. Table 11 presents the peak flows and Table 12 summarized the ditch characteristics used to calculate the ditch designs. Designs are shown from calculations based on the peak flows from a 10-year/24-hour precipitation event (Table 13 and Figures 3, 4, and 5). The ditch designs are triangular with 2:1 side slopes and minimum freeboards of 0.5 feet. This design exceeds the required design to handle peak flow from a 2-year/6-hour precipitation event for a temporary diversion (R645-301-742.333).

According to the Application, a 6 fps limiting velocity is used for unlined ditches. Table 13 shows that four ditches have calculated flows in excess of 6 fps (DD-1, DD-4, DD-6, and DD8A). Ditch DD-1 has a calculated flow velocity of 6.02 fps and will remain unlined unless it exhibits erosion. Ditch DD-4 is protected with the use of wire gabion energy dissipaters and ditch DD-8A is protected with rip-rap. Ditch DD-6 is naturally lined with bedrock.

Undisturbed Area Culverts

Culverts UC-PP and UC-RR (three nine-inch CMPs) divert runoff from undisturbed drainage UA-PP beneath the ASCA area on the southern end of the surface facility. The discharge is routed to ditch UD-Z (Map 7-2 and Table 2 of Appendix 7-4). The culverts were designed to handle the calculated peak flow of a 100-yr/6-hour precipitation event from the drainage of 2.0 inches. Table 6 of Appendix 7-4 lists the culvert characteristics used in calculations and Table 7 presents the culvert design summaries. The calculated minimum diameter for each culvert is shown to be smaller than constructed diameters in Table 7. The bypass culverts have been designed to handle peak flow of the 100-year/6-hour precipitation event, which exceeds the R645 requirement of a 2-year/6-hour precipitation event for a temporary diversion (R645-301-742.333).

Culvert UC-PP has a calculated flow velocity below 6 fps for calculated peak flow less than the 100-year/6-hour event. Therefore, discharge to ditch UD-A does not require protection. The undisturbed culverts are designed with trash rack and riprap inlet structures to reduce potential obstructions and undercutting (Section 2.9 and Figure 5 of Appendix 7-4).

Disturbed Area Culverts

Thirteen culverts are proposed to divert the disturbed area drainage. Ditches contributing to the respective culverts are presented in Table 10 of Appendix 7-4. The culverts are designed and sized to collect and transmit the peak flow from a 10yr - 24hr precipitation event. Table 14 of Appendix 7-4 lists the culvert characteristics used in calculations and Table 15 presents the culvert design summaries. The calculated minimum diameter for each culvert is shown to be smaller than constructed diameters in Table 15. The culverts have been designed to handle peak flow of the 10-year/24-hour precipitation event, which exceeds the R645 requirement of a 2-year/6-hour precipitation event for a temporary diversion (R645-301-742.333).

Nine of the culverts have a calculated flow velocity exceeding 6 fps for calculated peak flows from the 10-year/g-hour event and/or the 10-year/24-hour event (Table 15). These ditches are shown to require rip-rap protection at their discharge. Rip-rap sizing for the culvert discharge is presented in Table 15.

Stream Buffer Zones

With the exception of the diverted section of 'C' Canyon Creek, no land within 100 feet of a perennial or intermittent stream within the permit area has been disturbed. As stated in Section 731.600 of the MRP, Stream Buffer Zones, 'C' Canyon Creek behaves as an ephemeral drainage. The Division has authorized the mine to allow the disturbed area within 100 feet of 'C' Canyon Creek with the diversion of the stream channel beneath the mine site. A buffer zone has been established and marked along the stream above and below the culvert to prevent channel disturbance by surface operations. Water quality is protected through sedimentation controls discussed in this memo below.

Sediment Control Measures

Sediment control measures have been designed to prevent, to the extent possible, additional contributions of sediment to stream flow or to runoff outside the permit area; meet the more stringent of applicable State or Federal effluent limitations; and, minimize erosion to the extent possible. Structures used for the run-off control plan for the permit area include disturbed and undisturbed area diversion channels, sedimentation ponds, containment berms, silt fences, and road diversion culverts.

Alternative Sediment Control Areas (ASCAs)

There are four alternate sediment control areas (ASCAs) described in Section R645-301-742 and Appendix 7-4, and depicted on Plate 7-2 of the MRP (ASCA-W, ASCA-X, ASCA-Y,

and ASCA-Z). The combined ASCA areas encompass approximately 4.18 acres. The ASCAs as described in the MRP utilize either one or a combination of silt-fencing, straw bales, rip-rap, containment, and vegetative cover. These measures represent the Best Technology Currently Available (BTCA) in controlling sediment in areas that do not report to the sedimentation pond.

At the time of the field inspection on October 25th, 2011, the ASCA areas were inspected. The components of the ASCA's were visually observed and appeared to be functioning as designed. No signs of excessive erosion or cutting were observed during the inspection.

Siltation Structures: General

The West Ridge Mine sedimentation ponds are the only siltation structures within the permit area. The sedimentation pond design calculations are presented in Appendix 7-4 of the MRP. The operation and maintenance of the sedimentation pond is described in Section 7.42.22 of Appendix 7-4.

Siltation Structures: Sedimentation Ponds

The West Ridge Mine sedimentation ponds consist of two ponds in series (cells A and B). Together, they are designed to contain the runoff from contributing watersheds from a 10-year/24-hour precipitation event, along with a minimum of three years of sediment storage.

Appendix 7-4 presents the sediment pond design, stage volume data, and design summary. Computer backup data for the runoff and soil loss for each contributing watershed is presented in Appendix 1 of Appendix 7-4. The sediment pond plan and cross sections are provided in Maps 7-4 and 7-4A.

The sediment ponds meet the requirements and design standards of the R645 Coal Rules for sedimentation ponds. As a result, the sediment ponds represent BTCA to prevent additional contributions of suspended solids to stream flows outside of the permit area.

Discharge Structures

The only discharge structure for the West Ridge Mine is the rip rap outlet at the bypass culvert UC-OO described in Section 2.12 of Appendix 7-4. The discharge structure is designed to protect the natural channel from the discharge of a 100year/6-hour precipitation event plus sedimentation pond discharge of 102.01 cfs. The structure is comprised of 12-inch D_{50} riprap apron that is 20 feet long and tapers from 4 feet at the culvert outlet to 2 feet with a 0% grade.

Findings:

The West Ridge MRP contains commitments to use the best technology currently available (BTCA) to prevent additional contributions of suspended solids to stream flows outside of the permit area. BTCA means that the operator is employing the best methods available at any one time. However, a review of the Hydrologic Information of the MRP has identified a revision that must be completed for this midterm review:

RECOMMENDATIONS:

The mid-term response should be approved.

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