



G3	G5	H127	H139	H138	H137	H136	H135	H140	H141	H142	H147
100	115	12	13	14	15	16	17	18	19	20	21
C 25	C 19	H 110	C 100	H 163	C 95	C 28	H 20	C 20	C 20	C 13	C 20
H 82	H 16	H 12	H 10	H 80	C 23	H 18	H 20	H 20	H 20	H 10	H 20
C 17	NR 14.0	H 10	H 10	C 23	C 12	C 20					
42	42	C 21	C 21	C 21	C 21	C 21	C 21	C 21	C 21	C 21	C 21
NR 180	K0	H 130.0	C 12								
		K0	C 0.8								
			K0								

**DESCRIPTION OF MAP UNITS**

**Tv** Volcanic rocks from Mount Taylor (Pliocene)-Andesite, basalt, and tuffaceous rocks of the Mount Taylor volcanic field. Outlets not shown on map.

**Kmc** Clearly Coal Member of the Menefee Formation (Upper Cretaceous)—Mostly fine to medium-grained sandstone, sandy shale, mudstone, and shale; contains several thin beds of coal, about 300 ft (91 m) thick.

**H127** Measured section—Showing location and thickness in feet. Index number prefixed by H is section measured by Hunt (1936); index number prefixed by G is section measured by Gardner (1910). Letters used in section: R, rock; C, coal; NR, no record. Horizontal line indicates bottom of Clearly Coal Member of the Menefee Formation. Letters below the line, Kp, refer to Point Lookout Sandstone, which underlies the Clearly Coal Member of the Menefee Formation.

**—** Contact—Dotted where inferred or concealed.

**- - -** Fault—Dotted where inferred or concealed; bar and ball on downthrown side. Only faults that crosscut the Clearly Coal Member of the Menefee Formation and have displacements of 50 ft (15 m) or more are shown.

**→** Syncline—Approximately located, plunging northeast. Structural relief under Mount Taylor is at least 1,500 ft (455 m) for at least 10 mi (16 km) on each side of axis (Hunt, 1938).

**—** Overburden isopach—Shows approximate thickness of overburden, in feet, from surface to top of Clearly Coal Member. Only shown in areas where coal resources were calculated. Control based on synclinal structure and surface topography. Isopach contours drawn at 500 and 1,000 ft (152 and 305 m).

**Limit of coal resources**—Approximate erosional edge of the Clearly Coal Member of the Menefee Formation. Arrow shown on side containing coal resources.

**Mount Taylor volcanic center**—Indicates erosional edge of volcanic crater. Original crater was probably less than 1 mi<sup>2</sup> (2.6 km<sup>2</sup>), but erosion has enlarged it to nearly 5 mi<sup>2</sup> (13 km<sup>2</sup>) (Hunt, 1938).

**Measured section**—Showing location and thickness in feet. Index number prefixed by H is section measured by Hunt (1936); index number prefixed by G is section measured by Gardner (1910). Letters used in section: R, rock; C, coal; NR, no record. Horizontal line indicates bottom of Clearly Coal Member of the Menefee Formation. Letters below the line, Kp, refer to Point Lookout Sandstone, which underlies the Clearly Coal Member of the Menefee Formation.

**DISCUSSION**

The Clearly Coal Member of the Menefee Formation of Late Cretaceous age is mostly fine to medium-grained sandstone, sandy shale, mudstone, shale, and several thin beds of coal. Thickness is about 300 ft (91 m). The Clearly Coal Member crops out over a large area in the north-central part of the quadrangle. To the south, the Clearly Coal Member is buried by Tertiary basalt flows and other volcanic rocks of the

Mount Taylor volcanic field. The subsurface erosional edge of the Clearly Coal Member is assumed to be a few miles (5 km) north of the Mount Taylor volcanic center, as shown on the map.

The coal beds in the Clearly Coal Member are generally less than 3 ft (0.9 m) thick and discontinuous in the Grants 30' x 60' quadrangle. The coal is considered sub-bituminous in rank (U.S. Geological Survey and New Mexico Bureau of Mines and Mineral Resources, 1981). However, analyses of core samples taken from the Standing Rock area northwest of the Grants quadrangle show an apparent rank of high-volatile C bituminous and subbituminous A (Shonaker, 1971). The author assumes that the quality of coal in the Standing Rock area is similar to the quality of coal in the Grants quadrangle.

For purposes of the resource calculations, all coal in the Clearly Coal Member of the Menefee Formation is assumed to be bituminous. Coal resources are calculated using the definitions and methods of the U.S. Geological Survey (Wood and others, 1983). Resources were calculated for the entire area of approximately 264 mi<sup>2</sup> (684 km<sup>2</sup>) underlain by the Clearly Coal Member of the Menefee Formation. The total identified coal resources for the Clearly Coal Member in the Grants quadrangle are approximately 150 million short tons, mostly in beds less than 3.5 ft (1.1 m) thick and under less than 500 ft (150 m) of overburden (table 1). The total hypothetical coal resources for the Clearly Coal Member are approximately 200 million short tons (table 2).

Several exposed areas of the Clearly Coal Member of the Menefee Formation contain locally thick coal beds as much as 3.5 ft (1.1 m) thick and under less than 500 ft (150 m) of overburden. These may have potential for strip mining. Elsewhere

in the quadrangle, coal beds in the Clearly Coal Member are considered too thin and lenticular for economic development at the present time.

**REFERENCES CITED**

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Wood, G. H., Jr., Kahn, T. M., Carter, M. D., and Culbertson, W. C., 1983, Coal resource classification system of the U.S. Geological Survey: U.S. Geological Survey Circular 891, P. 28-34.

**Table 1.—Identified original bituminous coal resources under less than 500 feet of overburden in the Clearly Coal Member of the Menefee Formation, Grants 30' x 60' quadrangle, New Mexico, as of April 1, 1984**

All resources are 1.2-2.3 ft thick; in values of short tons; all values rounded to two significant figures except where indicated; values in parentheses are coal not present; 1 foot = 0.305 meters; 1 short ton = 0.907 metric tons.

County	T-R	Thickness of coal beds, in feet				Total
		Measured	Indicated	Inferred	Subtotal	
Colony	T-8	1.2-1.3	2.3-3.5	1.2-2.3	1.2-2.3	1.9-2.9
McKinley	13 N-7 W	—	—	1.6	—	1.6
Do-	13 N-8 W	—	—	1.6	—	1.6
Do-	13 N-9 W	—	—	4.5	1.2	5.7
Do-	14 N-7 W	0.18	2.3	1.1	26	34
Do-	14 N-8 W	4.7	0.71	1.6	2.6	3.2
Do-	15 N-8 W	1.8	1.0	—	4.9	3.2
Do-	15 N-9 W	14	4.9	3.7	16	32
Do-	15 N-4 W	4.9	4.4	1.1	6.1	6.1
<b>Total</b>		21	14	13	79	64

**Table 2.—Hypothetical original bituminous coal resources in the Clearly Coal Member of the Menefee Formation, Grants 30' x 60' quadrangle, New Mexico, as of April 1, 1984**

All resources are 1.2-2.3 ft thick; in values of short tons; all values rounded to two significant figures except where indicated; values in parentheses are coal not present; 1 foot = 0.305 meters; 1 short ton = 0.907 metric tons.

County	T-R	Thickness of overburden, in feet			Total
		0-500	500-1,000	Over 1,000	
McKinley	13 N-5 W	4.6	5.1	0.04	9.7
Do-	13 N-6 W	15	18	0.4	33
Do-	13 N-7 W	26	4.6	—	31
Do-	13 N-8 W	4.2	—	—	4.2
Do-	14 N-6 W	20	8.7	2.6	31
Do-	14 N-7 W	3.8	—	—	3.8
Do-	14 N-8 W	8.8	—	—	8.8
Do-	15 N-6 W	4.7	—	—	4.7
Do-	15 N-7 W	1.3	—	—	1.3
Sandoval	14 N-4 W	3.4	—	—	3.4
Do-	15 N-4 W	4.7	—	—	4.7
Valencia	13 N-6 W	3.9	—	—	3.9
Do-	12 N-6 W	4.7	3.7	—	8.4
Do-	13 N-6 W	4.9	2.6	1.1	8.6
Do-	12 N-8 W	5.4	4.6	—	10
Do-	12 N-9 W	11	—	—	11
<b>Total</b>		147	90	51	188

Coal resources map of the Clearly Coal Member of the Menefee Formation  
**COAL RESOURCES MAPS OF THE GRANTS 30' x 60' QUADRANGLE, WEST-CENTRAL NEW MEXICO**

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