COAL AND METHANE GAS IN THE SOUTHEASTERN PART OF THE PICEANCE CREEK BASIN, COLORADO

by

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ABSTRACT

The southeastern part of the Laramide Piceance Creek basin is one of the most important coal-producing areas in the western U.S. This also is a region of accelerated exploration for natural gas. The Upper Cretaceous Mesaverde Group contains the major coal beds and gas-bearing sandstones found in this part of Colorado; these strata are part of a sequence of marine — transitional — non-marine sediments. These complex rock units are of possible deltaic and/or coastal plain origin and represent east-west oscillations of the Late Cretaceous seaway. Numerous Tertiary intrusive bodies and related structural complexities characterize the eastern part of the area investigated. Abnormally high heat flow resulting from this plutonic activity has raised the rank of much of the coal that occurs here. As a consequence, the region contains large resources of premium-grade coking coal, much of it existing under deep cover (greater than 1,000 ft) and often high in methane gas content. Most of the area’s production consists of coking coal from underground mines. Several new mines of large capacity are in the planning or opening stages, which could result in an increase in the region’s production of both coking and steam coal by a factor of two or three by 1980-1982. The large resources of lower rank (high-volatile C bituminous) steam coal in the area offer an excellent potential for blending with higher rank coals to form metallurgical coke. The region contains large resources of methane gas that should be commercially producible from both relatively “tight” sandstone reservoirs and from fractured coal beds by employing advanced technology now in the field demonstration stage. Work to date reveals that multiple, thick (20-50 ft) coal beds occur in the basin at depths exceeding 3,000-7,000 ft. This deep energy resource possibly could be exploited by the in-situ gasification of coal beds, whereby low-Btu gas is produced through boreholes.

INTRODUCTION

The study area is located in west-central Colorado in Delta, Garfield, Gunnison, Mesa, and Pitkin Counties and lies mostly south of the Colorado River. This area is part of the Uinta coal region (Landis, 1959; Fig. 1, this paper), the Colorado portion of which includes the Piceance Creek basin. The basin is located in the eastern part of the Colorado Plateau physiographic province. Grand Hogback monocline marks the northeastern limit of this province and separates it from the southern Rocky Mountain province to the east. The periphery of the Piceance Creek basin is bounded by the following uplifts and associated coal fields: Axial Basin uplift and Danforth Hills coal field, on the north; Douglas Creek arch and Lower White River coal field, on the northwest and west; Book Cliffs and Grand Mesa and the coal fields with the same names on the southwest and south (and Uncompahgre uplift farther to the southwest); Elk and West Elk Mountains and Gunnison uplift, and Somerset and Crested Butte coal fields, on the southeast; and Grand Hogback monocline and Carbondale and Grand Hogback coal fields, on the east (Hornbaker and others, 1976; Murray and Haun, 1974).

The coal fields within the Colorado portion of the Uinta region are restricted to the moderately to steeply dipping rocks on the flanks of the Piceance Creek basin, which is the southeastern lobe of the Laramide Uinta structural basin of eastern Utah. The Piceance Creek and Uinta depressions are separated by the Douglas Creek arch (Murray and Haun, 1974). The long axis of the Piceance Creek basin strikes northwest.