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State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor
Kathleen Clarke
Executive Director
Lowell P. Braxton
Division Director

1594 West North Temple, Suite 1210
PO Box 145801
Salt Lake City, Utah 84114-5801
801-538-5340
801-359-3940 (Fax)
801-538-7223 (TDD)

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TO: File

THRU: Joe Helfrich, Permit Supervisor

FROM: Robert Davidson, Soils Reclamation Specialist RAD

RE: Minor Coal Exploration, Canyon Fuel Company, LLC, Dugout Mine, ACT/007/039-99B, Folder #2, Carbon County, Utah

SYNOPSIS

Canyon Fuel Company, LLC, Dugout Mine has submitted an application for minor coal exploration for six drill sites and for a seismic survey located within the north-central portions of the Book Cliffs coal field, occurring on the Pine Canyon U.S.G.S. 7½ minute quadrangle map. Surface and subsurface owners are Canyon Fuel Company, LLC, and the State of Utah. This document supplies the soils' Technical Analysis of the proposed coal exploration.

TECHNICAL ANALYSIS

COAL EXPLORATION: COMPLIANCE DUTIES OPERATIONAL STANDARDS

Regulatory Reference: R645-202-230.

Analysis:

The proposed coal exploration submittal adequately describes the soil resources and soil salvage operations. The following analysis is made:

- Exploration Drilling and Seismic Survey
- Soil Resources
- Soil Resource Protection
- Acid/Toxic Forming Materials

Exploration Drilling and Seismic Survey

Six coal-exploration drill sites and one seismic survey line are proposed. The proposed exploration area is located in T.13 S., R.12 E. and occurs within the Book Cliffs coal field of Carbon County, Utah. All access routes, roads and pad sites are shown on Map 1 in Appendix A. Areas of disturbance associated with access road and exploration drill site construction is shown in the following table:

Proposed Drill Site	Road Upgrade Length (feet)	New Road Construction (feet)	New Road Construction (acres)*	Drill Pad Area (acres)	Total New Disturbance (acres)
G	0	900	0.21	0.23	0.44
H	3000	1000	0.23	0.16	0.39
I	450	0	0.00	0.23	0.23
J	0	0	0.00	0.23	0.23
L	0	0	0.00	0.16	0.16
N	3300	2500	0.57	0.16	0.73
Seismic A-A'	0	0	0.00	0.00	0.00
Total	6750	4400	1.01	1.17	2.18

* Assumes 10 feet average road width.

The proposed exploration sites are accessed from Nine Mile Canyon Road, Route 53, then along the Dugout Canyon and Pine Canyon roads to various unimproved public and private dirt roads. The existing Pine Canyon dirt road will be utilized to access drill sties G, H, I, J, N and the seismic survey area. The new Dugout Canyon Mine road will be used to access site L. Existing roads have been used wherever possible, but some upgrades and new road construction will be required in for certain areas (see above table and Map 1).

Soil Resources

Soil resource information is adequately described. Soil resource information is extracted from the Carbon-Emery County Soil Survey published by the Natural Resource Conservation Service, formerly the Soil Conservation Service. Soils are mainly derived from the North Horn, Price River and Blackhawk Formations and often have a high clay content. Soil cover varies by location and slope. Surface horizons range from shallow to deep while subsoils typically contain high rock content. The infiltration rate is moderately high for all soils.

The following table summarizes the soils information as presented for each drill site:

Drill Site	Soil Name	Texture	Characteristic	Terrain	Vegetation
G	Podo-Rock outcrop complex	very bldery sandy loam	5" brown vry bldery sandy loam, 12" stgn brown gravelly sandy loam	access has steep side slopes	grasses sage brush, sparse juniper
	Beje-Trag complex	brown loam topsoil with brown clay loam subsoil	6" topsoil overlays thicker subsoil	pad area is flat lying	grasses and sage brush
H	Guben-Rock outcrop complex	bouldery fine sandy loam	7" fine brown sandy loam topsoil, 17" stoney loam subsoil	previously disturbed logging areas	sparse woods
I	Senchert loam	very dark gray-brown loam topsoil	4" topsoil is moderately deep and well drained, 3 ft deep loamy subsoil		grasses and aspen
J	Beje-Trag complex	brown loam topsoil with brown clay loam subsoil	6" topsoil overlays thicker subsoil		grasses and sage brush
L	Midfork family Comodore complex	stoney loam subsoil	less than 6" topsoil with 19" subsoil	adjacent to unimproved Dugout Canyon road located above the mine	
N	Rottulee family Trag complex	brown stoney loam topsoil, clay loam subsoil	10" topsoil with forest debris and high organic matter, 26" underlying subsoil	logging trails have been cut through the area	wooded
seismic	Beje-Trag, Rottulee-Trag, Rabbitex-Datino Variant, and Perma soils				

Soil Resource Protection

General. Topsoil will be separately removed, stored , and redistributed on areas disturbed by the coal exploration activities as necessary to assure successful revegetation. Drill sites H an N and their proposed access routes occur in areas where the original surface topsoil layer has been previously disturbed from logging activities and as a result, sparsely or non-

vegetated subsoil occur locally at the present time.

Where topsoil has been previously removed during logging road construction, the disturbed topsoil material, if present, will be handled as topsoil and separately removed, stored, and re-distributed as if it were native topsoil. Where practical, the original topsoil material will be recovered and redistributed to promote future revegetation and further rehabilitate the logging roads.

Topsoil stockpiles will not be seeded due to the short duration of storage.

Prior to drilling, an on-site inspection of proposed drill sites and access routes will be conducted with regulatory representatives to discuss site-specific concerns.

Road Construction. In areas of new road construction, a geologist or soil scientist will direct the topsoil stripping and salvage operations. Removed topsoil will be stockpiled or wind-rowed adjacent to the road. Where topsoil is stockpiled, a shallow trench will be dug on the downhill side of the stockpile to prevent loss of soil resource. Erosion control structures, such as water bars, berms, straw bales, etc, may also be installed to prevent runoff.

Drill Site Construction. Larger drill pads (100' x 100') will be constructed for deeper drill holes I and J, and possibly G. Smaller drill sites will accommodate the shallower holes H, N, and L. After grubbing, the topsoil present will be stripped from the drill sites and stockpiled on the uphill side of the drill pad using a D-6 bulldozer or equivalent and a backhoe. A shallow trench/berm will be constructed on the downhill side of the pile to help prevent soil loss from erosion. Topsoil stockpiles may be further protected with straw bales and/or silt fences. If additional leveling of the drill pad is needed, subsoil horizons will be stripped and stored separately.

Acid/Toxic Forming Materials

Mud pits will be dug at each site to contain drill cuttings and fluids. Pits will be sized approximately 10' x 20' x 6' deep each, but dug greater than four feet in depth and sufficiently deep to allow for the burial of potentially acid/toxic materials below a minimum of four feet of cover.

Findings:

The requirements of this section of the regulations are considered adequate.

COAL EXPLORATION: COMPLIANCE DUTIES RECLAMATION STANDARDS

TOPSOIL

Regulatory Reference: R645-202-241 and R645-202-242.100.

Analysis:

Soil reclamation activities will closely follow the completion of each hole as follows:

- When the mud pit is sufficiently dry, it will be filled with stored subsoil and compacted to minimize settling.
- A backhoe and a bulldozer will redistribute the stockpiled subsoil on and around the drill pad to achieve as closely as practicable the original contour of the site.
- Stored topsoil will be evenly distributed over the disturbed pad area and the site will be graded back to its approximate original contour.
- The entire drill pad area will be roughened and re-seeded. Seed will be crimped or worked into the soil by roughening the surface with a dozer or backhoe or by dragging the area. Straw or hay mulch may also be used at the rate of 2000 lbs/acre and will be certified as free of noxious weeds.
- Where access roads are newly created or logging trails are reconstructed, they will be reclaimed and re-seeded as explained above. Any other areas of surface disturbance where the pre-existing vegetation was bladed, will be ripped and seeded.
- Pre-existing roads will be left in a condition equal to or better than that observed on Canyon Fuel Company's entry into the area. The reclamation methods described above may be modified to address considerations of the land surface owner, which is, Canyon Fuel Company, LLC. However, before reclamation methods are changed as described in the proposed exploration plan so as to meet the needs of the surface owner, which is, Canyon Fuel Company, LLC, then an amendment will be filed and approved by the Division.

Findings:

The requirements of this section of the regulations are considered adequate.