SCALE 1:24 000

CONTOUR INTERVAL 20 FEET NATIONAL GEODETIC VERTICAL DATUM OF 1929

First First Front Front

UTM GRID AND 1971 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

Base from U.S. Geological Survey, 1971

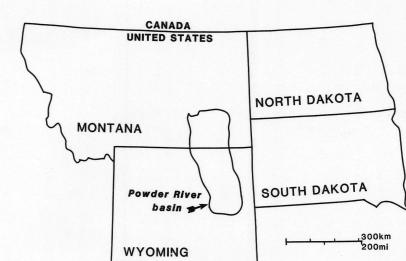


Figure 1.--Location of the Powder River basin.

Figure 2.--Index map of the Clearmont 7 1/2' quadrangle (stippled) and selected 30' x 60' quadrangles. The area with diagonal lines represents the Buffalo Creek-Clear Creek area (Molnia and Orrell, 1988), which is referred to in the

AGE STRATIGRAPHIC INTERVAL COAL BED Ulm 1 (Walters) 80-120 220 Formation 80-150 VERTICAL SCALE Fort Union Formation Tongue River

Figure 3. -- Generalized stratigraphic section (modified from Molnia and Orrell, 1988) of principal coal beds that crop out in the areas east of the Clearmont quadrangle, and north and northeast of the Clearmont quadrangle in the Buffalo Creek-Clear Creek area (fig. 2). The coal beds that crop out within the Clearmont quadrangle are the Truman, the Ulm 2 (or Healy), and the Ulm 1 (or Walters); although the Arkansas coal bed occurs within this stratigraphic interval the Arkansas coal bed is not a principal coal bed within the Clearmont quadrangle. Drawn on the basis of typical intervals (in ft) from the base of one coal bed to the base of the overlying coal bed.

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Campbell Counties, Wyoming: U.S. Geological Survey Bulletin

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ULM 1 (OR WALTERS)

The Ulm 1 coal bed in the Clearmont quadrangle correlates with the Walters coal bed of Mapel (1959) in the Buffalo-Lake De Smet area southwest of this quadrangle. In the study area, the Ulm 1 coal bed has burned extensively, forming clinker that caps hills and ridges. Directly west of the Clearmont quadrangle, in the Ulm 7 1/2' quadrangle, the Ulm 1 is a thick coal bed, typically 11-27 ft thick, and commonly contains several thin partings (Mapel and Dean, 1976).

MAP SHOWING PRINCIPAL COAL BEDS OF THE CLEARMONT QUADRANGLE, SHERIDAN COUNTY, POWDER RIVER BASIN, WYOMING

Tw

WYOMING

QUADRANGLE LOCATION

Publication approved by the Director, U.S. Geological Survey, May 20, 1988.

INTERIOR-GEOLOGICAL SURVEY, RESTON, VIRGINIA-1988 For sale by Branch of Distribution, U.S. Geological Survey, Box 25286, Federal Center, Denver, CO 80225

DESCRIPTION OF MAP UNITS Wasatch Formation (Eocene) -- Yellowish-brown sandstone and

siltstone, gray mudstone, tan and gray shale, duskyred-brown carbonaceous shale, both extensive and local coal beds, and thin lenses of limestone with mollusk shells. Exposed thickness about 1,000 ft

Coal bed--Approximately located. Drawn on base of coal bed or coal zone or on base of clinker. Coal beds (ascending order): T, Truman; H, Ulm 2 (or Healy); W, Ulm 1 (or Walters)

Approximate limit (shown by x) of coal bed because of apparent pinchout or splitting into minor coal beds

Area of clinker--Rocks baked and fused by the natural burning of underlying coal beds. Mostly red, yellow, orange, and black; commonly cap hills, mesas, and

ridges (Coates and Naeser, 1984). Shown only in

places of major areal extent. Dashed line indicates

INTRODUCTION

approximate limit of clinker

This map is a product of field mapping and of photogrammetric mapping using color aerial photographs at a scale of approximately 1:24,000 (Molnia, 1983). These geologic investigations were part of a project to map the principal coal beds of large parts of the Powder River basin for national coal resource assessment

PREVIOUS INVESTIGATIONS

This quadrangle is part of the Sheridan coal field. Some preliminary coal bed mapping of this quadrangle was shown at a scale of approximately 1:250,000 on a planimetric base map in Taff's (1909) report on the Sheridan coal field. Hinrichs (1984) mapped the surficial geology of the Sheridan 30' x 60' quadrangle, Wyoming and Montana, which includes the study area.

GEOGRAPHIC AND GEOLOGIC SETTING--CENTRAL POWDER RIVER BASIN

The study area lies in the Powder River basin, which is a large, northerly trending structural depression in Montana and Wyoming, between the Black Hills on the east and the Bighorn Mountains on the west (figs. 1 and 2). The basin is an asymmetric syncline with a long, gently dipping eastern flank and a steeply dipping western flank. The study area is west of the geographic center of the basin; however, because of this asymmetry, the Clearmont quadrangle is on the long, gently westward dipping, eastern flank of the basin.

The strata on the eastern flank of the Powder River basin generally dip less than 1° W. However, several small-scale structures cause local increases in dip and changes in dip direction. Intervals between the strata are relatively consistent over large areas of the basin, but can change locally over small distances because of facies changes in the depositional The entire quadrangle lies within the outcrop of the Eocene

part of the Wasatch Formation. During the time that the Wasatch Formation was deposited, this area consisted of an alluvial-plain environment that was drained by braided, meandering, and anastomosed streams. The streams were part of a north-trending trunk stream system that probably drained into the Williston basin in Montana and North Dakota (Flores and Ethridge, 1985). The following measured section shows the composition and character of the Wasatch Formation in the Clearmont quadrangle. (Section measured in secs. 26 and 35, T. 55 N., R. 80 W.; assisted

by Timothy P. Garvey.)

	Thickness
Top of hill Flourties engaginetals / 560 ft	(feet)
Top of hill. Elevation approximately 4,560 ft Wasatch Formation:	
Clinker of Ulm 1 coal bed; elevation of base	
approximately 4,530 ft	32
Cover	18
Sandstone, fine, with concretions	3
Shale, gray	3
Siltstone, beige	3
Shale, gray and tan	15
Shale, dusky-red-brown	2
Shale, tan, top of mollusk shell horizons	6
Siltstone, ledge-forming	1
Shale, gray and tan, with mollusk shell horizons;	
forms light band due to whitish-gray (caliche?)	
veneer	63
Shale, dusky-red-brown	5
Coal (local bed), some clinker laterally	1.5
Shale, red-brown and gray	3
Siltstone and shale, gray and tan; forms light-	
colored band due to whitish-gray veneer	10.5
Shale, dusky-red-brown, with 2-in. coal bed in middle	1
Shale, gray and tan, with mollusk shell horizons	12
Sandstone, whitish-gray, with trough crossbeds and	
log-shaped concretions	3
Shale, gray and tan	10
Clinker of the Ulm 2 coal bed; elevation at base	
approximately 4,360 ft	10
Cover	22
Cover, outcrops of coquinoid slabs laterally	4
Cover	10
Shale, dusky-red-brown	1
Shale, carbonaceous	0.3
Shale, dusky-red-brown	0.3
Coal (local bed)	1.2
Shale, dusky-red-brown and gray	6
Shale, gray and tan, with mollusk shells	6
Mudstone, light-tan, forming prominent white band due	
to whitish-gray veneer; one thin shell zone	20
Siltstone, coarsening-upward, with resistant nodules	4
Mudstone, light-tan, forming prominent white band due	
to whitish-gray veneer; one thin shell zone	19
Sandstone, resistant	2
Shale, tan and gray	10
Shale, carbonaceous and red-brown, forming dark band,	
with coals as much as 3 in. thick; silicified	
wood; shell hash in top 4 in	6
Shale, dusky-red-brown	2
Shale	24
Cover, base elevation approximately 4,160 ft	65

COAL BEDS

The three main coal beds that crop out in the study area are, in ascending order, the Truman, the Ulm 2 (or Healy), and the Ulm 1 (or Walters) coal beds (fig. 3). Thin, unnamed, local coal beds also crop out throughout the quadrangle. Because of their limited extent and thickness, these local coal beds are not included on

The Walters coal bed, the Healy coal bed, and other coal beds in the Buffalo-Lake De Smet area (about 10 mi to the southwest) vary in rank within narrow limits between lignite and subbituminous C (Mapel, 1959, p. 88); the rank of the three main coal beds in the Clearmont quadrangle is believed to be in this same range.

The Truman coal bed was traced into the Clearmont quadrangle from the southwestern part of the Recluse 30' x 60' quadrangle (fig. 2) where it originates (Kent and Berlage, 1980) as an upper split of the Ulm 2 coal bed of Olive (1957) (see discussion of the Ulm 2 coal bed). The northwesternmost outcrops of the Truman bed are about 5 mi north of the Clearmont quadrangle (Molnia and Orrell, 1988). There, the Truman bed is about 4-9 ft thick and is split by three to four partings, each a foot or less thick. In the southern half of the Clearmont quadrangle, the stratigraphic interval of the Truman coal bed contains only very thin coal beds (less than a foot thick); these coal beds are not

ULM 2 (OR HEALY)

mapped.

106°22'30'

Geology mapped in 1980-82

The Ulm 2 coal bed in the Clearmont quadrangle correlates with the Healy coal bed of Mapel (1959) in the Buffalo-Lake De Smet area southwest of this quadrangle. Regional correlations show that this Ulm 2 coal bed is stratigraphically higher than, and not equivalent to, the Ulm 2 coal bed of Olive (1957) (see Truman coal bed discussion) in the Spotted Horse coal field east of this quadrangle.

In the study area, the Ulm 2 coal bed has burned extensively and has baked large areas of rock to form clinker. Directly west of the Clearmont quadrangle, in the eastern part of the Ulm 7 1/2'quadrangle, the Ulm 2 coal bed is about 9-13 ft thick and commonly does not contain partings (Mapel and Dean, 1976). Outcrops of the Ulm 2 coal bed within the Clearmont

quadrangle represent the approximate easternmost extent of the bed. Farther to the east, the coal bed has been removed by erosion.

Outcrops of the Ulm 1 coal bed within the Clearmont quadrangle represent the approximate easternmost extent of the bed. Farther to the east, the coal bed has been removed by erosion.