

PRELIMINARY PETROGRAPHIC STUDY OF SOME CRETACEOUS COALS

IN ARIZONA

By

Willard D. Pye

Department of Geology, University of Arizona

For the purpose of better evaluating the coal deposits of Arizona a petrographic study of them has been started. If it later appears desirable, field mapping and analysis can supplement the laboratory studies of the properties of the coals of the State.

The main coal deposits of Arizona are located in the Black Mesa region of northeastern Arizona and are closely related to those found in the northwestern New Mexico coal fields. These coal deposits are of Cretaceous age and are confined to the Dakota formation and Mesa Verde group of beds.

The Dakota coal occurs above the massive sandstone of the Dakota formation and consists of relatively thin, highly lenticular beds. This coal was not examined in the field but analysis of samples indicates an ash content of 10-15 per cent with some minor sulfur. Moisture is about 10-15 per cent; volatile matter is about 35 per cent, giving by difference a fixed carbon value of about 35-40 per cent. Preliminary microscopic work indicates the coal to be of low bituminous grade carrying much inorganic material. The inorganic materials is disseminated throughout the coal as well as being concentrated in small lenses or thin partings. It is doubtful that benefaction would improve these coals to any great degree because of the type of distribution of the ash-producing ingredients. The ash content of the organic matter was not determined.

The Mesa Verde coal is confined to the Wepo formation, is the silty and shaly middle unit of the Mesa Verde group. The coal beds are fairly thick but are lenticular, although the coal-bearing portion in the section is fairly continuous. The swamps in which the coal formed apparently were limited in size but of frequent occurrence both laterally and vertically. Examination of coal from a number of Mesa Verde localities indicates a range in quality from high grade lignite to medium grade bituminous. Thin sections and laboratory analysis indicate that the coal has a variable ash content, as would be expected from the conditions of deposition inferred from the geologic distribution. About one per cent of sulfur, largely in the form of iron sulfides, is present in the coal, although in some samples it is higher. Pyrite crystals nearly a quarter of an inch across are locally present. For certain uses of the coal it would be possible to remove substantial portions of the sulfides. The amount of organic sulfur was determined. Proximate analyses indicate an ash content of about 10 per cent and a moisture content of 5 to 10 per cent; volatile matter ranges from 35 to 40 per cent and fixed carbon from 40 to 50 per cent. The ash is light yellow-gray in color. Agglomeration is slight and indicates that cooking properties are not too good. However, most of the samples were taken from near surface outcrops; improvement of grade might be anticipated for unweathered material. The organic ash content has not yet been determined.

The Upper Cretaceous coal outcrop in the Pinedale area was visited. It is of limited extent and appears to have characteristics similar to the Mesa Verde coal farther north. Apparently it is an erosional remnant which at one time was connected with the more extensive coal areas to the north and east. Laboratory work has not been started on any of the coal from this location, but is planned for the future.

The Deer Creek Coal basin near Hayden contains coal of Cretaceous age. These beds are relatively thin and dirty as judged by surface exposures. Preliminary examination of samples indicates the coals will be dirty and have a high

sulfur content with poor coking qualities. The ash content will be high. Petrographic work and analysis have not been started pending more detailed mapping of the coal field and acquisition of less weathered samples.

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