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TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

January 27, 2011

TO: Internal File

THRU: Ingrid Campbell, Mine Lead *ICC*
Jim Smith, Permit Supervisor *JCS 02/03/11*

FROM: Steve Christensen, Environmental Scientist *SKC*

RE: Change in Water Monitoring, West Ridge Resources, Inc., West Ridge Mine, C/007/0041, #3717.

SUMMARY:

On December 21st, 2010, the Division of Oil, Gas and Mining (the Division) received an application from West Ridge Resources, Inc. (the Permittee) to revise the West Ridge Mine mining and reclamation plan.

The Permittee proposes to eliminate and/or reduce the schedule and number of water monitoring points. The application should not be approved at this time. The following deficiencies must be addressed prior to Division approval of the application:

R645-301-731.210: The Permittee must revise Table 7-1, Hydrologic Monitoring Protocols and Locations to depict the termination of water monitoring activity at spring site SP-15. Table 7-1 in the application appears to depict SP-15 as being actively monitored.

R645-301-731.210: The Permittee must revise the application to reflect on-going quarterly water monitoring (field and lab) for spring monitoring sites SP-12, SP-13, SP-101, SP-102, SP-80 and SP-8. Each of these springs has recently exhibited fairly significant upward trends in TDS and its associated components. As such, annual laboratory sampling is not approved at this time.

R645-301-731.210: The Permittee must revise Table 7-1, *Hydrologic Monitoring Protocols and Locations* to list Protocol D and provide a reference to the page where the specific analytical parameters for UG-1 are listed.

R645-301-731.220: The Permittee must revise the application to reflect on-going quarterly water monitoring (both field and lab) of surface water monitoring site ST-8. Based upon projected mining activity to occur adjacent to Grassy Trail Reservoir and given that ST-8 is the only surface-water monitoring site located below the reservoir, the Division finds that quarterly monitoring (field and lab analyses) of this site should continue. However; the Division would be amenable to replacing ST-8 with a monitoring site in closer proximity to the permit area in an effort to more accurately identify impacts associated with mining activity.

R645-301-731.220: Based upon projected mining activity in the areas adjacent to stream monitoring sites ST-3 and ST-9, the Permittee must revise the application to reflect continued quarterly water monitoring (both field and lab) for stream monitoring sites ST-3 and ST-9. The reduction in laboratory analyses from quarterly to annual for stream monitoring site ST-10 is approved.

R645-301-731.220: Based on the historically erratic water quality trends of the mine-water discharge, the Permittee must revise the application to reflect continued quarterly water monitoring (both field and lab) for stream monitoring site ST-6.

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:

Groundwater Monitoring

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

The application proposes to drop spring monitoring sites SP-15, SP-16, WR-1 and WR-2. Spring monitoring site WR-1 is located outside of the West Ridge permit area.

Spring WR-1 was undermined approximately 15 years ago by the Sunnyside Mine with an approximate overburden thickness of more than 2,000 ft. Additionally, projected future mining activity is located approximately two miles north of the spring. A field visit to the site was conducted on June 16th, 2010. The site was wet with saturated soils in the area of WR-1, however no measurable flow was observed. The spring site had been heavily impacted by cattle as evidenced by the foot prints and droppings located all over the spring site. Termination of monitoring activity at spring WR-1 is approved.

The application proposes the termination of monitoring activity at spring site WR-2. WR-2 was undermined in June of 2004. The coal seam is located approximately 2,400 ft below grade at the location of spring monitoring site WR-2. Subsidence monitoring was conducted 1,700 ft from WR-2 in 2006. The subsidence monitoring information has been provided in Appendix 7-13. The subsidence monitoring data indicates that the area has been stable for the last three years with less than 0.7 ft subsidence during that time. A field visit to the site was conducted on June 16th, 2010. Like spring monitoring site WR-1, water was present; however, no measurable flow was observed. There was evidence of extensive cattle movement at the site. The spring appeared to have been heavily impacted by cattle. Termination of monitoring activity at spring monitoring site WR-2 is approved.

The application proposes to terminate monitoring activity at spring monitoring sites SP-15 and SP-16. SP-15 is located due south of Grassy Trail Reservoir (approximately 1/8th of a

TECHNICAL MEMO

mile). The spring has been a historically low producer of water. The maximum discharge recorded at this site was in June of 2000 (6.7 gallons per minute). The spring was never undermined. The spring is located directly adjacent to the access road for the Grassy Trail Reservoir and Dam. As a result, the water quality data obtained from this spring would be greatly influenced with no connection whatsoever to mining activity. The termination of monitoring activity at spring monitoring site SP-15 is approved. However; the Permittee must revise Table 7-1, Hydrologic Monitoring Protocols and Locations to depict the termination of water monitoring activity at spring site SP-15. Table 7-1 in the application appears to depict SP-15 as being actively monitored.

SP-16 is located above the old Kaiser Mine works. The monitoring of SP-16 was initially conducted by the Permittee during the initial permitting of the West Ridge Mine. However; mining activity has never occurred in this area. The spring was utilized to provide baseline data for representative springs in the area. As mining activity is not projected to occur in this area and due to the fact that the spring was undermined by the Kaiser Mining Company years ago, continued data collection at this spring is no longer valuable. The termination of monitoring activity at spring monitoring site SP-16 is approved.

The application proposes to reduce the laboratory analytical sampling from quarterly to annually at spring monitoring sites SP-12, SP-13, SP-8, SP-101, SP-102 and S-80. The application states, "The existing long term quarterly record is sufficient to document trends and variation over time, and the basic makeup of this water is well-established, as shown by Stiff, Piper and Schoeller Diagrams." However; recent sampling data from each of these springs has produced increasing trends in TDS and its associated components. Additional monitoring of these springs is necessary. The Permittee must revise the application to reflect on-going quarterly water monitoring (field and lab) for spring monitoring sites SP-12, SP-13, SP-101, SP-102, SP-80 and SP-8. Each of these springs has recently exhibited fairly significant upward trends in TDS and its associated components. As such, annual laboratory sampling is not approved at this time.

The Permittee must revise Table 7-1, *Hydrologic Monitoring Protocols and Locations* to list Protocol D and provide a reference to the page where the specific analytical parameters for UG-1 are listed.

Surface Water Monitoring

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

The Permittee proposes to stop sampling surface water monitoring site ST-8 beginning in 2nd quarter of 2011. The Permittee must revise the application to reflect on-going quarterly water monitoring of surface water monitoring site ST-8. Based upon projected mining activity to occur

adjacent to Grassy Trail Reservoir and given that ST-8 is the only surface-water monitoring site located below the reservoir, the Division finds that quarterly monitoring (field and lab analyses) of this site should continue. However; the Division would be amenable to replacing ST-8 with a monitoring site in closer proximity to the reservoir in an effort to more accurately identify impacts associated with mining activity.

The Permittee proposes to reduce water quality sample collection and analysis from quarterly to annually. Stream monitoring site ST-3 has been monitored quarterly for water quality analysis since the second quarter of 1997. Stream monitoring sites ST-9 and ST-10 have been monitored for water quality on a quarterly basis since the second quarter of 2002. Based upon the water quality data that has been submitted, there has been no substantive change in the overall water chemistry of Grassy Trail Creek at these three monitoring sites. During the review/approval of the West Ridge MRP, the baseline data that was initially submitted for these three sites (ST-3, ST-9 and ST-10) identified magnesium, calcium and bicarbonate as the major ionic components of Upper Grassy Trail Creek. With ten years of data from ST-3 and nine years of data from ST-9 and ST-10, the general water chemistry of the Grassy Trail Creek drainage at these locations has not changed. Magnesium, calcium and bicarbonate are still the dominant ions and majority of the dissolved solids in the Upper Grassy Trail Creek drainage. However, due to projected mining activity in the areas of ST-3 and ST-9, quarterly sampling (field and lab) should continue at these sites. Based upon projected mining activity in the areas adjacent to stream monitoring sites ST-3 and ST-9, the Permittee must revise the application to reflect continued quarterly water monitoring (both field and lab) for stream monitoring sites ST-3 and ST-9. The reduction in laboratory analyses from quarterly to annual for stream monitoring site ST-10 is approved.

ST-15 is a surface water monitoring site on a tributary to Upper Grassy Trail Creek in Whitmore Canyon. The site has been monitored since 2003. No observable flows have been reported since that time. The Permittee proposes to continue quarterly sampling visits at the site and collect samples if flow is observable. Samples would be submitted for laboratory analyses on a quarterly basis.

ST-5 is located below the confluence of B and C Canyons. ST-5 was initially submitted as a surface-water monitoring point (during mine plan approval) as surface facilities were contemplated within B Canyon. Surface facilities have not been constructed within the B Canyon drainage and are not anticipated. Flows at site ST-5 are (with the exception of rainfall/snow-melt events) primarily mine-water discharge. Absent mine-water discharge, the flows recorded at site ST-5 have characterized this portion of the drainage is ephemeral. Quarterly data has been obtained at the site since the 2nd quarter of 2007. Given the ample water quality and flow data obtained during that time, the ephemeral nature of the drainage at this location is well documented. Furthermore, surface-water monitoring site ST-6 (located approximately 1 mile upstream from ST-5) is to remain a quarterly water monitoring point. Site ST-6 serves as a better indicator of the flow and chemistry of the water within this drainage as it

TECHNICAL MEMO

is located just off the permit boundary and much closer to the surface facility (thus more reflective of potential mining induced changes to water quality/quantity). Surface water monitoring site ST-5 is approved for removal from the water monitoring program.

The Permittee proposes to drop surface water monitoring activities at surface-water monitoring site ST-6A. ST-6A is located upstream of the surface facilities within the C Canyon drainage. The site has not recorded a observable flow since it became a monitoring site during the 2nd quarter of 1997. Mining last occurred in the area of ST-6A in 2007. Given the extensive monitoring conducted at the site and the overall lack of any observable flow, the ephemeral nature of this portion of the C Canyon drainage is well documented. The Division finds that terminating water monitoring activities at ST-6A is well founded.

Surface-water monitoring site ST-6 is located adjacent to the southern permit boundary within a half of a mile down gradient from the surface facilities of the mine. As with site ST-5, the flows at this site are comprised of primarily mine-water discharge. The Permittee proposes to reduce the water quality sampling from quarterly to annually. However, based on historically erratic trends in total dissolved solids and total iron (resulting in two notices of violation from the Division), it's recommended that ST-6 be analyzed quarterly for both field and laboratory parameters. Based on the historically erratic water quality trends of the mine-water discharge, the Permittee must revise the application to reflect continued quarterly water monitoring (both field and lab) for stream monitoring site ST-6.

The application proposes to drop ST-7 from the water monitoring program. This surface water monitoring site is located within A Canyon below the permit area. The site has not reported an observable flow since 1997. The Division finds that this monitoring site is no longer needed and is not producing substantive or worthwhile data.

Surface water monitoring sites ST-11, ST-12 and ST-13 were added to the water monitoring program in 2005. Since that time, the sites have been monitored quarterly, yet no observable flows have ever been reported at any of these monitoring sites. Additionally, mining occurred in this area over three years ago. There is no scientific reason to continue monitoring these sites.

Findings:

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

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RECOMMENDATIONS:

The application should not be approved at this time.