

# TECHNICAL MEMORANDUM

## Utah Coal Regulatory Program

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March 9, 2005

TO: Internal File

THRU: Pamela Grubaugh-Littig, Permit Supervisor

FROM: David Darby, Environmental Specialist, Lead.

RE: Permit Boundary Expansion-Mathis/Summit Creek, Andalex Resources, Inc., Centennial Project, C/007/0019, Task ID #2119

### **SUMMARY:**

Andalex Resources Inc. proposes to add 1090.21 acres to their current mine permit. The change includes 380.0 acres in the Mathis Tract, 80.0 acres of the State LBA and 630.21 acres remaining in the Federal Summit Creek Lease. Plate 29 shows the three proposed areas the best. The State Lease has not been confirmed to date, but the permittee is expecting an action to affirm the lease so they can secure the rights to mine it. The total leases/LBA area (1182.53 acres) described under Section R645-301-114 of the Permit Application submitted on January 14, 2005. The information shown on page 1-21 is different than the area (1090,21 acres) requested for this expansion, because the expansion area requested in the application cover letter does not include the areas previously approved for incidental boundary changes (IBC). Plate 25 shows the three IBC's in relation to the Mathis and Federal (Summit Creek, UTU-79975) leases.

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**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 Centennial Project is located in the Book Cliffs, northeast of Price Utah. (Figure 6). The surface geology is shown in Plate 21. The exposed surface over the proposed leases is the Flagstaff Limestone. The permit expansion will provide access to develop two new sets of longwall panels. The panels will run east to west and have an over burden thickness of 2600 feet to 3100 feet (Plate 29). The dip of the formations is approximately 12 degrees, North 25 East.

**Analysis:**

*Acid- and Toxic-forming Materials*

Roof and Floor Properties

*Drill Holes*

*Stratigraphy*

Star Point Sandstone

The Star Point Sandstone is the oldest stratigraphic unit exposed in the lease areas. It is the basal unit of the Mesaverde Group and is approximately 440 feet thick. The formation contains the Panther, Storrs, and Spring Canyon Sandstone Members which consist of coarsening upward littoral sequences of white to light gray, fine to medium grained, tight, quartzose sandstone (Blanchard 1981). The Star Point Formation overlies and intertongues with the marine Mancos Shale. The Star Point is the lowest cliff-forming unit over most of the east side of the Wasatch Plateau.

Blackhawk Formation

The Blackhawk Formation measures approximately 900 feet thick in the Gordon Creek area and consists of interbedded fluvial and marine sandstone, siltstone, and shale. The Blackhawk Formation conformably overlies the Star Point Sandstone and the boundary between

the two formations is sharp; the massive Spring Canyon Sandstone member of the Star Point Sandstone is overlain by an easily erodible, shaley sandstone.

In the lease area, the Blackhawk Formation is the principal surficial bedrock unit. The Blackhawk disconformably overlain by the massive coarse grained, fluvial Castlegate Sandstone. A total of eight coal seams can be identified in the Gordon Creek region. Four of the eight seams are present in the mine area and outcrop on the walls of the North Fork of Gordon Creek Canyon, Coal Canyon, and Bryner Canyon.

Weathering, burning and vegetation obscures the majority of coal outcrops of the Hiawatha, Gordon, Castlegate "A", and Bob Wright seams. Only the Hiawatha and Castlegate "A" seams have been economically mined in the area. The Hiawatha seam marks the base of the Blackhawk Formation. The Castlegate "A" seam overlies the Aberdeen Sandstone. The Aberdeen is a marine sandstone sequence that coarsens upward, and is similar in character to the Star Point Sandstone. The Aberdeen measures over 120 feet at Price Canyon (Sec. 12, T13S, R9E) and thins to the west. In the vicinity of the Horizon No. 1 Mine and the National Mine (Sec. 17, T13S, R8E), the Aberdeen Sandstone is apparently discontinuous and not easily recognizable on outcrop. The westward pinch-out of the Aberdeen Sandstone is illustrated on the west-east stratigraphic section between drill hole LMC-4 and the Arco measured section near the National Mine as illustrated on Plate 6-3.

#### Castlegate Sandstone

The Castlegate Sandstone is exposed in the central and northeastern portion of the lease block (Plate 6-1) The formations consists of a white to gray, coarse grained to conglomeratic fluvial sandstone. Exposures of the Castlegate Sandstone typically form cliffs to steep slopes. The Castlegate Sandstone is approximately 300 feet thick in the Gordon Creek area.

#### Price River Formation

The Price River Formation occurs in the northeastern portion of the lease block (Plate 6-1). The Price River is also a fluvial deposit and contains gray to white silty sandstones with interbedded subordinate shale and conglomerate. The formation typically forms ledges and slopes. The Price River formation ranges from 600 to 1,000 feet in thickness.

#### Unconsolidated Deposits

Unconsolidated deposits composed of silt and fine grained sand, alluvial sediments and talus debris occur along valley floors and at the base of steep slopes. The thickness of these sediments is variable. In the Horizon No. 1 Mine area, the thickest alluvial deposits occur along Beaver Creek. Based on field observations, the alluvial sediments appear to exceed 10 feet in thickness.

#### *Structure*

Figure 6-3 shows data of a dipslope from the top of the Spring Canyon Member of the Star Point Sandstone to the north-northeast. The area around the minesite is dissected by several

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faults. There are two graben zones, the Gordon Creek Graben and the Fish Creek Graben. These grabens run parallel and converge into N-S trending faults of the North Gordon Fault zone. The proposed mine expansion will take place in the Fish Creek Graben Zone. According to Figure 6-3 any buildup of mine water may flow out the portal.

Several igneous dikes have been reported in area mines including the Beaver Creek Coal Mines #2 and #3. The dikes are reported to be Miocene age and are a mica peridotite (Tingey, 1986). The dikes are typically associated with faults that bisect the area and trend east-west to northwest-southeast.

### *Faults*

The area of the permit is heavily faulted (Plate 6-1). Two major fault zones affect the lease block: the North Gordon and Fish Creek fault zones (Figure 6-2). The North Gordon fault zone measures three miles wide and five miles in length and is located east of the lease. The Fish Creek fault zone averages two miles wide and enters the lease from the northwest.

The permit area contains essentially two major fault trends. They are the N60 degree west trending faults (Range N50-75W) associated with the Fish Creek fault zone, and the N-S trending faults associated with the North Gordon fault zone. Sympathetic faulting also occurs within the mine area. Displacements of the faults in the mine area are variable ranging from a few feet to as much as 200 feet.

### **Findings:**

The applicant has submitted sufficient Geologic Resource Information to meet the minimum requirements if the regulations.

## **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

Figure 6-2 in the text section identifies the general regional geology. There are no coordinates or boundary lines to provide specific reference on the map, however it does give an idea of the relationship between surface stratigraphy and faulted areas. Plate 6-1 provides more detail of the geology and permit area. The map shows a layout for the geologic cross-sections, shown in Plate 6-2 (N-S cross-section) and 6-3 (E-W cross-section). The streams are not shown on Plate 6-1. Figure 6-3 provides information of the regional structure. Generally the structure

is to the north north-east, however do to the multitude of fault in the area the slope could change in any fault block..

### **Well Maps**

Plate 6-1 identifies the wells and drill holes on and adjacent to the permit area.

### **Findings:**

The applicant 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 requirements of this section have been addressed within the approved mining and reclamation plan, Chapter 5, page 5-22.

Type and Method of Mining Operations

### **Findings:**

The applicant 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-

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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 holes LMC 1, 2, 3, and 4 will be plugged and abandoned following State approved methods. ThreeFour new holes have been (HZ-1, HZ-2, HZ-3, and HZ-3HZ01-6-1) drilled and completed as monitoring wells within the uppermost saturated zone beneath the Hiawatha seam to better predict the potential of inflow into the mine.

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 Section 3.5 of this permit application.

When no longer needed for monitoring or other use approved by the UDOGM and upon a finding of no adverse environmental or health and safety effects, or unless approved for transfer as a water well, 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 by people, livestock, fish and wildlife, machinery and to keep acid or other toxic drainage from entering the groundwater system.

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:**

It is recommended that the geological section of the application be approved.