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COAL RESOURCE OCCURRENCE AND COAL DEVELOPMENT POTENTIAL MAPS OF THE KANDA QUADRANGLE, SWEETWATER COUNTY, WYOMING

[Report includes 15 plates]

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GEOLOGICAL SURVEY

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INTRODUCTION

Purpose

This text is to be used in conjunction with Coal Resource Occurrence (CRO) and Coal Development Potential (CDP) Maps of the Kanda quadrangle, Sweetwater County, Wyoming. This report was compiled to support the land planning work of the Bureau of Land Management (BLM) to provide a systematic coal resource inventory of Federal coal lands in Known Recoverable Coal Resource Areas (KRCRA's) in the western United States. This investigation was undertaken by Dames & Moore, Denver, Colorado, at the request of the U.S. Geological Survey under contract number 14-08-0001-17104. The resource information gathered for this report is in response to the Federal Coal Leasing Amendments Act of 1976 (P.L. 94-377). Published and unpublished public information available through April, 1978, was used as the data base for this study. No new drilling or field mapping was performed, nor was any confidential data used.

Location

The Kanda quadrangle is located in west-central Sweetwater County, Wyoming, approximately 1 mile (1.6 km) west of the city of Rock Springs and 5 miles (8 km) east of the town of Green River, Wyoming. Kanda, located in the southwestern part of the quadrangle, is an abandoned loading station on the Union Pacific Railroad. The quadrangle is unpopulated.

Accessibility

Interstate Highway 80 passes southwesterly across the central part of the quadrangle following the Bitter Creek valley and the old Overland Trail. Wyoming Highway 373, a paved medium-duty road connecting Interstate Highway 80 and the Wyoming-Utah border (Wyoming State Highway Commission, 1978), follows the Little Bitter Creek valley south for several miles, then leaves the valley to climb toward the Firehole Basin area to the southwest. An improved light-duty road branches from Wyoming Highway 373 and follows the Little Bitter Creek valley south. White Mountain road, an improved light-duty road, follows the crest of White Mountain across the northwestern part of the quadrangle. Several

unimproved dirt roads and trails provide access through the remainder of the quadrangle.

The main east-west line of the Union Pacific Railroad crosses southwesterly through the central part of the quadrangle. This line provides railway service across southern Wyoming, connecting Ogden, Utah, to the west with Omaha, Nebraska, to the east.

Physiography

The Kanda quadrangle lies on the western flank of the Rock Springs uplift. The landscape within the quadrangle is characterized by steep escarpments, relatively flat-lying dip slopes, buttes, canyons, and valleys. White Mountain rises approximately 1,200 feet (366 m) above the Bitter Creek valley in the northwestern quarter of the quadrangle. Altitudes range from approximately 7,600 feet (2,316 m) on White Mountain to approximately 6,160 feet (1,878 m) on Bitter Creek along the southwestern edge of the quadrangle.

Bitter Creek, which flows westerly, and Little Bitter Creek, which flows northerly into Bitter Creek, drain the southeastern two thirds of the quadrangle. Greens Canyon flows westerly and drains the northwestern third of the quadrangle. Both Bitter Creek and Greens Canyon are tributaries of the Green River that lies to the west of the quadrangle boundary. All of the streams in the quadrangle are intermittent, flowing mainly in response to snowmelt in the spring.

Climate and Vegetation

The climate of southwestern Wyoming is semiarid and is characterized by low precipitation, rapid evaporation, and large daily temperature changes. Summers are usually dry and mild, and winters are cold. The annual precipitation averages 9 inches (23 cm), with approximately two thirds falling during the spring and early summer months. The average annual temperature is 42°F (6°C). The temperature during January averages 18°F (-8°C), with temperatures typically ranging from 8°F (-13°C) to 28°F (-2°C). During July temperatures typically range from

54°F (12°C) to 84°F (29°C), with an average of 69°F (21°C) (Wyoming Natural Resources Board, 1966; U.S. Bureau of Land Management, 1978).

Winds are usually from the west-southwest and southwest with an average velocity of 11 miles per hour (18 km per hr) (U.S. Bureau of Land Management, 1978).

Principal types of vegetation in the area include sagebrush, saltbush, greasewood, rabbitbrush, mountain mahogany, juniper, serviceberry, and grasses (U.S. Bureau of Land Management, 1978).

Land Status

The Kanda quadrangle lies on the western edge of the Rock Springs Known Recoverable Coal Resource Area (KRCRA). Approximately the eastern two thirds of the quadrangle lies within the KRCRA boundary with the Federal government owning the coal rights for less than half of this area. One active coal lease is present within the KRCRA boundary, as shown on plate 2.

GENERAL GEOLOGY

Previous Work

Schultz described the geology of the southern part of the Rock Springs coal field in 1910. The Gunn-Quealy coal district to the east of the quadrangle was mapped by Dobbin and McKim in 1940. Hale described the stratigraphy and depositional environment of the formations cropping out on the flanks of the Rock Springs uplift in 1950 and 1955. Weimer (1960), Smith (1961), Burger (1965), and Keith (1965) described the stratigraphy and discussed the depositional environment of Upper Cretaceous formations in the area. Roehler described the Late Cretaceous-Tertiary unconformity (1961) and Early Tertiary depositional environments (1965) present in the Rock Springs area. Bradley (1964) and Culbertson (1965) discussed the Green River and Wasatch Formations in the Rock Springs area. Culbertson (no date, a and b) mapped coal outcrops in the Fort Union Formation in the Firehole and Kanda quadrangles. Stuart

discussed the stratigraphy of the Green River Formation west of the Rock Springs uplift in 1965. Roehler and others described the geology and coal resources of the Rock Springs uplift in 1977. Roehler prepared a geologic map of the area in 1977 and correlated measured sections along the western flank of the uplift in 1978. Unpublished data from Rocky Mountain Energy Company (RMEC) also provided coal thickness information.

Stratigraphy

The formations cropping out in north- to northwest-trending bands across the Kanda quadrangle range in age from Late Cretaceous to Eocene. Only the Rock Springs, Fort Union, and Green River Formations are known to contain coal in this quadangle.

The Mesaverde Group of Late Cretaceous age is subdivided into four formations which are, in ascending order, the Blair, the Rock Springs, the Ericson Sandstone, and the Almond. In this quadrangle, the Blair Formation occurs deep within the subsurface and part of the Almond Formation is missing because of Larimide erosion. Both the Rock Springs Formation and Ericson Sandstone of the Mesaverde Group crop out in the quadrangle.

The upper part of the Rock Springs Formation crops out in the southeastern corner of the quadrangle (Roehler, 1977). It is approximately 1,425 feet (434 m) thick where penetrated in the Union Oil Company of California White Mountain Unit No. 1-C-19 well drilled in sec. 19, T. 19 N., R. 105 W. The Rock Springs Formation consists of interbedded carbonaceous shale, sandstone, siltstone and coal (Roehler, 1978) in this quadrangle.

The Ericson Sandstone, unconformably overlying the Rock Springs Formation (Roehler and others, 1977), crops out in the southeastern corner of the quadrangle. The formation is approximately 600 feet (183 m) thick where measured in sec. 16, T. 17 N., R. 105 W. (Roehler, 1978) and approximately 550 feet (168 m) thick where measured in the White Mountain Unit No. 1-C-19 well. It consists of upper and lower units of

light-gray, cross-bedded, fine-to coarse-grained sandstone separated by approximately 100 feet (30 m) of rusty-weathering shale, carbonaceous shale, siltstone and thin sandstone called the Rusty Zone (Smith, 1961; Roehler, 1978).

Although the Almond Formation was encountered in the White Mountain Unit No. 1-C-19 well at a depth exceeding 6,300 feet (1,920 m), it does not crop out in the quadrangle because of Larimide erosion. Thin, deeply eroded remnants of the formation are present to the northeast and southeast of the quadrangle (Roehler, 1977).

The Fort Union Formation of Paleocene age unconformably overlies the Ericson Sandstone and crops out along the eastern edge of the quadrangle (Roehler, 1977). It consists of approximately 1,000 feet (305 m) of light-gray shale, sandy shale and siltstone, thick beds of gray-white to white coarse-grained sandstone (some cross-bedded), gray to brown carbonaceous shale, and coal (Roehler, 1961).

The main body of the Wasatch Formation of Eocene age conformably overlies the Fort Union Formation and crops out over the east-central part of the quadrangle (Roehler, 1977). It is approximtely 1,200 feet (366 m) thick and consists of a sequence of non-red bed fluviatile sandstones and shales called the Nightingale Member. In the subsurface, the Nightingale Member is composed of grayish-blue-green shale interbedded with light-gray, fine-grained sandstone (Roehler, 1965).

A thin, but unknown, thickness of low-grade oil shale and coal beds comprising the Luman Tongue of the Green River Formation of Eocene age conformably overlies the main body of the Wasatch Formation (Roehler, 1965). The Luman Tongue crops out as a narrow band in the south-central part of the quadrangle, but wedges out into the main body of the Wasatch Formation in T. 19 N., R. 105 W. (Roehler, 1977).

The Niland Tongue of the Wasatch Formation crops out in the south-central part of the quadrangle (Roehler, 1977) where it conformably

overlies the Luman Tongue of the Green River Formation. It is composed of both red bed and non-red bed fluviatile sequences of drab, gray-weathering shales and gold-brown-weathering sandstones. North of Interstate Highway 80, where the Luman Tongue is missing, the Niland Tongue is included in the main body of the Wasatch Formation. The Niland Tongue ranges in thickness from 500 to 700 feet (152 to 213 m) in the southern part of the quadrangle (Roehler, 1965).

The Tipton Tongue (Tipton Shale Member) of the Green River Formation overlies the Niland Tongue of the Wasatch Formation and crops out in a narrow north-south trending band through the west-central part of the quadrangle (Roehler, 1977). It consists of approximately 180 feet (55 m) of buff-colored papery low-grade oil shale, marlstone, and sandstone (Bradley, 1964).

The Wilkins Peak Member of the Green River Formation conformably overlies the Tipton Tongue and is approximately 900 feet (274 m) thick. It crops out along the western edge of the quadrangle (Roehler, 1977) and forms the core of the White Mountain escarpment. It is composed of gray to green mudstone, and abundant thin beds of gray dolomitic siltstone, marlstone, dolomite and limestone, and buff-colored calcareous sandstone (Stuart, 1965).

The Laney Shale Member of the Green River Formation conformably overlies the Wilkins Peak Member and crops out in the northwestern and southwestern corners of the quadrangle (Roehler, 1977). It consists of an unknown thickness of interbedded gray to tan siltstone, shale, fine-grained sandstone and abundant thin beds of organic limestone. The basal part of the member consists of 20 to 30 feet (6.1 to 9.1 m) of low-grade oil shale. Light-gray tuffs are also quite common in the member (Stuart, 1965; Roehler, 1965).

Holocene deposits of alluvium have been mapped in the stream valleys of Bitter Creek and Little Bitter Creek (Roehler, 1977).

Both marine and continental deposits are contained in the Rock Springs Formation. Northwest of a strand line extending from approximately the southeastern corner of the T. 16 N., R. 106 W., northeastward through T. 22 N., R. 100 W., the formation consists of sediments deposited in swamp, deltaic and fluvial environments. Southeast of the strand line the formation consists mainly of shallow-water marine deposits (Burger, 1965; Douglass and Blazzard, 1961; Gosar and Hopkins, 1969).

The Ericson Sandstone was deposited in stream and floodplain environments with a source area to the northwest (Douglass and Blazzard, 1961; Gosar and Hopkins, 1969).

The rocks of the Fort Union Formation are characteristic of sediments deposited in intermontane paludal environments (Roehler, 1978).

The drab gray and green colors of the main body of the Wasatch Formation indicate deposition in a non-red bed (reducing) fluviatile environment in poorly-drained lowlands (Roehler, 1965).

Swampy and fluvial conditions alternately prevailed between episodes of fresh-water lake formation, giving rise to the Luman, Niland, Tipton, Wilkens Peak and Laney Shale Members of the Green River and Wasatch Formations (Culbertson, 1965; Roehler, 1978).

Structure

The Kanda quadrangle is located along the western flank of the Rock Springs uplift. The formations strike north to northeast and dip west to northwest. Dips measured in the quadrangle (Dobbin and McKim, 1940; Bradley, 1964) range from 13° to 21° along the eastern half and 1 1/2° to 2 1/2° in the western half of the quadrangle.

COAL GEOLOGY

The Rock Springs and Fort Union Formations, and possibly the Luman Tongue of the Green River Formation, contain coal in this quadrangle.

Very little is known about the Luman Tongue coal although it is believed to be thin, trashy, and lignitic. Fort Union Formation coal beds are believed to be the only important coal beds cropping out within the quadrangle boundaries (plate 1). Three Rock Springs Formation coal beds have been mapped in the subsurface along the eastern edge of the quadrangle. These coal beds have been inferred to exist in this quadrangle based on information from the Kanda quadrangle and the adjacent Rock Springs quadrangle to the east.

Chemical analyses of coal.--Data on the coal quality of the coal beds in the Fort Union Formation in this quadrangle are not available although Roehler and others (1977) ranks them, generally, as subbituminous. Representative analyses of samples of Rock Springs Formation coal in the Rock Springs quadrangle are shown in table 1. These coals rank as high-volatile C bituminous on a moist, mineral-matter-free basis according to ASTM Standard Specification D 388-77 (American Society for Testing and Materials, 1977).

Coal Beds of the Rock Springs Formation

Numerous coal beds of the Rock Springs Formation have been identified in the northern part of the Rock Springs uplift. A number system adopted by the Union Pacific Coal Company is most commonly used (Schultz, 1909) to name the coal beds in this foration. Three of the thicker coal beds present in the adjacent Rock Springs quadrangle to the east have been mapped in this quadrangle.

Rock Springs No. 7 Coal Bed

The Rock Springs No. 7 coal bed is inferred to exist in the Kanda quadrangle using data available from the Rock Springs quadrangle. This coal bed is inferred to have a maximum thickness of 6 feet (1.8 m) in this quadrangle (plate 4), but it thickens to 7.5 feet (2.3 m) to the east just outside the quadrangle boundary. In the Reliance and southwest quarter of the Boars Tusk 15-minute quadrangles, this coal bed ranges up to 12 feet (3.7 m) in thickness and commonly contains rock partings up to 6 feet (1.8 m) thick.

Rock Springs No. 3 Coal Bed

The Rock Springs No. 3 coal bed was penetrated in the coal test holes drilled in this quadrangle and the maximum reported thickness is 6.1 feet (1.9 m) in sec. 16, T. 18 N., R. 105 W. (plate 6). This coal bed is also reported to be 6.4 feet (2.0 m) thick just east of the quadrangle boundary.

Rock Springs No. 5

Two drill holes in the Kanda quadrangle penetrated the Rock Springs No. 5 coal bed where thicknesses ranged from 2.3 to 4.4 feet (0.7 to 1.3 m). However, based on drill-hole measurements in the Rock Springs quadrangle, this coal bed may be as much as 7 feet (2.1 m) thick near the quadrangle boundary (plate 9). The maximum thickness reported in the Rock Springs quadrangle is 11.8 feet (3.6 m), and this coal bed is generally less than Reserve Base thickness (5.0 feet or 1.5 meters) in the northern part of the Rock Springs uplift.

Coal Beds of the Fort Union Formation

The Fort Union Formation contains two coal beds exceeding Reserve Base thickness in this quadrangle. The D coal bed, as named by RMEC, has been traced into the Kanda quadrangle from the south by Culbertson (no date, b). The Fort Union No. 1, or White Mountain coal bed (Roehler, 1977), is inferred to exist at thicknesses exceeding 5 feet (1.5 m) in the northeastern corner of the quadrangle on the basis of data obtained from the Reliance quadrangle. The Fort Union No. 1 and the D coal beds probably correlate (Roehler, oral communication, 1979) although additional field mapping in the Kanda quadrangle will be required to confirm this.

D Coal Bed

The D coal bed has been mapped by Culbertson (no date, b) in the Firehole Basin 15-minute quadrangle to the south and in this quadrangle. Drill holes by RMEC (no date) and Culbertson's measured sections (no date, a and b) have been used to construct the isopach and structure contour map shown on plate 12. The maximum reported thickness of 11 feet

(3.4 m) was measured in a drill hole in sec. 9, T. 18 N., R. 105 W. Thin rock partings in the coal bed have been recorded in several areas and range from 0.1 to 5 feet (0.03 to 1.5 m) in thickness. The coal bed commonly contains minor amounts of rock partings, as shown on plates 1, 3, and 12. Dips of 18° are present in much of the area where the coal has been isopached.

In the northeast quarter of the Firehole Basin 15-minute quadrangle, the D coal bed ranges up to approximately 8 feet (2.4 m) in thickness. Where mapped in the southeast quarter of the Firehole Basin 15-minute quadrangle, the coal bed is less than 5 feet (1.5 m) in thickness.

Fort Union No. 1 (White Mountain) Coal Bed

The Fort Union No. 1 coal bed, projected into this quadrangle from the Reliance quadrangle to the northeast, is shown on plate 4. It ranges from 7 to 14 feet (2.1 to 4.3 m) in thickness in the Reliance quadrangle and is inferred to be from 5 to 8 feet (1.5 to 2.4 m) thick in the northeastern corner of this quadrangle. This coal bed is believed to be quite clean, containing only a thin rock parting in a single hole in the Reliance quadrangle. In the southwest quarter of the Boars Tusk 15-minute quadrangle, the Fort Union No. 1 coal bed has been labeled the B coal bed. In that quadrangle, the coal bed occurs approximately 400 feet (122 m) above the base of the formation and is 9 feet (2.7 m) thick in sec. 17, T. 21 N., R. 104 W. Two thick Fort Union coal beds above and below the Fort Union No. 1 (B) coal bed have also been located in the southwest quarter of the Boars Tusk 15-minute quadrangle. All of these coal beds may thicken considerably in the subsurface down-dip to the west (Roehler and others, 1977).

Isolated Data Points

In instances where isolated measurements of coal beds thicker than 5 feet (1.5 m) are encountered, the standard criteria for construction of isopach, structure contour, mining ratio, and overburden isopach maps are not available. The lack of data concerning these coal beds limits the extent to which they can be reasonably projected in any direction and usually precludes correlations with other, better known

coal beds. For this reason, isolated data points are included on a separate sheet in U.S. Geological Survey files for non-isopached coal beds. The isolated data point used in this quadrangle is located in sec. 3, T. 18 N., R. 104 W., where a Fort Union Formation coal bed 7.3 feet (2.2 m) thick was encountered 176 feet (54 m) below the ground the surface. This coal bed may lie approximately 250 to 300 feet (76 to 91 m) stratigraphically below the D coal bed and possibly correlates with the A coal bed mapped in the Reliance quadrangle.

COAL RESOURCES

Information from coal test holes drilled by RMEC, as well as mapping or drill hole data from Schultz (1910), Dobbin and McKim (1940), and Culbertson (no date, a and b), were used to construct outcrop, isopach, and structure contour maps of the coal beds in this quadrangle. In the case of the isopached Rock Springs Formation coal beds, information from the Rock Springs quadrangle was also used. The source of each indexed data point shown on plate 1 is listed in table 3.

Coal resources were calculated using data obtained from the coal isopach maps (plates 4, 6, 9, and 12). The coal bed acreage (measured by planimeter) multiplied by the average isopached thickness of the coal bed, and by a conversion factor of 1,770 short tons of coal per acre-foot (13,018 metric tons per hectare-meter) for subbituminous coal, or 1,800 short tons of coal per acre-foot (13,238 metric tons per hectare-meter) for bituminous coal, yields the coal resources in short tons for each isopached coal bed. Coal beds of Reserve Base thickness (5 feet or 1.5 meters) or greater that lie less than 3,000 feet (914 m) below the ground surface are included. These criteria differ somewhat from that used in calculating Reserve Base and Reserve tonnages as stated in U.S. Geological Survey Bulletin 1450-B which calls for a minimum thickness of 28 inches (70 cm) for bituminous coal and a maximum depth of 1,000 feet (305 m) for both bituminous and subbituminous coal.

Reserve Base and Reserve tonnages for the isopached coal beds are shown on plates 8, 11, and 14, and are rounded to the nearest 10,000 short tons (9,072 metric tons). Coal Reserve Base tonnages per Federal

section are shown on plate 2 and total approximately 390,000 short tons (354,000 metric tons) for the entire quadrangle, including 36,000 short tons (33,000 metric tons) from the isolated data point. Reserve Base tonnages in the development potential categories for subsurface mining methods are shown in table 2.

Dames & Moore has not made any determination of economic recoverability for any of the coal beds described in this report.

COAL DEVELOPMENT POTENTIAL

Coal development potential areas are drawn so as to coincide with the boundaries of the smallest legal land subdivisions shown on plate 2. In sections or parts of sections where no land subdivisions have been surveyed by the BLM, approximate 40-acre (16-ha) parcels have been used to show the limits of the high, moderate, or low development potentials. A constraint imposed by the BLM specifies that the highest development potential affecting any part of a 40-acre (16-ha) lot, tract, or parcel be applied to that entire lot, tract, or parcel. For example, if 5 acres (2 ha) within a parcel meet criteria for a high development potential, 25 acres (10 ha) a moderate development potential, and 10 acres (4 ha) a low development potential, then the entire 40 acres (16 ha) are assigned a high development potential.

Development Potential for Surface Mining Methods

Areas where the coal beds of Reserve Base thickness are overlain by 200 feet (61 m) or less of overburden are considered to have development potential for surface mining. Since no coal beds of Reserve Base thickness within 200 feet (61 m) of the ground surface are known to occur on Federal lands in this quadrangle, all Federal land areas within the quadrangle have been rated as having unknown development potential for surface mining methods.

Development Potential for Subsurface and In-Situ Mining Methods

Areas considered to have a development potential for conventional subsurface mining methods are those areas where the coal beds of Reserve

Base thickness are between 200 and 3,000 feet (61 and 914 m) below the ground surface and have dips of 15° or less. Coal beds lying between 200 and 3,000 feet (61 and 914 m) below the ground surface, dipping greater than 15°, are considered to have development potential for in-situ mining methods.

Areas of high, moderate, and low development potential for conventional subsurface mining are defined as areas underlain by coal beds of Reserve Base thickness at depths ranging from 200 to 1,000 feet (61 to 305 m), 1,000 feet to 2,000 feet (305 to 610 m), and 2,000 to 3,000 feet (610 to 914 m), below the ground surface, respectively.

Areas where the coal data is absent or extremely limited between 200 and 3,000 feet (61 and 914 m) below the ground surface are assigned unknown development potentials. This applies to that area influenced by the isolated data point and to those areas where coal beds of Reserve Base thickness are not known, but may occur. The area influenced by the isolated data point in this quadrangle contains approximately 36,000 short tons (33,000 metric tons) of coal available for subsurface mining.

Areas classified as having coal development potential for subsurface mining methods are shown on plate 15. The Federal land area having known development potential for conventional subsurface mining methods has been rated high. The remaining Federal lands are classified as having unknown development potential for conventional subsurface mining methods.

Areas classified as having coal development potential for in-situ mining methods are also shown on plate 15. Section 8, T. 18 N., R. 105 W., contains coal in the D coal bed which dips in excess of 15°. Because of the low amount of coal available for the in-situ process (approxiately 160,000 short tons or 145,000 metric tons) and the presence of a fault, the area has been rated as having low development potential for in-situ mining methods.

Table 1. -- Chemical analysis of the Kanda quadrangle, Sweetwater County, Wyoming.

Location	COAL BED NAME	Form of Analysis	Proximate				Ultimate					Heating Value	
			Moisture	Volatile Matter	Fixed Carbon	Ash	Sulfur	Hydrogen	Carbon	Nitrogen	Oxygen	Calories	Btu/Lb
Sec. 26, T. 19 N., R. 105 W., Union Pacific Old No. 5 Mine (U.S. Bureau of Mines, 1931)	Rock Springs No. 5	A	10.9	30.8	42.7	15.6	1.0	-	-	-	-	-	9,990
		C	0.0	34.6	47.9	17.5	1.1	-	-	-	-	-	10,540
NW¼, NW¼, sec. 2, T. 18 N., R. 105 W., Blairtown Mine (U.S. Bureau of Mines, 1931)	Rock Springs No. 3	A	11.5	36.8	50.1	1.6	0.8	-	-	-	-	-	12,220
		C	0.0	41.6	55.6	1.8	0.9	-	-	-	-	-	13,810
Sec. 35, T. 19 N., R. 105 W., Union Pacific No. 1 Mine (U.S. Bureau of Mines, 1931)	Rock Springs No. 1	A	8.5	35.6	50.4	5.5	0.8	-	-	-	-	-	11,830
		C	0.0	38.9	55.1	6.0	0.9	-	-	-	-	-	12,940
Sec. 26, T. 19 N., R. 105 W., Sweetwater No. 2 Mine (U.S. Bureau of Mines, 1931)	Rock Springs No. 7	A	9.8	32.6	48.6	9.0	0.9	-	-	-	-	-	11,300
		C	0.0	36.2	53.8	10.0	1.0	-	-	-	-	-	12,530

Form of Analysis: A, as received
B, air dried
C, moisture free

Note: To convert Btu/pound to kilojoules/kilogram, multiply by 2.326

Table 2. -- Coal Reserve Base data for subsurface mining methods for Federal coal lands (in short tons) in the Kanda quadrangle, Sweetwater County, Wyoming.

Coal Bed or Zone	High Development Potential	Moderate Development Potential	Low Development Potential	Unknown Development Potential	Total
Deadman	-	-	-	160,000	160,000
Rock Springs No. 5	60,000	-	-	-	60,000
Rock Springs No. 3	-	40,000	-	-	40,000
Rock Springs No. 7	-	90,000	-	-	90,000
Isolated Data Points	-	-	-	100,000	100,000
Totals	60,000	130,000	-	260,000	450,000

NOTE: To convert short tons to metric tons, multiply by 0.9072.

Table 3. -- Sources of data used on plate 1

Plate 1 Index Number	Source	Data Base
1	Rocky Mountain Energy Co., (no date), unpublished data	Drill hole No. 1AS
2	Schultz, 1910, U.S. Geological Survey Bulletin 381-B, p. 239	Measured Section
3	Rocky Mountain Energy Co., (no date), unpublished data	Drill hole No. 2AS
4	↓	Drill hole No. 1AS
5	↓	Drill hole No. 3AS
6	↓	Drill hole No. 1AS
7	Dobbin and McKim, 1940, U.S. Geological Survey, unpublished report	Drill hole No. 2
8	↓	Drill hole No. 1A
9	Rocky Mountain Energy Co., (no date), unpublished data	Drill hole No. 1AS
10	↓	Drill hole No. 1AS
11	Schultz, 1910, U.S. Geological Survey Bulletin 381-B, p. 239	Measured Section
12	Culbertson, (no date, a), U.S. Geological Survey, unpublished data	Measured Section No. LB-23
13	Rocky Mountain Energy Co., (no date), unpublished data	Drill hole No. 1AS
14	↓	Drill hole No. 1AS
15	U.S. Bureau of Mines	Waterwell No. 1-RS-6
16	Union Oil of California	Oil/gas well No. 1-C-19 White Mountain Unit

Table 3. -- Continued

Plate 1 Index Number	Source	Data Base
17	Rocky Mountain Energy Co., (no date), unpublished data	Drill hole No. 1AS
18	↓	Drill hole No. 1AS
19	↓	Drill hole No. 2AS
20	Schultz, 1910, U.S. Geological Survey Bulletin 381-B, p. 229	Measured Section

REFERENCES

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