

OPEN FILE REPORT 115

SUMMARY OF THE GEOLOGY

OF THE

ENGLE COAL FIELD

by

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# THE ENGLE COAL FIELD

## Introduction

The Engle coal field (Lee, 1905), named for the small town of Engle along the Santa Fe Railway, lies in central Sierra County, New Mexico. The sparsely vegetated area comprising the Engle field is roughly bounded by Truth or Consequences on the northwest, Engle on the northeast, Cutter on the southeast and Palomas Gap on the southwest. The coal bearing rocks lie along the eastern edge of the Fra Cristobal and Caballo Mountains. Near the mountain front the Engle field consists of north-south trending sandstone ridges; the steep dip of these ridges flattens out eastward under the plain of the Jornada del Muerto Basin.

The Engle field can be reached via New Mexico highway 52 which connects Truth or Consequences and Engle. Dirt roads leading off highway 52 provide some access to nearly all parts of the field. The Santa Fe Railway, traversing the eastern margin of the field, is less than 10 miles from any potential coal mine.

## UPPER CRETACEOUS ROCKS

A 3,800 ft thick sequence of Upper Cretaceous sandstones and shales of the Dakota Sandstone, Mancos Shales, and the Mesaverde Group have been recognized in the area (Doyle 1951, Kelley and Silver, 1952, and Melvin 1963). Unconformably overlying the Mesaverde Group is the McRae formation which is believed to be deposited during both Upper Cretaceous and Tertiary time (Bushnell, 1955). This sequence of rocks crops out on the west

limb of the broad synclinal Jornada del Muerto Basin along the east sides of the Fra Cristobal and Caballo Mountains. Near the crest of the mountain uplift the beds dip steeply to the east or are overturned, but going east the dips flatten rather quickly.

### Dakota Sandstone

In the Caballo Mountains, the approximately 220 ft thick Dakota Sandstone rests disconformably on the San Andres formation (Kelley and Silver, 1952). The lower 26 ft of the Dakota Sandstone is a medium-bedded, white siltstone; however, above this basal unit the Dakota is a thick-ledged, cross-bedded, coarse-grained, brown weathering sandstone similar to rocks referred to as Dakota Sandstone in other parts of New Mexico. The upper part of the section is reported to contain some sandstones which are locally impregnated with bituminous matter (Kelley and Silver, 1952).

### Mancos Shale

Kelley and Silver (1952) report a thickness of up to 500 ft for the Mancos Shale in the Engle field. The lower third of the section consists of laminated gray shales with thin limestone beds, generally less than 6 inches thick, containing a Greenhorn fauna. The Mancos Shale has a medial sandy interval, the Tres Hermanos sandstone member (Hook and Cobban 1979), containing occasional fragments of petrified wood and some ammonite-bearing concretions at its top. The upper part of the Mancos consists of gray to olive-drab shale and siltstone plus a few thin limestone beds.

## Mesaverde Group

A thick section of Mesaverde Group rocks is found near the Caballo Mountains, measuring more than 3,300 ft thick (Bushnell, 1955). Thin pods of lignite coal and carbonaceous shale are present in the lower part of the section. Lee (1905) describes a 1 ft bed of coal upon which a prospect was driven. The upper part of the Mesaverde section becomes increasingly sandy and coarse with the upper 100 to 200 ft composed of coarse-grained sandstone and quartz pebble conglomerate (Bushnell, 1955).

## McRae Formation

The McRae formation unconformably overlies the Mesaverde Group rocks. It consists of a basal conglomerate containing volcanic material overlain by several hundreds of feet of reddish-brown or purple sandstone and shale (Bushnell, 1955).

## COAL

Exposures of coal found along the eastern flank of the Caballo mountains near the base of the Mesaverde Group are all thin, generally 2 ft or less in thickness. Kelley and Silver (1952) describe a 15 in bed exposed in a mine in sec. 12, T.14S., R.4W.; this author found no more than 9 or 10 inches exposed at this locality. The coal at this mine is described by Kelley and Silver as follows:

"... the coal is clean and friable and has no foreign matter. It is banded parallel to bedding with vitrain layers 1 mm-1cm in thickness. The vitrain seams show remnants of plant stems. The coal contains a few partings of limonitic highly carbonaceous coaly shale 1-2 cm thick. Although pyrite is not visible, the presence of melanterite and limonite suggest its former presence. The coal displays a poorly developed prismatic cleavage."

This coal mine is probably the same one mentioned in records of the New Mexico Inspector of Mines (1909) as being located a few miles west of Ash Spring and operated by the Southwest Lead and Coal Company. The working, now caved, consisted of 172 ft shaft on a coal seam dipping roughly 80° and a 145 ft drift at the bottom of the shaft which exposed 18 inches of good coal. Metal mines at Palomas Gap reportedly used the coal from this mine for the reduction of ores (Kelley and Silver, 1952).

Two other propsects are also reported to have been opened on thin coal seams. Federal coal lease permit records indicate a 60 ft prospect slope was opened on 1 ft coal bed somewhere in the permit area covering parts of sec. 17 and 18, T.14S., R.3W. (Howard Nicholson, U.S. Geological Survey, personal communication, 1977). The third prospect is reported to be near the Durham Ranch in sec. 29, T.14S., R.3W. (Kelley and Silver, 1952).

Along with the surface workings, coals were intersected in several wells drilled in the Engle field. Darton (1922) mentions a well in sec. 15, T.14S., R.3W. in which 4 ft of coal was found at 250 ft. Drillers logs for the following four wildcat holes are filed at the New Mexico Bureau of Mines and Mineral Resources.

<u>COMPANY</u>	<u>LOCATION</u>	<u>REMARKS</u>
1) Wright and Winslow	S.2,T.15S.,R.3W.	thin coal seams at 361 ft 2 ft of coal at 386 ft
2) Park Bowers	S.19,T.14S.,R.2W.	3 ft of coal at 1,203 ft

- 3) Wofford, Wilson, King S.8,T.14S.,R.2W. 2 ft of coal at 387 ft  
2 ft of coal at 395 ft
- 4) Clyde R. Wofford S.7,T.14S.,R.2W. 2 ft of coal at 396 ft

Two samples of coal, one from the sides of a caved adit and the other a grab sample from the old dump in the NE, NW, SE, sec. 12,T.14S.,R.4W., were sent to the U.S. Geological Survey Laboratories in Denver, Colorado for analysis. The results of the analyses indicate the rank of the coal is probably subbituminous.

## REFERENCES CITED

- Bushnell, H. P., 1955, Mesozoic stratigraphy of south-central New Mexico: New Mexico Geological Society, Guidebook 6th field conference, p. 81-87.
- Darton, N. H., 1922, Geologic structure of parts of New Mexico: U.S. Geological Survey, Bull. 726-E, p. 173-275.
- Doyle, J. C., 1951, Geology of the northern Caballo Mountains, Sierra County, New Mexico: M.S. thesis, New Mexico Institute of Mining and Technology, 51 p.
- Hook, S. C., and Cobban, W. A., 1979, *Prionocyclus Novimexicanus* (Marcov)-common Upper Cretaceous guide fossil in New Mexico: New Mexico Bureau of Mines and Mineral Resources, Annual Rept. 1977-78 p. 34-42.
- Kelley, V. C., and Silver, C., 1952, Geology of the Caballo Mountains, Sierra County, New Mexico: University of New Mexico, Pub. in Geol., No. 4, 286 p.
- Lee, W. T., 1905, The Engle coal field, New Mexico: U.S. Geological Survey, Bull. 285, p. 240.
- Melvin, J. W., 1963, Cretaceous stratigraphy in the Jornada del Muerto region, including the geology of the Mescal Creek area, Sierra County, New Mexico: M.S. thesis, University of New Mexico, 121 p.



# COAL-ANALYSIS REPORT

LAB NO. K88379

ORGANIZATION: USGS, DENVER  
SAMPLE ID: USGS(D), 0190724, FACE CHANNEL COAL  
DT 46771 CAN NO: -

CPR: NEGRAVERDE FATH, CRETACEOUS AGE MINE: OLD MINE WORKING  
STATE: NV COUNTY: SIERRA BEE: UNNAMED, 0.75 FT THICK  
TOWN: -

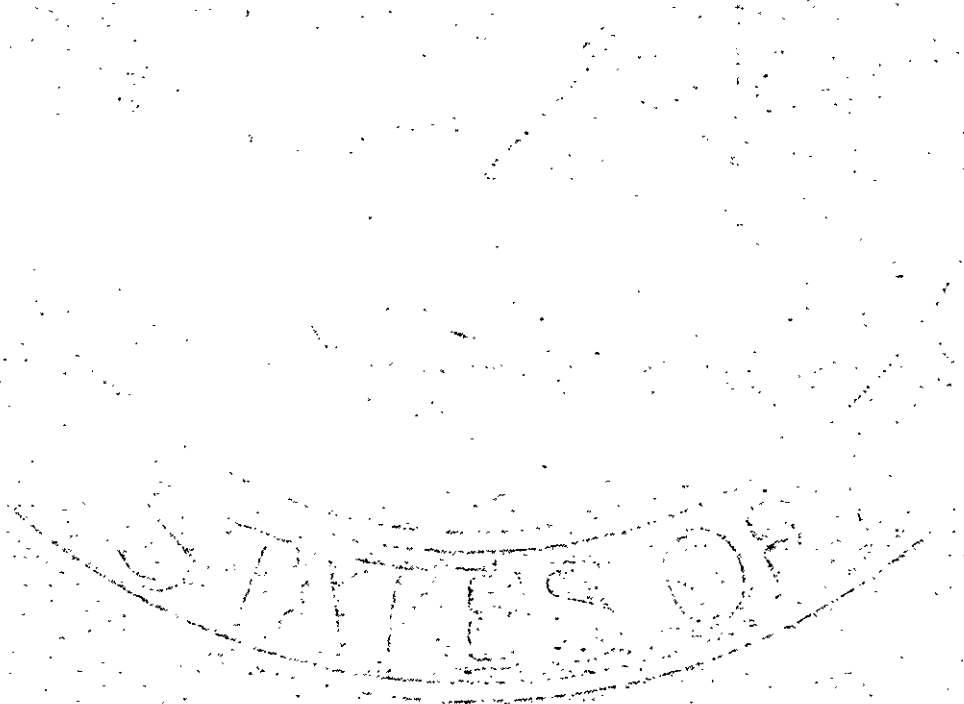
DATE OF SAMPLING: 12-21-78 DATE RECEIVED: 1-24-79 DATE OF REPORT: 2-13-79  
COLLECTOR: JOSEPH R. HATCH

	COAL	COAL	COAL
AIR DRY LOSS	[AS RECD.]	[MOIST FREE]	[MOIST, ASH FREE]

APPROXIMATE ANALYSIS			
MOISTURE	12.0	N/A	N/A
VOLATILE MATTER	24.4	27.7	35.9
FIXED CARBON	43.5	49.5	64.1
ASH	20.1	22.8	N/A

SULFUR	4	4	3
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HEATING VALUE (BTU/LB)	7665	8710	11291
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# COAL-ANALYSIS REPORT

LRB NO. 889378

ORGANIZATION: USGS, DENVER  
SAMPLE ID: USGS(D).D190723.GRAB SAMPLE, COAL  
DT 46772 CAN NO: -

FORM: DEERVERDE FNTH, CRETACEOUS AGE MINE: ABANDONED STOCKPILE  
STATE: NY COUNTY: SIERRA BED: UNNAMED  
FORM: -

DATE OF SAMPLING: 12-21-78 DATE RECEIVED: 1-24-79 DATE OF REPORT: 2-10-79  
COLLECTOR: JOSEPH R. HATCH

AIR DRY LOSS	2	COAL (AS RECD.)	COAL (MOIST FREE)	COAL (MOIST, ASH FREE)
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### APPROXIMATE ANALYSIS

MOISTURE	1.0	N/A	N/A
VOLATILE MATTER	13.3	13.5	16.9
FIXED CARBON	85.9	66.5	83.1
ASH	19.8	20.0	N/A

SULFUR	.6	.6	.8
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HEATING VALUE (BTU/LE)	11825	11948	14938
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