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COAL RESOURCE OCCURRENCE AND COAL DEVELOPMENT POTENTIAL MAPS OF THE NORTHWEST QUARTER OF THE BOARS TUSK 15-MINUTE QUADRANGLE, SWEETWATER COUNTY, WYOMING

[Report includes 11 plates]

Prepared for

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

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This report has not been edited
for conformity with U.S. Geological
Survey editorial standards or
stratigraphic nomenclature.

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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 northwest quarter of the Boars Tusk 15-minute 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 Published and unpublished public information available through April, 1978, was used as the data base for this study.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

In this report, the term "quadrangle" refers only to the northwest quarter of the Boars Tusk 15-minute quadrangle which is located in the north-central part of Sweetwater County, approximately 20 miles (32 km) north of the city of Rock Springs. In general, the quadrangle is unpopulated.

Accessibility

An improved light-duty road follows Killpecker Creek north to Fifteenmile Knoll in the south-central part of the quadrangle, then branches to the northwest and northeast. The northwest branch connects with U.S. Highway 187 to the west of the quadrangle boundary. The northeast branch follows Nitch Creek east into the Leucite Hills. Several unimproved dirt roads and trails provide access through the remainder of the quadrangle. Interstate Highway 80 passes east-west through southern Wyoming approximately 19 miles (31 km) south of the quadrangle boundary (U.S. Bureau of Land Management, 1971; Wyoming State Highway Commission, 1978).

The main east-west line of the Union Pacific Railroad passes through the city of Rock Springs south of the quadrangle. This line provides railway service across southern Wyoming connecting Odgen, Utah, to the west with Omaha, Nebraska, to the east. A spur from the main line at Rock Springs extends northward through the quadrangle. It is privately owned by the U.S. Steel Corporation and connects with South Pass City, Wyoming, northeast of the quadrangle (U.S. Bureau of Land Management, 1978).

Physiography

The northwest quarter of the Boars Tusk 15-minute quadrangle lies in the northwestern part of the Rock Springs uplift. The quadrangle is characterized by relatively flat-lying valleys along Killpecker Creek and Nitch Creek and by gentle dip slopes throughout the remainder of the quadrangle. Boars Tusk, an erosional remnant of a volcanic neck (Carey, 1955), rises approximately 375 feet (114 m) above the Killpecker Creek valley to an elevation of 7,095 feet (2,163 m) above sea level. Elevations in the quadrangle range from less than 6,600 feet (2,012 m) on Killpecker Creek on the southern border of the quadrangle to over 7,200 feet (2,195 m) in the southeastern corner of the quadrangle. The northern fifth of the quadrangle is covered by a wide belt of sand dunes, part of the Killpecker dune field (Ahlbrandt, 1975).

Killpecker Creek and a tributary, Nitch Creek, drain the quadrangle. Killpecker Creek flows south joining Bitter Creek near the city of Rock Springs. All of the streams in the quadrangle are intermittent and flow 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. 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), according to the U.S. Bureau of Land Management (1978).

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

Land Status

The northwest quarter of the Boars Tusk 15-minute quadrangle lies in the northwestern part of the Rock Springs Known Recoverable Coal Resource Area (KRCRA). The southeastern three quarters of the quadrangle lie within the KRCRA boundary, with the Federal government owning the coal rights for over 75 percent of this area. One active coal lease and one preference right lease application (PRLA) area are present within the KRCRA boundary, as shown on plate 2.

GENERAL GEOLOGY

Previous Work

Schultz described the geology and coal resources of the northern (1909) and the southern (1910) parts of the Rock Springs coal field and the geology and structure of the Baxter Basin (1920). Hale described the stratigraphy and depositional history of the formations cropping out on the flanks of the Rock Springs uplift in 1950 and 1955. Carey reviewed the geology of the Leucite Hills in 1955. Weimer (1960 and 1961) Smith (1961), Douglas and Blazzard (1961), and Keith (1965) discussed stratigraphy and depositional environment of the Upper Cretaceous formations of the Rock Springs uplift. Analyses of coals in the Rock Springs coal field were discussed by Yourston (1955) and Glass (1976). Roehler and others described the geology and coal resources of the coal field in 1977. Roehler prepared a geologic map of the Rock Springs uplift in 1977 and, in 1978, correlated coal beds in several formations using measured sections. Unpublished data from Rocky Mountain Energy Company (RMEC) also provided coal thickness information.

Stratigraphy

The formations cropping out in northeast-trending bands across the quadrangle range in age from Late Cretaceous to Eocene. The Rock Springs and Almond Formations, both of Late Cretaceous age, and the Fort Union Formation of Paleocene age contain significant amounts of coal.

The Mesaverde Group of Late Cretaceous age conformably overlies and laterally intertongues with the Baxter Shale in this area. The Mesaverde Group is subdivided into four formations which are, in ascending order, the Blair, the Rock Springs, the Ericson Sandstone, and the Almond.

The Blair Formation is present in the subsurface and is approximately 925 to 1,050 feet (282 to 320 m) thick where measured in the oil and gas wells drilled in the quadrangle. The lower part of the formation is composed of a thick series of light brown, thin-bedded, very fine grained sandstone; light-brownish-gray arenaceous siltstone; and brownish-gray silty to sandy shale with a basal layer of massive to thick-bedded, light-brown to brown, very fine to fine-grained sandstone which grades downward into the Baxter Shale. The upper part of the formation consists of light-brown sandy shale and may contain occasional thin brown sandstones and coal beds which grade into the overlying Rock Springs Formation (Hale, 1950 and 1955; Keith, 1965; Smith, 1961).

The coal-bearing Rock Springs Formation, conformably overlying the Blair Formation and present in the subsurface, is approximately 1,630 to 1,690 feet (497 to 515 m) thick where measured in the oil and gas wells drilled in the quadrangle. It consists of a sequence of interbedded brown, black and gray carbonaceous shale, siltstone, claystone, gray sandstone and coal (Roehler, 1978).

The Ericson Sandstone crops out in the southeastern corner of the quadrangle, where it unconformably overlies the Rock Springs Formation (Roehler, 1977; Roehler and others, 1977). The formation ranges from approximately 470 to 550 feet (143 to 168 m) thick where measured in oil and gas wells drilled in the quadrangle. The Ericson Sandstone consists of light-gray to white, massive, cliff-forming, cross-bedded, fine- to coarse-grained sandstone and conglomerate containing chert pebbles (Hale, 1950 and 1955; Smith, 1961).

The Almond Formation, conformably overlying the Ericson Sandstone, crops out in the southeastern corner and along the eastern edge of the quadrangle (Roehler, 1977). It is approximately 780 feet (238 m) thick in the quadrangle, where measured by Roehler (1978), and consists of carbonaceous shale, shale, sandstone (some cross-bedded), and coal. The upper part of the formation is predominantly a thick-bedded to massive fossiliferous sandstone and gray shale (Hale, 1950 and 1955; Roehler, 1978).

The Lewis Shale of Late Cretaceous age conformably overlies the Almond Formation where it crops out in the eastern part of the quadrangle (Roehler, 1977 and 1978). According to Roehler (1978) it is only 120 feet (37 m) thick where measured in the quadrangle because of the Larimide unconformity between it and the overlying Fort Union formation. The Lewis Shale is composed of dark-bluish-gray gypsiferous silty shale with occasional thin interbeds of siltstone and sandstone (Hale, 1950 and 1955; Roehler, 1978) and thickens to the north.

An unknown thickness of the Lance Formation of Late Cretaceous age crops out in the extreme northeastern corner of the quadrangle (Roehler, 1977) where it conformably overlies the Lewis Shale. The formation generally consists of thin beds of silty fine-grained sandstone interbedded with carbonaceous shale and coal (Hale, 1950; Land, 1972; Roehler and others, 1977). The Lance Formation has been removed from much of the quadrangle by (Larimide) erosion and is not shown on the composite stratigraphic column (plate 3). The Fox Hills Sandstone, usually present between the Lewis and Lance Formations, is not shown on Roehler's map (1977) but may be present as nearshore marine and barrier bar sandstones within the Lewis Shale (Roehler, oral communication, 1979).

The Fort Union Formation unconformably overlies either the Lewis Lance, or Almond Formations and crops out in the south-central part of the quadrangle (Roehler, 1977). An oil and gas well drilled in sec. 5, T. 22 N., R. 104 W., penetrated approximately 1,260 feet (384 m) of the Fort Union Formation which consists of alternating gray lenticular sandstone and siltstone, interbedded gray shale, gray and brown carbonaceous shale and coal (Roehler and others, 1977). The formation thins up-dip and thickens down-dip from this drill hole.

The main body of the Wasatch Formation of Eocene age conformably overlies the Fort Union Formation and crops out in the southwestern and western parts of the quadrangle (Roehler, 1977). It consists of gray sandstone and siltstone with interbedded gray, green, and red mudstone, gray and brown, partly carbonaceous shale, and sparce thin beds of gray limestone (Bradley, 1964; Roehler and others, 1977).

Leucite- and phlogopite-rich volcanic rocks (Eocene to Pliestocene in age) comprise Boars Tusk, an eroded volcanic neck, in the north-central part of the quadrangle (Carey, 1955; Roehler, 1977).

Sand dunes of the Killpecker dune field cover much of the northern fifth of the quadrangle, and Holocene deposits of alluvium cover the stream valleys of Killpecker Creek and Nitch Creek (Ahlbrandt, 1975; Roehler, 1977).

The Upper Cretaceous formations in the northwest quarter of the Boars Tusk 15-minute quadrangle indicate the transgressions and regressions of a broad, shallow, north-south trending seaway that extended across central North America. These formations accumulated near the western edge of the Cretaceous sea and reflect the location of the shoreline (Weimer, 1960 and 1961).

The Blair Formation, composed of intertonguing nearshore sandstones and offshore marine shales, was deposited in a shallow-water marine sequence as the Cretaceous sea regressed eastward (Douglass and Blazzard, 1961; Gosar and Hopkins, 1969).

Northwest of a strand line extending from approximately the southeastern corner of T. 16 N., R. 106 W., northeastward through T. 22 N., R. 100 W., the Rock Springs Formation consists mostly of sediments deposited in swamp, deltaic and fluvial environments. Southeast of the strand line the Rock Springs Formation consists mainly of shallow-water marine deposits (Douglass and Blazzard, 1961; Burger, 1965; 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 Almond Formation reflects deposition in fresh-water coastal swamps, brackish-water lagoons and shallow-water marine environments (Hale, 1950).

The Lewis Shale is composed of neritic shale and siltstone deposited in water depths ranging from a few tens of feet to several hundred feet (Land, 1972).

The Lance Formation, consisting of swamp, lagoonal, floodplain and channel sand deposits, was deposited on the landward side of the Cretaceous sea shoreline as the sea retreated to the east (Gosar and Hopkins, 1969; Roehler and others, 1977).

After the final withdrawal of the Cretaceous sea, the Fort Union Formation was deposited mainly in paludal or swamp environments across the Rock Springs uplift (Roehler, 1961).

The main body of the Wasatch Formation was deposited in fresh-water swamps in the topographic low of an intermontane basin (Bradley, 1964; Roehler and others, 1977).

Structure

The northwest quarter of the Boars Tusk 15-minute quadrangle is located on the northwestern flank of the Rock Springs uplift which separates the Great Divide and Green River structural basins. The Rock Springs uplift is a doubly plunging asymmetric anticline with the west limb having the steeper dips (4° to 35° to the west). Dips along the east limb are from 5° to 8° to the east (Roehler and others, 1977).

Bradley (1964) shows dips of 5° or less to the west and northwest for this quadrangle. No faults have been mapped within the quadrangle boundaries.

COAL GEOLOGY

Coal beds of five formations were identified in the northwest quarter of the Boars Tusk 15-minute quadrangle. A few coal beds encountered within the Rock Springs-Blair Formation transitional contact have been assigned to the Blair Formation. Only one of these coal beds exceeds Reserve Base thickness (5 feet or 1.5 meters) and it has been treated as an isolated data point (see Isolated Data Points section of this report). Several Rock Springs Formation coal beds have been identified in oil and gas wells drilled in the northeastern part of the quadrangle. The majority of the Almond Formation coal beds occur approximately 800 feet (244 m) above the top of the Rock Springs Formation in a zone approximately 400 feet (122 m) thick. A few Fort Union Formation coal beds and a single thin coal bed of the Wasatch Formation were encountered in the southern part of the quadrangle.

The Lance Formation, cropping out in the northeastern part of the quadrangle but extensively covered by sand dunes, is probably coal-bearing but will require study in the future to determine if the coal beds are important.

Chemical analyses of coals.--Although no analyses were available for coal within the quadrangle, representative chemical analyses from the Rock Springs uplift area are shown in table 1 for the Rock Springs, Almond, Fort Union, and Wasatch Formations. No information was found on the Blair Formation coals, but they are probably of the same quality as the Rock Springs Formation coals.

In general, the Rock Springs Formation coals are high-volatile C bituminous in rank; Almond Formation coals are subbituminous B; Fort Union Formation coals are subbituminous B; and the Wasatch Formation coals are subbituminous B to A in rank. The coals have been ranked 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

Geophysical logs from oil and gas wells drilled in the quadrangle indicate that coal beds occur at depth within the Rock Springs Formation and vary in thickness up to 8 feet (2.4 m). However, lack of surface exposures of the coal beds puts severe constraints on correlations. The bracketed numbers and letters used to name the coal beds are for identification purposes in this quadrangle only and show the relative position of the coal beds within the stratigraphic sequence with high number values indicating a higher stratigraphic position.

Because of a lack of more complete data, all of the Rock Springs Formation coal beds exceeding Reserve Base thickness (except the Rock Springs [2] and [23] coal beds) have been included in the Isolated Data Point section of this report and are shown on plate 9. The isopach and structure contour maps of the Rock Springs [2] and [23] coal beds (plates 4 and 7) are based on data projected from the northeast quarter of the Boars Tusk 15-minute quadrangle, where both coal beds thicken to approximately 6 feet (1.8 m).

Coal Beds of the Almond Formation

Coal beds of the Almond Formation tend to be thin, lenticular, and of limited areal extent. Only one coal bed, the Almond [8B], lying approximately 320 feet (98 m) below the top of the formation, has been mapped (plate 4) in this quadrangle.

The Almond [8B] coal bed has been isopached in sec. 13, T. 22 N., R. 104 W., where the maximum reported thickness is 6 feet (1.8 m). Because of the lack of more complete subsurface data and the lagoonal nature of the coal, this coal bed could not be correlated with Almond Formation coal beds in surrounding quadrangles.

Coal Beds of the Fort Union Formation

A single Fort Union Formation coal bed, located near the base of the formation, exceeds Reserve Base thickness in this quadrangle. This coal bed has been designated the A coal bed in this quadrangle and where it is found in the southwest quarter of the Boars Tusk 15-minute quadrangle to the south.

Using data from two coal test holes and information from an oil and gas well, the A coal bed has been isopached and structure contoured on plate 4. Measured thicknesses range from 2 to 9 feet (0.6 to 2.7 m) in the southwestern part of this quadrangle, and a maximum thickness of 7 feet (2.1 m) was reported in the the adjacent quadrangle to the south.

This coal bed is believed to thicken considerably to the west (beyond the quadrangle boundary), where oil and gas wells have penetrated thick Fort Union coal beds in the subsurface (Roehler and others, 1977). Correlations are made difficult, however, by a lack of drill holes and intraformational thickening above and below the A coal bed.

Isolated Data Points

In instances where isolated measurements of coal beds of Reserve Base thickness or greater 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 plate for non-isopached coal beds (plate 9). Coal beds identified by bracketed numbers and letters are not formally named, but are used for identification purposes in this quadrangle only.

COAL RESOURCES

Information from oil and gas wells and coal test holes from RMEC, as well as measured sections from Schultz (1910), were used to construct outcrop, isopach, and structure contour maps of the coal beds in the northwest quarter of the Boars Tusk 15-minute quadrangle. The source of each indexed data point shown on plate 1 is listed in table 4.

Coal resources were calculated using data obtained from the coal isopach maps (plates 4 and 7). 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 thicker than 5 feet (1.5 m) that lie less than 3,000 feet (914 m) below the ground surface are included. These criteria differ somewhat from those 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 beds are shown on plates 6 and 8, 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 86.18 million short tons (78.18 million metric tons) for the entire quadrangle. This includes 51.68 million short tons (46.88 million metric tons) from the isolated data points. Reserve Base tonnages in the various development potential categories for surface and subsurface mining methods are shown in tables 2 and 3.

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 potential for surface mining and were assigned a high, moderate, or low development potential based on the mining ratio (cubic yards of overburden per ton of recoverable coal). The formula used to calculate mining ratios for surface mining of coal is as follows:

$$MR = \frac{t_o\ (cf)}{t_c\ (rf)}$$

where MR = mining ratio

t_o = thickness of overburden in feet

t_c = thickness of coal in feet

rf = recovery factor (85 percent for this quadrangle)

cf = conversion factor to yield MR value in terms of cubic yards of overburden per short tons of recoverable coal:
0.911 for subbituminous coal
0.896 for bituminous coal

Note: To convert mining ratio to cubic meters of overburden per metric ton of recoverable coal, multiply MR by 0.8428.

Areas of high, moderate, and low development potential for surface mining methods are defined as areas underlain by coal beds having respective mining ratio values of 0 to 10, 10 to 15, and greater than 15. These mining ratio values for each development potential category are based on economic and technological criteria and were provided by the U.S. Geological Survey.

Areas where the coal data is absent or extremely limited between the 200-foot (61-m) overburden line and the outcrop are assigned unknown development potentials for surface mining methods. This applies to those areas where coal beds of Reserve Base thickness are not known, but may occur.

The coal development potential for surface mining methods is shown on plate 10. Of the Federal land areas having a known development potential for surface mining methods, 63 percent are rated high, 12 percent are rated moderate, and 25 percent are rated low. These areas contain approximately 1.15 million short tons (1.04 million metric tons) of coal available for surface mining methods. The remaining Federal lands within the KRCRA boundary are classified 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 include 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 a development potential for in-situ mining methods.

Areas of high, moderate, and low development potential for subsurface mining methods are defined as areas underlain by coal beds at depths ranging from 200 to 1,000 feet (61 to 305 m), 1,000 to 2,000 feet (305 to 610 m), and 2,000 to 3,000 feet (610 to 914 m), 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 those areas influenced by isolated data points and to the areas where no known coal beds of Reserve Base thickness occur. The areas influenced by isolated data points in this quadrangle contain approximately 51.68 million short tons (46.88 million metric tons) of coal available for subsurface mining.

The coal development potential for subsurface mining methods is shown on plate 11. Of those Federal land areas having known development potential for conventional subsurface mining methods, 21 percent are rated high, 77 percent are rated moderate, and 2 percent are rated low. The remaining Federal land is classified as having unknown development potential for conventional subsurface mining methods.

Because the coal beds in this quadrangle have dips less than 15°, all Federal land areas within the KRCRA boundary have been rated as having an unknown development potential for in-situ mining methods.

Table 1.--Chemical analyses of coals in the northwest quarter of the Boars Tusk 15-minute 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
Average or range from the Black Buttes area (Glass, 1976)	Wasatch Formation, undifferentiated	A	19.3-19.6	33.0	40.4	7.2-8.1	0.74-1.5	-	-	-	-	-	8,770-9,610
Average from the Black Buttes area (Glass, 1976)	Fort Union Fm, undifferentiated	A	17.69	30.93	43.85	8.48	0.41	-	-	-	-	-	9,728
SW¼, SW¼, sec. 26, T. 20 N., R. 101 W., Point of Rocks Mine (Yourston, 1955)	Almond Formation, undifferentiated	A	16.6	30.2	44.0	9.2	0.7	-	-	-	-	-	9,410
		C	0.0	36.3	52.7	11.0	0.8	-	-	-	-	-	11,290
Sec. 3, T. 21 N., R. 103 W., Prospect Pits (U.S. Bureau of Mines, 1931)	Rock Springs Fm, undifferentiated	A	13.8	31.7	49.5	5.0	0.9	-	-	-	-	-	10,790
		C	0.0	36.8	57.4	5.8	1.0	-	-	-	-	-	12,520

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 surface mining methods for Federal coal lands (in short tons) in the northwest quarter of the Boars Tusk quadrangle, Sweetwater County, Wyoming.

Coal Bed or Zone	High Development Potential	Moderate Development Potential	Low Development Potential	Unknown Development Potential	Total
A	330,000	280,000	540,000	-	1,150,000
Totals	330,000	280,000	540,000	-	1,150,000

NOTE: To convert short tons to metric tons, multiply by .09072.

Table 3.--Coal Reserve Base data for subsurface mining methods for Federal coal lands (in short tons) in the northwest quarter of the Boars Tusk quadrangle, Sweetwater County, Wyoming.

Coal Bed or Zone	High Development Potential	Moderate Development Potential	Low Development Potential	Unknown Development Potential	Total
A	2,600,000	29,430,000	680,000	-	32,710,000
Rock Springs {23}	-	120,000	-	-	120,000
Rock Springs {2}	-	-	520,000	-	520,000
Isolated data points	-	-	-	51,680,000	51,680,000
Totals	2,600,000	29,500,000	1,200,000	51,680,000	85,030,000

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

Table 4. -- 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. 3AS
2	↓	Drill hole No. 1AS
3	British-American Oil Producing Co.	Oil/gas well No. 1 Gov't-Haskey
4	Rocky Mountain Energy Co., (no date), unpublished data	Drill hole No. 1AS
5	↓	Drill hole No. 2AS
6	↓	Drill hole No. 1AS
7	↓	Drill hole No. 2AS
8	↓	Drill hole No. 1AS
9	Amax Petroleum Corp.	Oil/gas well No. 5 Nitchie Gulch Unit
10	Sunset International Petroleum Corp.	Oil/gas well No. 11-10 Gov't-Amax
11	Amax Petroleum Corp. & Grynberg, Inc.	Oil/gas well No. 12-1 Gov't-Rogers
12	Terra Resources	Oil/gas well No. 7-13 Terra-Gov't
13	Southland Royalty Co.	Oil/gas well No. 1-26 Nitchie Gulch-Federal

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