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COAL RESOURCE OCCURRENCE AND
COAL DEVELOPMENT POTENTIAL OF THE
LITTLE DEE CREEK QUADRANGLE,
UINTA COUNTY, WYOMING

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 report on the coal resource occurrence of the Little Dee quadrangle, Uinta County, Wyoming 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 Published and unpublished public information was used as the data base for this study.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 Little Dee Creek quadrangle is located in northwestern Uinta County, Wyoming, approximately 9 airline miles (14 km) northeast of the town of Evanston and 17 airline miles (27 km) southwest of the town of Elk, Wyoming. The area is unpopulated.

Accessibility

No major roads cross the quadrangle. Interstate Highway 80 runs east-west approximately 6 miles (10 km) south of the quadrangle. Several unimproved dirt roads and trails provide access within the quadrangle.

The main east-west line of the Union Pacific Railroad passes approximately 13 miles (21 km) south of the quadrangle, providing railway service across southern Wyoming, connecting Ogden, Utah to the west with Omaha, Nebraska to the east.

Physiography

The Little Dee Creek quadrangle lies on the southeastern edge of the Wyoming Overthrust Belt. The landscape is characterized by

northeast-trending ridges and narrow valleys. Altitudes range from approximately 6,860 feet (2,091 m) along Shurtleff Creek in the northeast quarter of the quadrangle to 8,040 feet (2,451 m) on a ridge near the northwestern edge of the quadrangle.

The major drainages in the Little Dee Creek quadrangle flow northeasterly, roughly parallel to each other, into Little Muddy Creek and the Green River northeast of the quadrangle. Ryckman Creek is joined by Little Dee Creek in the northern part of the quadrangle. Shurtleff Creek, flowing across the center of the quadrangle, and Clear Creek, flowing across the southern half of the quadrangle, join east of the quadrangle boundary. Numerous springs and small reservoirs (stock ponds) are present along most of the streams and their tributaries. All streams in the quadrangle are intermittent, flowing mainly in response to snow-melt in the spring.

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. Annual precipitation in the area averages approximately 10 inches (25 cm) and is fairly evenly distributed throughout the year.

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

The winds are usually from the west and west-southwest with an average velocity of 15 miles per hour (24 km per hour) (U.S. Bureau of Land Management, 1978).

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

Land Status

The Little Dee Creek quadrangle lies on the southwestern border of the Kemmerer Known Recoverable Coal Resource Area. Approximately three percent of the quadrangle lies within the KRCRA boundary, with the Federal government owning the coal rights for approximately one third of this area (figure 1). No outstanding Federal coal leases, prospecting permits, or licenses occur within the quadrangle.

GENERAL GEOLOGY

Previous Work

The geology and economic resources of a large part of Lincoln and Uinta counties in southwestern Wyoming, including the Little Dee Creek quadrangle, were reported by Veatch in 1907. Oriel and Tracey (1970) described the Evanston, Wasatch and Green River Formations in the Kemmerer-Evanston area. Schroeder mapped the geology and coal resources of the adjacent Meadow Draw quadrangle in 1976. Roehler and others (1977) described the geology and coal resources of the Hams Fork coal region including the Kemmerer-Evanston area. Glass described and reported chemical analyses of the coals in the Hams Fork coal region in 1977. Kelly and Hine (1977) described the structure of the Ryckman Creek oil and gas field located in the central part of the Little Dee quadrangle.

Stratigraphy

The geologic map by Veatch (1907) covering a large part of southwestern Wyoming is the only source for locations of formation contacts in this quadrangle. Because this map is old and generally unreliable, the areal extent of the formations cropping out in the quadrangle is uncertain. Thicknesses of the formations in this quadrangle have been derived from data in adjacent quadrangles, and a generalized columnar section is shown in figure 2.

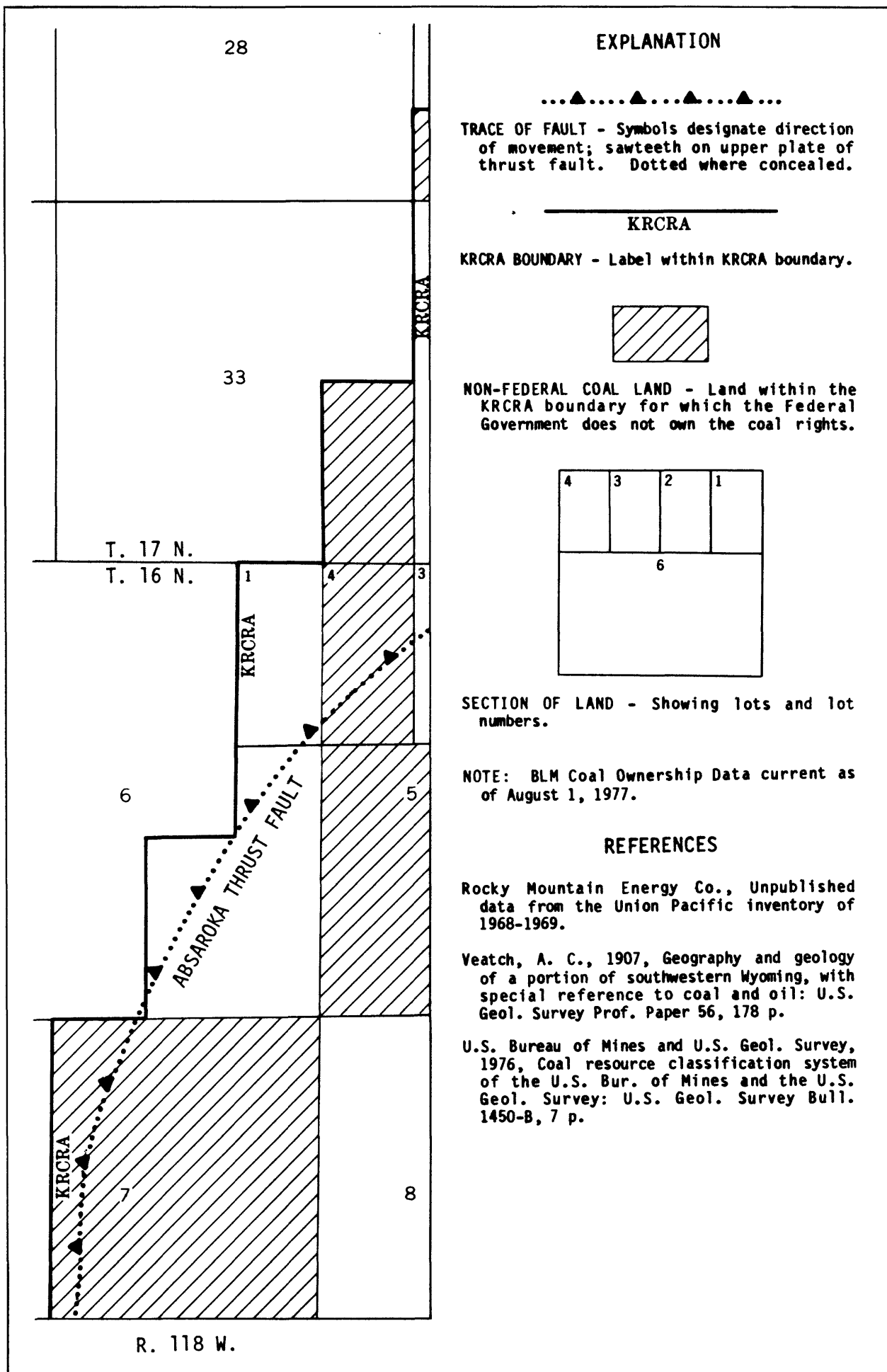


FIGURE 1. — Boundary data map.

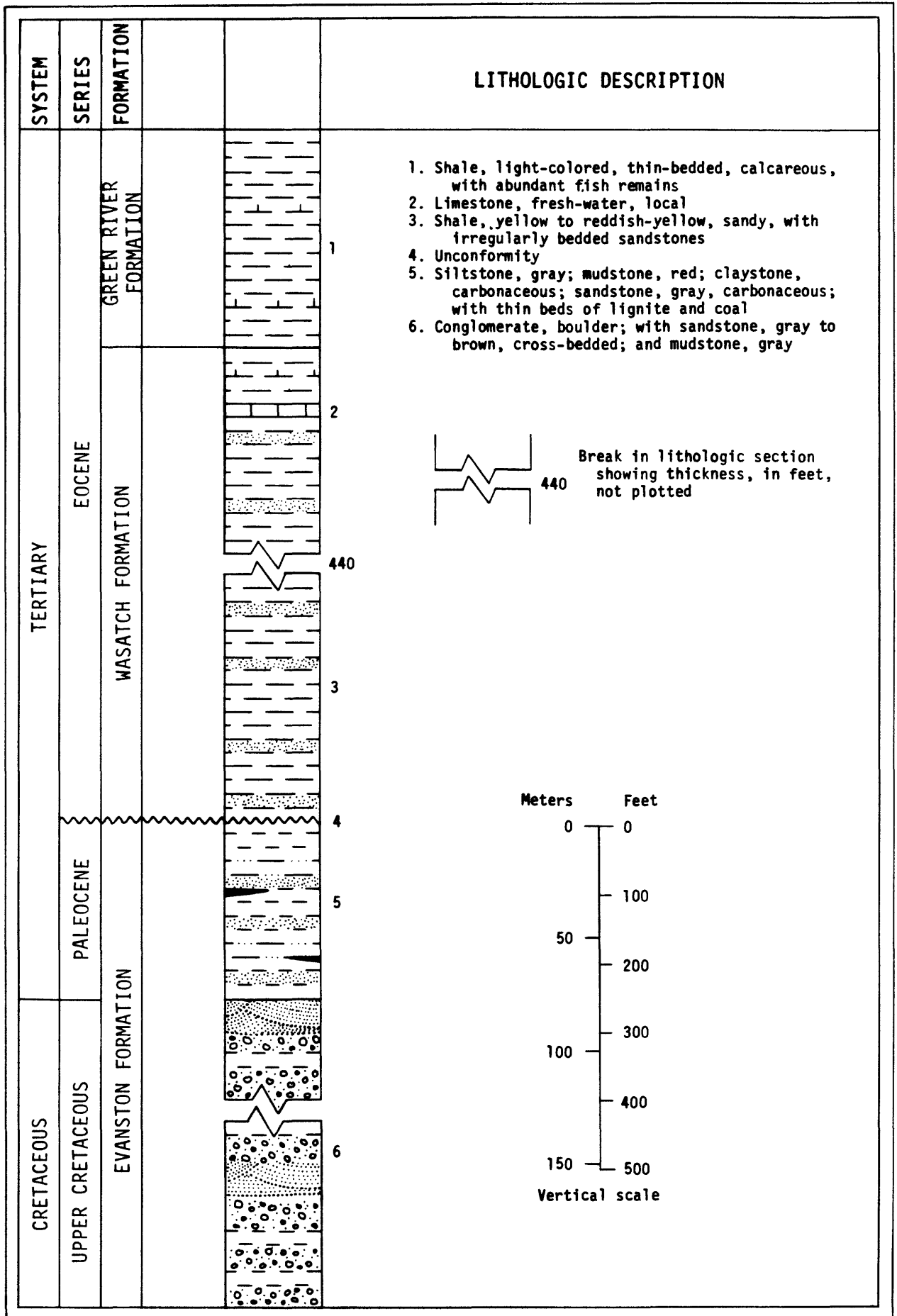


FIGURE 2. — Composite columnar section.

The Evanston Formation is present in the subsurface of this quadrangle. The lower part of the formation contains the Hams Fork Conglomerate Member of Late Cretaceous age which consists of boulder-conglomerate beds with gray to brown cross-bedded sandstone and gray mudstone. This member may be up to 1,000 feet (305 m) thick. The main body of the Evanston Formation, which is Paleocene in age, consists of over 250 feet (76 m) of gray siltstone, red mudstone, carbonaceous claystone, gray carbonaceous sandstone, dark-brown concretionary ironstone, thin coal beds and lignite (Oriel and Tracey, 1970, and Rubey and others, 1975).

The Wasatch Formation of Eocene age unconformably overlies the Evanston Formation and crops out throughout the Little Dee Creek quadrangle. This formation is composed of red, maroon, yellow and gray variegated mudstone; yellow, brown and gray, fine- to coarse-grained sandstone; and stream channel conglomerate beds containing boulders, cobbles and pebbles of quartzite, chert, and limestone. The maximum thickness of the Wasatch Formation is approximately 2,000 feet (610 m) in this quadrangle (Oriel and Tracey, 1970, and Schroeder, 1976).

The Green River Formation of Eocene age intertongues with and overlies the Wasatch Formation with a sharp and conformable contact. The Green River Formation is located in the northern half of the quadrangle and is over 400 feet (122 m) thick. It consists of buff marlstone that weathers to white, gray calcareous siltstone, claystone, and thin beds of tuffaceous ash (Oriel and Tracey, 1970, and Schroeder, 1976).

Recent deposits of alluvium cover the stream valleys of Ryckman Creek, Shurtleff Creek and Clear Creek.

The formations in this quadrangle were deposited in non-marine environments. Thick sections of detrital material, eroded from older deposits to the west, were deposited by large streams as the conglomerates of the Hams Fork Conglomerate Member of the Evanston Formation. The main body of the Evanston Formation was deposited in stream, marsh, and, probably, pond environments (Oriel and Tracey, 1970).

The main body of the Wasatch Formation is composed of continental sediments. The bright-colored mudstones were probably deposited on a flood plain and then cut by lens-shaped stream channels now filled with well-sorted conglomerate (Oriol 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 (Oriol and Tracey, 1970).

Structure

The Little Dee Creek quadrangle is located on the southeastern edge of the structurally complex Wyoming Overthrust Belt. Folded Paleozoic and Mesozoic rocks are thrust eastward over folded Cretaceous-age rocks with younger rocks, Cretaceous and Tertiary in age, resting unconformably on top of the older rocks (Roehler and others, 1977).

The Absaroka fault, an extensive thrust fault mapped for a linear distance of 205 miles (330 km) in Wyoming and Idaho, crosses the southeastern corner of the quadrangle (figure 1). It has a stratigraphic displacement of approximately 10,000 to 15,000 feet (3,048 to 4,572 m) and a lateral displacement of approximately 3 miles (4.8 km). The major movement along the Absaroka faults occurred in very late Cretaceous time, with probably minor movement in Paleocene time (Rubey and others, 1975).

Oil and gas wells drilled in the Ryckman Creek Field in T. 17 N., R. 118 W., penetrated Upper Cretaceous and Tertiary sedimentary rocks (the Evanston, Wasatch and Green River Formations, figure 2) to a depth of over 4,000 feet (1,219 m). These sediments unconformably overlie an asymmetric overturned anticline of Mesozoic sediments cut by several minor thrusts. The Absaroka fault was penetrated at a depth of approximately 14,800 feet (4,511 m) in the field (Kelly and Hine, 1977).

COAL GEOLOGY

In this quadrangle, the Evanston Formation is the only formation that is potentially coal-bearing at depths less than 3,000 feet (914 m) below the ground surface. Veatch (1907) reports coal beds of significant thickness in the Evanston Formation to the southwest in the Evanston quadrangle. One coal bed, the Almy coal bed, was extensively mined in the late 1800's in the Evanston quadrangle. Veatch (1907) reports a maximum measured thickness of 28 feet (8.5 m) for the Almy coal bed and ranks the bed as low-grade bituminous. In the Little Dee Creek quadrangle, a lack of drill-hole and coal-resource data has precluded any evaluation of coal resources in the Evanston Formation.

To the east, in the Meadow Draw quadrangle, numerous thick coal beds in the Adaville Formation dip to the west under the Little Dee Creek quadrangle. The stratigraphically lowest coal bed in the Adaville Formation, the Adaville No. 1 coal bed, is particularly persistent, with a maximum measured thickness of 62 feet (18.9 m) in the Meadow Draw quadrangle. The Adaville No. 1 coal bed is believed to persist down-dip as well as along strike. However, because of the steep dips found in that area, the coal bed, as well as the entire thickness of the Adaville formation, probably exists at a depth greater than 3,000 feet (914 m) below the ground surface.

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) or less 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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