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COAL RESOURCE OCCURRENCE AND COAL DEVELOPMENT POTENTIAL OF THE ROUND MOUNTAIN QUADRANGLE, LINCOLN COUNTY, WYOMING

Prepared for

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

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Purpose

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 Published and unpublished public information available through April, 1978, was used as the data base for this study.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 Round Mountain quadrangle is located in central Lincoln County, Wyoming, approximately 6 airline miles (10 km) northeast of the town of Kemmerer, Wyoming. The quadrangle is generally unpopulated.

Accessibility

Wyoming Highway 189, a paved heavy-duty road, crosses through the southeastern part of the Round Mountain quadrangle connecting the town of Kemmerer, approximately 10 miles (16 km) to the southwest of the quadrangle (via Wyoming Highway 189), with the town of La Barge to the northeast. U.S. Highway 30N passes east-west through Kemmerer and Interstate Highway 80 lies approximately 35 miles (56 km) to the south of Kemmerer. The historical Emigrant, or Slate Creek, Trail crosses the northern part of the quadrangle. Numerous unimproved dirt roads and trails provide the major access throughout the Round Mountain quadrangle (U.S. Bureau of Land Management, 1971; Wyoming State Highway Commission, 1978).

Physiography

The Round Mountain quadrangle lies on the eastern edge of the Wyoming Overthrust Belt and on the western edge of the Green River

Basin. The topography in the quadrangle is characterized by steep escarpments, long ridges and several flat-topped mesas. Round Mountain, in the southeastern corner of the quadrangle, rises to an altitude of over 7,680 feet (2,341 m). Slate Creek Ridge, located in the northwestern part of the quadrangle, forms a steep escarpment east of the valley of the North Fork of Slate Creek. Altitudes in the quadrangle range from less than 6,840 feet (2,085 m) on the North Fork of Slate Creek along the east-central edge of the quadrangle to 7,975 feet (2,431 m) on a ridge along the west-central edge of the quadrangle.

Slate Creek and its tributaries (including Emigrant Creek, and the North, Middle, and South Forks of Slate Creek) are the major drainages in the quadrangle. Slate Creek flows easterly into the Green River east of the quadrangle boundary. The East Branch of Willow Creek, a tributary of Hams Fork and the Green River, flows southerly along the western edge of the quadrangle. Numerous springs are scattered throughout the quadrangle (U.S. Bureau of Land Management, 1971; Wyoming State Highway Commission, 1978).

Climate and Vegetation

The climate of southwestern Wyoming is semiarid, characterized by low precipitation, rapid evaporation, and large daily temperature variations. Summers are usually dry and mild, and winters are cold. The annual precipitation averages approximately 10 inches (25 cm) and is fairly evenly distributed throughout the year (Wyoming Natural Resources Board, 1966).

The average annual temperature of the area is 39° F (4° C). The temperature during January averages 17° F (-8° C) and typically ranges from 4° F (-16° C) to 30° F (-1° C). During July, the average temperature is 62° F (17° C), and the temperature typically ranges from 43° F (6° C) to 82° F (28° C) (Wyoming Natural Resources Board, 1966; U.S. Bureau of Land Management, 1978).

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

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

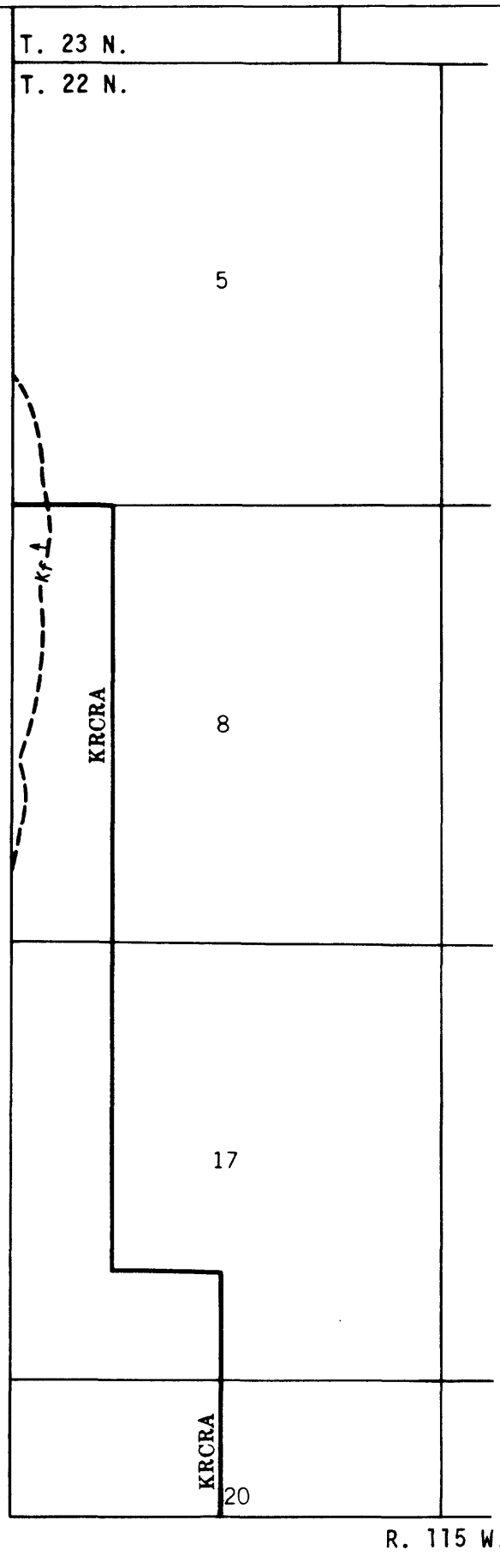
Land Status

The Round Mountain quadrangle is located in the northeastern part of the Kemmerer Known Recoverable Coal Resource Area (KRCRA). Only a small area in the southwestern part of the quadrangle, approximately 1 percent of the quadrangle's total area, lies within the KRCRA boundary. The Federal government owns the coal rights for all of this area, as shown on figure 1. No outstanding Federal coal leases, prospecting permits or licenses occur within the KRCRA boundary in this quadrangle.

General Geology

Previous Work

The geology and economic resources of a large part of Lincoln and Uinta counties located in southwestern Wyoming, including most of the Round Mountain quadrangle, were described by Veatch in 1907. Schultz (1914) investigated the geology and coal resources in the northern part of the Kemmerer coal field. Andrews (1944) described the coal and mapped the geology of the adjacent northeast quarter of the Kemmerer 15-minute quadrangle to the west. The stratigraphy of the coal-bearing Frontier Formation was described by Cobban and Reeside (1952) and Hale (1960). Oriel (1969) mapped the geology of the adjacent Fort Hill 15-minute quadrangle to the north. Oriel and Tracey (1970) described the stratigraphy of the uppermost Cretaceous and Tertiary formations in the Kemmerer area, and the geology of the Kemmerer 15-minute quadrangle was mapped by Rubey and others (1975). Glass (1977) described the coal-bearing formations and reported chemical analyses of the coal beds present in the Hams Fork coal region. The geology and coal resources of the Hams



EXPLANATION

KRCRA

KRCRA BOUNDARY - Label within KRCRA boundary.

6

SECTION OF LAND

Kf

FORMATION CONTACT - Letters designate formation name as listed below. Arrow points toward formation-bearing area. Dashed where inferred.

Kf - Frontier

FORMATION SYMBOL AND NAME

REFERENCES

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FIGURE 1. — Boundary data map.

Fork coal region, including the Kemmerer coal field, were also described by Roehler and others (1977). Myers (1977) made a detailed study of the stratigraphy of the Frontier Formation in the Kemmerer area.

Stratigraphy

In the Round Mountain quadrangle, formations of Triassic, Jurassic, Cretaceous, and Eocene age crop out in north-south-trending bands across the quadrangle. Only two formations, the Aspen and the Frontier Formations of Cretaceous age, are exposed within the KRCRA boundary. A generalized columnar section is shown in figure 2.

Formations of Triassic and Jurassic age, including the Nugget Sandstone, the Twin Creek Limestone, the Preuss Red Beds, and the Stump Sandstone, crop out in the central part of the quadrangle. They are unconformably overlain by the Wasatch and the Green River Formations of Eocene age in the eastern part of the quadrangle.

The Gannett Group of Early Cretaceous age crops out in the central part of the quadrangle and consists of approximately 800 feet (244 m) of red and greenish-gray variegated mudstone interbedded with white sandstone and limestone (Oriel, 1969).

The Bear River Formation of Early Cretaceous age unconformably overlies the Gannett Group and crops out in a narrow band in the western part of the quadrangle. This formation is approximately 1,400 feet (427 m) thick and consists of interbedded dark-gray to black fissile claystone, tan to olive-brown fine-grained sandstone, and fossiliferous limestone (Rubey and others, 1975).

Conformably overlying the Bear River Formation, the Aspen Shale of late Early Cretaceous age crops out in a narrow band along the western edge of the quadrangle. It consists of approximately 1,025 to 1,225 feet (312 to 373 m) of light- to dark-gray arenaceous shale, siltstone, claystone, gray quartzitic sandstone, and numerous porcelanite and bentonite beds. The porcelanite beds in the lower part of the Aspen Shale

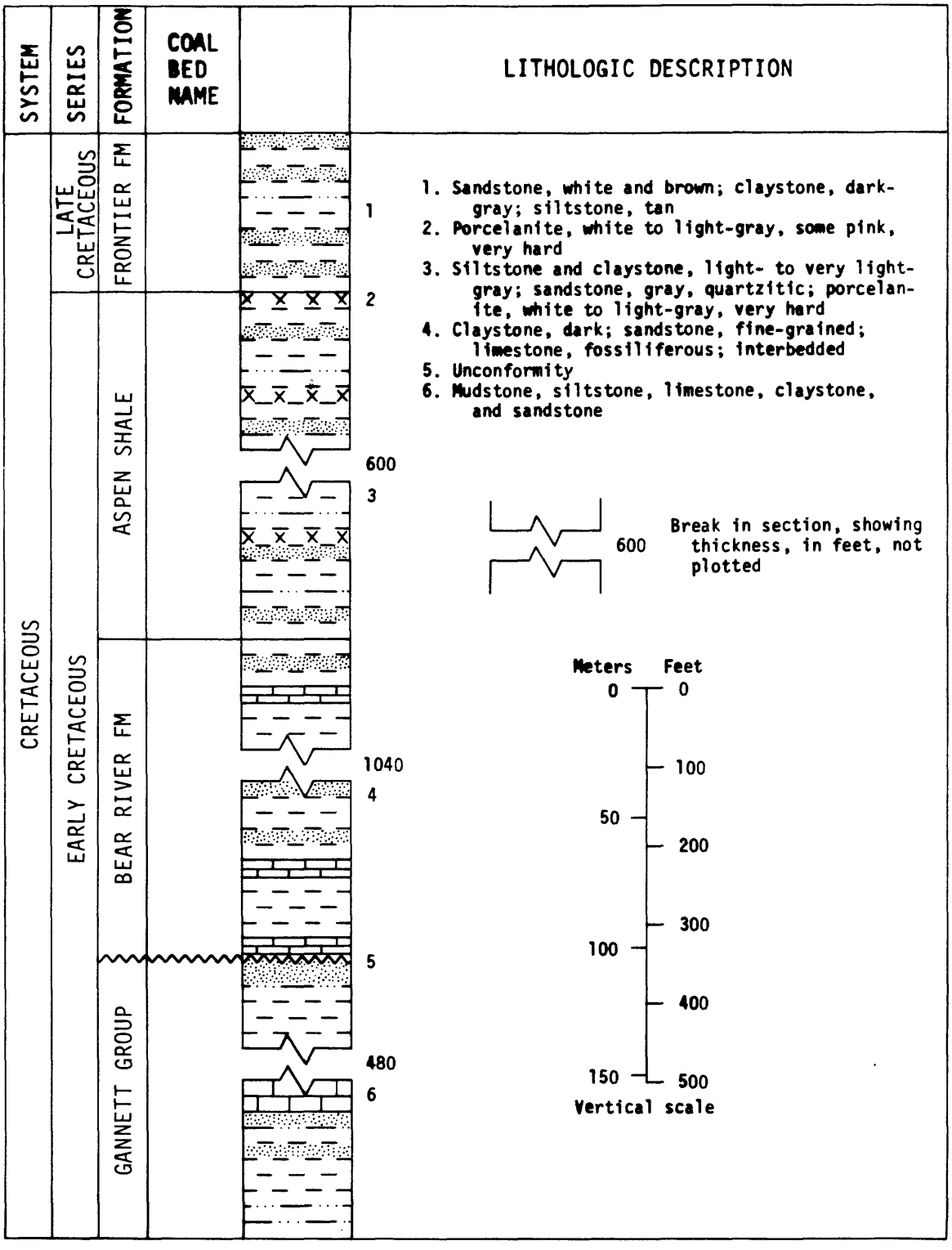

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FIGURE 2. — Composite columnar section.

form vegetation-bare silver-gray ridges and hogbacks (Rubey and others, 1975).

The Frontier Formation of early Late Cretaceous age conformably overlies the Aspen Shale. Only the basal part of the formation crops out within the Round Mountain quadrangle in secs. 5 and 8, T. 22 N., R. 115 W. The remainder of the Frontier Formation, including the coal-bearing part, crops out west of the quadrangle boundary. The lower part of the formation is composed of thin white and brown sandstone beds (which are less resistant to erosion than the rest of the formation), tan siltstone, dark-gray claystone, and thin beds of gray, pink and white porcelanite (Rubey and others, 1975).

The Wasatch Formation of Eocene age crops out in the eastern part of the quadrangle, and unconformably overlies Triassic and Jurassic formations. It consists of red, maroon, tan, and green variegated mudstone, white and tan sandstone and siltstone, conglomerate, and limestone (Oriel, 1969).

The Green River Formation of Eocene age intertongues with and overlies the Wasatch Formation along the eastern edge of the quadrangle. It consists of thinly laminated light-gray to white limestone, light-gray marlstone, buff-colored sandstone, light-gray mudstone, siltstone, oil shale, and tuffaceous ash beds (Oriel, 1969).

The Cretaceous formations in the Round Mountain quadrangle indicate the transgressions and regressions of a broad, shallow north-south seaway that extended across central North America during Cretaceous time. Sediments accumulated near the western edge of the sea and reflect the location of the shoreline (Weimer, 1960 and 1961).

The Gannett Group was formed in lacustrine and marine environments (Holm and others, 1977).

The sandstone, black claystone, and fresh water limestone of the Bear River Formation were deposited in coastal swamps and flood plains during a regression of the Cretaceous sea (Roehler and others, 1977).

Deposition of the Aspen Shale marked a westward or landward movement of the sea. The marine shale, siltstone and sandstone of the Aspen Shale were deposited in water up to 120 feet (37 m) deep (Hale, 1960).

The lower part of the Frontier Formation is probably of fluviatile origin (Cobban and Reeside, 1952).

The Wasatch Formation is composed of continental sediments. The bright-colored mudstones were probably deposited on a flood plain and then cut by stream channels now filled with well-sorted conglomerate. Other sediments were deposited in a lacustrine environment (Oriel and Tracey, 1970).

Sediments of the Green River Formation were deposited in a lacustrine environment. Fluctuations in the lake size are recorded by the intertonguing of Green River Formation beds with Wasatch Formation strata around the margin of the basin. Volcanic activity occurred in the area during the deposition of the Green River Formation, as indicated by the thin beds of tuffaceous ash in the formation (Oriel and Tracey, 1970).

Structure

The Round Mountain quadrangle is located on the southeastern edge of the structurally complex Wyoming Overthrust Belt and on the western edge of the Green River Basin. West of the quadrangle, Paleozoic and Mesozoic rocks are thrust eastward over folded Cretaceous formations with younger Cretaceous and Tertiary rocks resting unconformably on top of the older rocks. Cretaceous formations crop out in eroded limbs of folds as long narrow belts bounded on the west by major thrust faults (Roehler and others, 1977).

The axis of the Lazeart Syncline, a major structural feature, trends northeasterly across the central part of the adjacent northeast quarter of the Kemmerer 15-minute quadrangle. Beds of Cretaceous age dip approximately 30° on the eastern limb of the syncline and 60° on the western limb. In the Round Mountain quadrangle, Cretaceous formations are exposed in the eroded eastern limb of the Lazeart Syncline, giving their outcrops a linear appearance. Beds dip to the west at approximately 18° (Oriel, 1969; Rubey and others, 1975).

COAL GEOLOGY

The Frontier Formation is the only formation that is potentially coal-bearing at depths of less than 3,000 feet (914 m) below the ground surface in the Round Mountain quadrangle. No drill-hole or coal-resource data is available to evaluate coal resources in the Frontier Formation. All Frontier Formation coal zones, including the lowermost Spring Valley coal zone, crop out to the west of the Round Mountain quadrangle in the northeast quarter of the Kemmerer 15-minute quadrangle. That part of the Frontier Formation which crops out in the Round Mountain quadrangle is, stratigraphically, below all the Frontier Formation coal zones. Although coal beds may occur near the base of the Frontier Formation, it is doubtful that any coal beds of Reserve Base thickness (5 feet or 1.5 meters) exist below the Spring Valley coal zone in this quadrangle.

COAL DEVELOPMENT POTENTIAL

Areas where coal beds of Reserve Base thickness (5 feet or 1.5 meters) or greater are overlain by 3,000 feet (914 m) of overburden are considered to have development potential for either surface or subsurface mining methods. Coal beds of Reserve Base thickness are not known to be within 3,000 feet (914 m) of the ground surface in this quadrangle. Therefore, all Federal lands within the KRCRA boundary have been classified as having an unknown development potential for both surface and subsurface mining methods.

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