T E C H N I C A L M E M O R A N D U M

Utah Coal Regulatory Program

November 17, 2005

TO: Internal File

THRU: D. Wayne Hedberg, Permit Supervisor

FROM: David Darby, Reclamation Specialist/Hydrogeologist

RE: SITLA Muddy Lease Amendment, Canyon Fuel Company, LLC., SUFCO Mine, C/041/0002, Task ID #2354

SUMMARY:

The Division of Oil, Gas and Mining (the Division) received a significant revision to the MRP to mine the SITLA Muddy Tract Lease on February 11, 2005. This Technical Memorandum evaluates the Geology information provided in the MRP.

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

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

GEOLOGIC RESOURCE INFORMATION

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

The Permittee has addressed the requirements for this section. Geological information is supplied in Chapter 6 of the MRP. Plate 6-1 illustrates the local geology in the vicinity of the SUFCO Mine. The information described below is sufficient to allow the Permittee to determine the probable hydrologic consequences from mining.

Analysis:

Acid- and Toxic-forming Materials

The Permittee submitted information to address this section. Drill hole information is provided, along with coal seam, roof and floor samples for acid and toxic forming materials. The information is located in Chapter 6, and in Appendix 6-1 and 6-2 of the MRP (Confidential File). Most samples in the MRPshow no acid or toxic materials, however two samples taken in 1991 show potentially high levels of toxic material. One sample in 1991 exceeds the boron value. Another sample shows a SAR of 19.3 from drill hole 89-20-2. The Permittee discounts the data, stating there is likely an error in the level reported. The permittee is sampling mine waste prior to placing it in the refuse pile. No current samples show high levels of acid or toxic material. The Permittee contends there are no acid or toxic material going to the refuse pile. The refuse is sampled quarterly. The Permittee commits to sampling material going to the refuse pile. No offsite contamination is expected, because the refuse pile will be compacted in lifts then covered with topsoil to minimize contact between refuse and overland flow. Vegetation will be planted to stabilize the refuse at reclamation. The data sheets do not specify which coal seam or location where the samples were taken. Additional information was submitted on November 14, 2005 from two drill holes on the SITLA lease.

Drill Holes

The Permittee conducted drilling in the SITLA lease area and the sites are shown on Plate 6-1. Plate 6-5 provides a geologic cross-section of the coal zone strata in the lease from west to east. Section 6.2.2 identifies the drill holes.

Stratigraphy

All rock units within the SUFCO Mine property boundaries are sedimentary (Figure 6-1). The oldest unit is the Upper Cretaceous Masuk Member of the Mancos Shale, which is overlain in order of increasing younger rocks, by the Star Point Sandstone Member of the Blackhawk Formation, the upper Blackhawk Formation, the Castlegate Sandstone, the Price River Formation and the overlying North Horn Formation. The Permittee describes the stratigraphy in Chapter 6. Plate 6-1 shows the attitude of the formations over the permit area. The strike of the formations on the lease is approximately N. 54 E. and the dip is about 2.5 degrees to the northwest. Plate 6-1 also shows the stratigraphy over the permit area. Each stratigraphic unit is described in Chapter 6.

Mining will take place in the Upper Hiawatha Coal seam. Strata overlying the coal seam ranges from about 1000 feet to over 1800 feet.

Structure

From Plate 6-1 there appears to be one fault in the lease tract, however is lies outside the area of proposed mining. The surface of the lease features a mountain oriented from southwest to northeast. It is known a Big Ridge. The elevation over the lease ranges from about 8300 feet to over 9100 feet. The Cretaceous Price River Formation and Tertiary North Horn formations are exposed on the surface. The Castlegate Sandstone, which underlies the Price River Formation, forms vertical cliffs along Box Canyon to the east, Cowboy Canyon to the northwest and Green Canyon to the north. Joint patterns appear in the Castlegate Sandstone

Several perched springs discharge from the North Horn Formation. The springs that discharge from the Price River Formation are found along Cowboy Canyon. Subsidence will take place over much of the lease, however the springs should not be impacted, of the vertical distance from the coal seam to be mined and the spring should buffer fracturing impacts especially in the North Horn Formation where shales and mudstone are more elastic and should not fracture. Local changes to the bedding plane may occur, but a loss of water is not expected.

Fracturing in the Blackhawk Formation and Castlegate sandstone could occur and groundwater stored in these formations could be intercepted. The Permittee has discussed how intercepted groundwater flows into the mine where active mining is taking place, then abates as mining progresses to another area.

It is expected that subsidence will be observed on the surface in some areas where the cover is less as has occurred in the past in the Pines Tract. The Permittee has prepared a subsidence monitoring and mitigation plan.

Faults

The area of the permit is not heavily faulted according to Plate 6-1. No groundwater should be intercepted from faults.

Findings:

The applicant has submitted sufficient Geologic Resource Information.

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:

Coal Resource and Geologic Information Maps

Map 6-1 identifies the general regional geology and shows the coal seam stratigraphy, which dips northeast at about 2.5 degrees and structure. Plates 6-3 and 6-4 (geologic cross-sections B-B' and C-C') have been added. The revised Plate 6-1, Geology and Drill hole Location Map, includes federal lease UTU-76195 within the permit boundary and shows the locations of the two new cross-sections. Detailed geologic information is in the R2P2 on file with the BLM

Revised Plate 5-11 shows overburden isopach thickness for the SUFCO mine area, including the Pines tract. Revised Plate 5-10A shows the limits of anticipated subsidence for the Quitchupah Tract, Plate 5-10- B show the anticipated limits of subsidence for the Muddy Tract and the same area.

Plate 5-7 shows projected mining through the year 2009, plus outlines of additional longwall panels that are apparently projected for recovery at some time after 2004. Plate 5-7 indicates that the northern portion of the Muddy Tract Lease will not be mined. The Permittee explains that the sand channel that prevented complete mining of the panels in the Pines Tract extends west into the Muddy Tract lease to prevent complete mining of the panels in the Upper Hiawatha coal seam. The Permittee also explains that the coal thins northward, which hinders coal recovery. Plate 5-11 shows the overburden isopach for the strata above the Upper Hiawatha Coal.

Well Maps

Figure 8, Chapter 7 identifies the wells and drill holes on and adjacent to the permit area.

Findings:

The Permittee has submitted sufficient Maps, Plans and Cross-section information to meet the minimum requirements if the regulations

OPERATION PLAN

COAL RECOVERY

Regulatory Reference: 30 CFR 817.59; R645-301-522.

Analysis:

The Permittee has submitted sufficient information to address this regulation. The Permittee explains in Chapter 6 of the MRP the reason plans have been set to mine only in the upper Hiawatha seam. This submittal also includes a report from Agapito Associates that provides a detailed description of the stratigraphy and lithology on and adjacent to the mined area. The applicant submitted Plate 5-7 showing the mine projection in the upper Hiawatha coal seam. Map 6-3 shows the Upper Hiawatha isopachs.

Plate 5-7shows Muddy Tract lease and mine layout. The panels do not extend to the end of the permit boundary of the lease, because a sand channel that cuts the coal seam runs perpendicular to the mine panels, which blocks mine access. Also, a low seam height has been identified, which prevents further mining. The Permittee states that the information is in the Resource Recovery and Protection Plan on file is on file with the State of Utah School and Institutional Trust Lands Administration (SITLA). DOGM has requested the plan under the Engineering review. A deficiency exists under the R645-301-500.

Type and Method of Mining Operations

The permittee explains in Chapter 5 the planned mining method. Both continuous mining and longwall mining will be employed to maximize coal recovery. The Permittee has supplied maps, plans to show where mining will take place. Both room and pillar and longwall mining is planned to take as much coal as possible. The mining plan and Resource Recovery and Protection Plan has been compiled by the U.S. Bureau of Land Management BLM). It has been provided to the State Institute and Trust Lands Administration (SITLA), the owner of the mineral lease. SITLA has accepted the mining plans.

The Permittee has submitted several maps showing the mine projection in the upper Hiawatha coal seam. Map 6-3 shows the upper Hiawatha isopachs. The Permittee explains in Chapter 6 of the MRP the reason plans have been set to mine only in the upper Hiawatha seam. This submittal also includes a report from Agapito Associates that provides a detailed description of the stratigraphy and lithology on and adjacent to the mined area.

Several plates, including Plate 5-10-B, show the panel layout for the Muddy Tract lease. The panels do not extend to the boundary of the lease, because a sand channel that cuts the coal seam runs perpendicular to the mine panels, which blocks mine access. Also, a low seam height has been identified, which prevents further mining.

Type and Method of Mining Operations

The permittee explains in Chapter 5 the planned mining method. Both continuous mining and longwall mining will be employed to maximize coal recovery.

Findings:

The Permittee has submitted sufficient Coal Recovery information to meet the minimum requirements if the regulations

RECLAMATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

Analysis:

The applicant has provided information in the MRP to show they will conduct reclamation activities on the minesite at completion of mining. Drill will be plugged and abandoned following State approved methods.

Reclamation of the mine site following completion of the mining operations as required by state regulations R645-301 and R645-302 will be accomplished. The reclamation plan is discussed in detail in Chapter 3 of the MRP. No surface disturbance is planned for the SITLA leases.

When no longer needed for monitoring each well or boring will be capped, sealed, backfilled, or otherwise properly managed, as required by UDOGM. Permanent closure measures will be designed to prevent access to the borings or monitoring wells.

No oil and gas exploration or production wells are located in the permit area.

Subsidence of the sediments overlying the mining area will be monitored. A detailed description of the subsidence monitoring plan, including a map illustrating the location of monitoring stations, is presented in Section 3.4.8.

Findings:

The applicant has submitted sufficient Reclamation Plan information to meet the minimum requirements if the regulations.

RECOMMENDATIONS:

Geological information provided is sufficient to meet the requirements of the Coal Mining Rules. The proposed amendment should be approved.

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