

DEPARTMENT OF THE INTERIOR

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Distribution of coal beds in the Fruitland Formation,  
Southern Ute Indian Reservation,  
Archuleta and La Plata Counties, southwestern Colorado

by

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.

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The five accompanying maps are from results of a program of mineral resource assessment of Southern Ute Tribal lands by the Bureau of Indian Affairs and the Geological Survey. A study of the location, thickness, extent, and quantity of coal deposits of the Fruitland Formation on the Southern Ute Indian Reservation, is part of this program. The results, which are based primarily on interpretation of about 500 geophysical logs, are summarized in a report (Sandberg, 1988) in a guidebook on the geology and coal-bed methane resources of the northern San Juan Basin. The maps accompanying this open-file report are enlarged to the preparationa scale of approximately 1:100,000 to supplement the small-scale maps shown in the guidebook report. Figure numbers used for maps in this open-file report are identical to those of the guidebook but include only figures 3, 5, 6, 7, and 9.

The interval studied includes, in ascending stratigraphic order, the Huerfanito Bentonite Bed in the upper part of the marine Lewis Shale, the regressive-marine Pictured Cliffs Sandstone, and the coal-bearing Fruitland Formation, all of Late Cretaceous age. The three units are related to the distribution of the coal beds and, therefore, were studied to determine the coal-geology framework. The isopach map (fig. 3) of the interval between the Huerfanito Bentonite Bed (used as a datum and believed to have been deposited everywhere at the same time), and the top of the Pictured Cliffs Sandstone, shows the configuration of the top of the Pictured Cliffs Sandstone (Fassett and Hinds, 1971). The top surface of the Pictured Cliffs Sandstone, which marks the shoreline, is closely related to the distribution of the coal beds in the Fruitland Formation, which was deposited in an environment of coastal swamps and distributary river systems landward of the Pictured Cliffs shoreline. The regressive Pictured Cliffs Sandstone crosses time-lines, and in relation to the Huerfanito Bentonite Bed of the Lewis Shale, rises northeastward stratigraphically, in the direction of the receding shoreline of the Cretaceous epicontinental sea. By using this relationship in combination with coal beds of the Fruitland Formation, correlations of coal beds are possible, at least locally.

In this study the coal-bearing interval was divided into three overlapping zones: lower, middle, and upper. The lowest (and oldest) coal beds are in the southwestern part of the Reservation; progressively higher (and younger) coal beds (middle and upper zones) appear northeastward. Distribution and aggregate thickness of coal, and thickness of overburden in the respective coal zones are shown in figures 5, 6, and 7.

Figure 9 shows the structure at the top of the Pictured Cliffs Sandstone that includes the Ignacio anticline, the highest part of which is near the town of Ignacio (T. 33 N., R. 7 W.). Evidence suggests that this anticline may have influenced the distribution of the Pictured Cliffs Sandstone and the coal beds.

#### REFERENCES CITED

- Fassett, J.E., and Hinds, J.S., 1971, Geology and fuel resources of the Fruitland Formation and Kirtland Shale of the San Juan Basin, New Mexico and Colorado: U.S. Geological Survey Professional Paper 676, 76 p.
- Sandberg, D.T., 1988, Coal resources and coal-bed geometry, Fruitland Formation, Southern Ute Indian Reservation, Archuleta and La Plata Counties, Colorado, in Geology and coalbed methane resources symposium, northern San Juan Basin, Colorado and New Mexico: Rocky Mountain Association of Geologists Guidebook \_\_, \_\_p.

## ILLUSTRATIONS

(In pocket)

Figure 3.--Map showing thickness of interval between top of the Pictured Cliffs Sandstone and Huerfanito Bentonite Bed of the Lewis Shale, Southern Ute Reservation and vicinity, Archuleta and La Plata Counties, Colorado, and Rio Arriba and San Juan Counties, New Mexico

Figure 5.--Thickness of overburden and aggregate thickness of coal beds, lower zone of Fruitland Formation, La Plata County, Colorado, and San Juan County, New Mexico

Figure 6.--Thickness of overburden and aggregate thickness of coal beds, middle zone of Fruitland Formation, La Plata County, Colorado, and San Juan County, New Mexico

Figure 7.--Thickness of overburden and aggregate thickness of coal beds, upper zone of Fruitland Formation, Archuleta and La Plata Counties, Colorado, and Rio Arriba and San Juan Counties, New Mexico

Figure 9.--Structure contour map, top of Pictured Cliffs Sandstone, Southern Ute Reservation and vicinity, Archuleta and La Plata Counties, Colorado, and Rio Arriba and San Juan Counties, New Mexico