

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Text to accompany:

Open-File Report 78-634

1978

COAL RESOURCE OCCURRENCE MAP AND  
COAL DEVELOPMENT POTENTIAL OF THE  
BEEBE SW QUADRANGLE,  
CUSTER COUNTY, MONTANA

[Report includes 3 plates ]

By

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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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## ILLUSTRATIONS

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[Plates are in pocket]

Plates 1-3. Coal resource occurrence maps:

1. Coal data map.
2. Boundary and coal data map.
3. Coal data sheet.

## Conversion table

| <u>To convert</u>  | <u>Multiply by</u> | <u>To obtain</u>                   |
|--------------------|--------------------|------------------------------------|
| feet               | 0.3048             | meters (m)                         |
| miles              | 1.609              | kilometers (km)                    |
| acres              | 0.40469            | hectares (ha)                      |
| tons (short)       | 0.907              | metric tons (t)                    |
| short tons/acre-ft | 7.36               | metric tons/hectare-meter (t/ha-m) |
| Btu/lb             | 2.326              | kilojoules/kilogram (kJ/kg)        |

## INTRODUCTION

### Purpose

This text is to be used in conjunction with the Coal Resource Occurrence (CRO) maps of the Beebe SW quadrangle, Custer County, Montana (3 plates; U.S. Geological Survey Open-File Report 78-634). This report was compiled to support the land planning work of the Bureau of Land Management in response to the Federal Coal Leasing Amendments Act of 1975, and to provide a systematic resource inventory of Federal coal lands in Known Recoverable Coal Resource Areas (KRCRAs) in the western United States.

### Location

The Beebe SW 7 1/2-minute quadrangle is in south-central Custer County, Montana, about 20 miles (32 km) southeast of Miles City.

### Accessibility

The quadrangle is accessible from Miles City by going 30 miles (48 km) southeast on U.S. Highway 312, and then west about 2 miles (3.2 km) on an unimproved road to the eastern edge of the quadrangle. A few unimproved ranch roads and trails extend through the quadrangle.

There is no railroad passing through the quadrangle. The main east-west route of the Burlington Northern Railroad, which parallels Interstate Highway 94, passes 30 miles (48 km) north of the quadrangle.

### Physiography

The Beebe SW quadrangle is within the Missouri Plateau division of the Great Plains physiographic province. The quadrangle is on the divide

between the north-flowing Tongue River on the west and its principal tributary, Pumpkin Creek, on the east. The Tongue River flows into the Yellowstone River at Miles City about 20 miles (32 km) north-northwest of the quadrangle.

On the higher divides between 3,200 and 3,300 feet (975 and 1,005 m) there are narrow remnants of the rolling upland plateau surface. These ridge remnants are irregularly crenulated by reentrant valleys, and have pinnacle-shaped buttes along their margins.

About 90 percent of the land surface is intricately dissected by tributaries of the Tongue River and Pumpkin Creek, in many places being carved into badlands. The sides of the valleys are steep slopes. Only two valleys, those of Ash Creek and the East Fork Ash Creek have flat flood plains. These plains are at about 2,700 feet (823 m) in elevation.

The lowest elevation in the quadrangle, along Ash Creek at the western side of the quadrangle, is 2,660 feet (811 m). The highest elevation, on one of the upland divides near the center of the quadrangle, is 3,280 feet (1,000 m). Topographic relief is 620 feet (189 m).

### Climate

The climate of Custer County is characterized by pronounced variations in seasonal precipitation and temperature. Annual precipitation in the region varies from less than 12 inches (30 cm) to 16 inches (41 cm). The heaviest precipitation is from April to August. The largest average monthly precipitation is during June. Temperatures in eastern Montana ranges from as low as -50 °F (-46 °C) to as high as 110 °F (43 °C). The

highest temperatures occur in July and the lowest in January; the mean annual temperature is about 45°F (7°C) (Matson and Blumer, 1973, p. 6).

#### Land status

The Northern Powder River Basin Known Recoverable Coal Resource Area (KRCRA) extends into the southwest corner of the quadrangle less than 1 mile (1.6 km). The Boundary and Coal Data Map (pl. 2) shows the location of three small KRCRA tracts, less than 90 total acres. Federal coal ownership in the KRCRA tracts is less than 80 acres. There were no outstanding Federal coal leases, prospecting permits, or licenses of record as of 1977.

### GENERAL GEOLOGY

#### Previous work

Pierce (1936) mapped the quadrangle as part of the Rosebud coal field, Rosebud and Custer Counties, Montana.

#### Stratigraphy

A generalized columnar section of the coal-bearing rocks is shown on the Coal Data Sheet (pl. 3) of the CRO maps. The exposed bedrock units belong to the Fort Union Formation (Paleocene) which is composed of three members: the upper Tongue River Member, the middle Lebo Shale Member, and the lower Tullock Member. Pierce (1936, p. 53) considered the Tullock to be a member of the Lance Formation, but since 1949 the U.S. Geological Survey has considered the Tullock in Montana to be the lowest member of the Fort Union Formation.

The Tullock Member forms the lowermost beds cropping out in the drainage streams along the west and north sides of the quadrangle. The

member is 260 to 300 feet (79 to 91 m) thick and is composed of alternating beds of sandstone and shale and contains several unimportant local coal beds (Pierce, 1936).

The overlying Lebo Shale Member is predominantly gray shale but also contains a number of thin, lenticular sandstones. This unit is 160 to 200 feet (49 to 61 m) thick and crops out throughout the quadrangle. Where present, the Big Dirty coal bed marks the base of the Lebo Shale Member, and several additional lenticular, impure coal beds may lie above it within the unit.

The Tongue River Member is exposed in a north-south trending belt through the central part of the quadrangle on the divide between the Tongue River and Pumpkin Creek. The unit is mainly yellow sandstone, sandy shale, carbonaceous shale, and some thin coal beds. The thicker coal beds have burned, resulting in areas of clinker. According to Pierce (1936, pl. 1), the residual thickness of the Tongue River Member is 400 feet (122 m); the greater part of the unit has been eroded.

#### Structure

The strata in this quadrangle dip eastward or southeastward at a rate of about 25 feet (7.6 m) per mile (about 1/4 degree), or are nearly flat lying. Although there are a few very minor undulations and structural irregularities due to deposition, differential compaction, and slumping, there are no folds or faults of consequence.

## COAL GEOLOGY

Eight different coal beds were detected on the surface of this quadrangle; their locations are shown on plates 1 and 3 of the CRO maps. Six of the beds are less than 5 feet (1.5 m) thick and of very limited extent; they are unnamed and designated as local beds. The overlying Terret and Flowers-Goodale coal beds are burned extensively, and their presence is evidenced by clinker.

## COAL RESOURCES

Most of the coal (including the Big Dirty coal bed) in the Beebe SW quadrangle is in beds too thin to be included in the Reserve Base. The normally thicker Terret and Flowers-Goodale beds contain only a small amount of coal left as residue from natural burning of the coals. It is concluded that there is no coal thick enough to be included in the Reserve Base. Therefore, no additional Coal Resource Occurrence (CRO) maps were prepared from which Reserve Base or Reserve coal tonnages for Federal coal could be calculated. Also, no further discussion of the properties of individual coal beds is included in this report. Nor were Coal Development Potential (CDP) maps for surface mining or underground mining methods prepared.

## REFERENCES

- Pierce, W. G. , 1936, The Rosebud coal field, Rosebud and Custer Counties,  
Montana: U.S. Geological Survey Bulletin 847-B, p. 43-120.
- Matson, R. E. , and Blumer, J. W. , 1973, Quality and reserves of strippable  
coal, selected, southeastern Montana: Montana Bureau of Mines and  
Geology Bulletin 91, 135 p.