III. FORMATION AND OCCURRENCE OF COAL

Pertinent 30 CFR[1] sections:

Geology description.

Cross sections, maps, and plans.

Coal beds are the result of a vast accumulation of trees and other vegetation in paludal environment (swamps and marshes), such as in the present day Mississippi River delta. The decayed vegetal matter initially forms peat, then the increasing pressure and temperature caused by progressively deeper burial transform the peat deposits into lignite and then into the more volatile forms of coal.

A typical delta setting for the formation of peat is depicted in figure III-l. Fluctuations in sea level through time cause lateral shifts in stream channels and produce variations in the thickness, lateral extent, and continuity of the peat, lignite, and coal deposits. The erosion of coal seams, the deposition of alluvial material, which will become sandstone with time, and the recent deposition of glacial material, are illustrated in cross section in figure III-2.

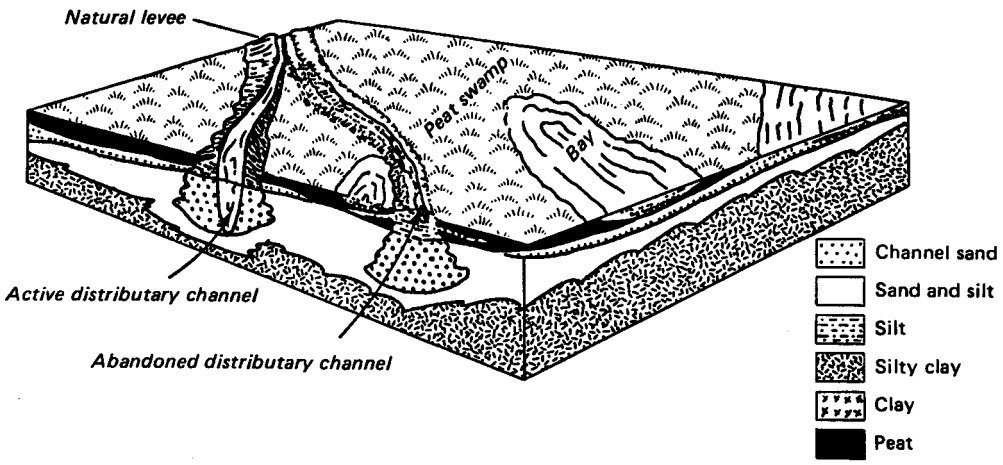


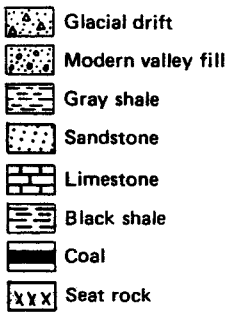
Figure III-l.—Distribution of peat and related alluvial sediments on a portion of a large delta.
(From Cassidy, 1973, fig. 3)

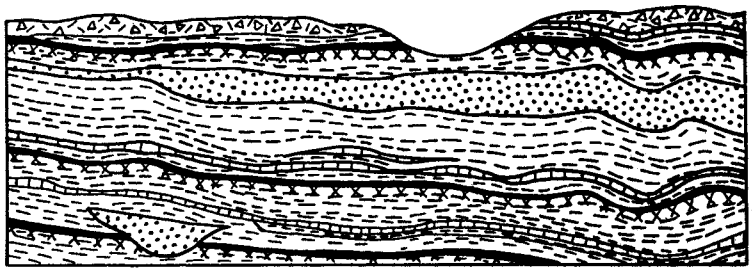
The proximity of water-bearing deposits (aquifers) to the coal seams is one of the major concerns of coal mining operations. The aquifers can be overlying, underlying, or laterally adjacent to the coal deposits to be mined. The presence of water-bearing sandstone or alluvial material in place of coal beds, is called a washout.

Flat-lying coal seams, as shown in figures HI-2(a) and III-2(c), are found in the Northern Great Plains, Interior, Gulf, and, to a lesser extent, the Eastern Coal Provinces (See figure 1-1). In the regions where mountain building has occurred, the sedimentary rock sequence containing the coal seams is folded and locally faulted. The folding of these rock units produces synclines and anticlines, as shown in figure III-2(b). This type of coal-bearing structure is common in the Eastern and Rocky Mountain Coal Provinces.

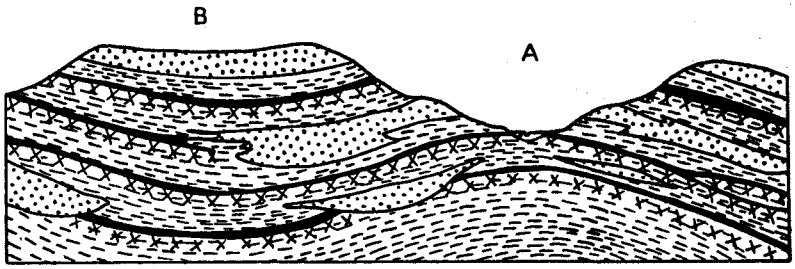
Chapter IV, "Geologic Setting Classification System", and Chapter VI", Hydrologic Setting Classification System", presents the types of information needed to systematically analyze the geologic setting of the coal to be mined and the hydrologic setting of aquifers within the geologic setting. This combined system enables the applicant and the regulatory authority to anticipate any safety hazards, of the proposed mining operation, any water-supply problems, and any adverse effects of the mining operation on the aquifers and water resources within the permit area and vicinity.

[1]CFR= Code of Federal Regulations

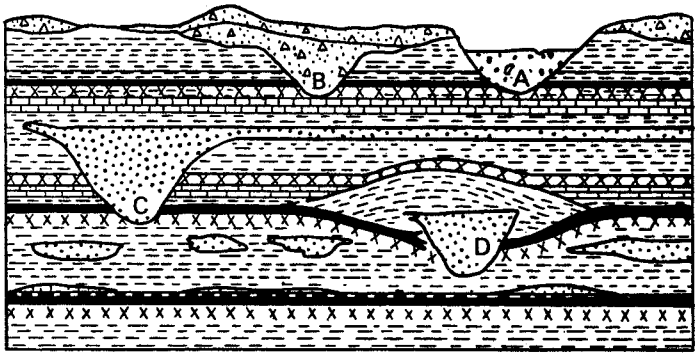




(a) Simplified cross section of coal - bearing sequence representative of the Interior Coal Province. A layer of glacial drift overlies the rocks in most of this area.



(b) Simplified cross section of coal - bearing sequence in parts of the Appalachian Coalfield. Rocks have been gently folded into anticline (upfold) at A and syncline (downfold) at B.



(c) Some features affecting continuity of coals. Coal removed by modern stream erosion at A; preglacial erosion at B; by a stream after coal deposition at C; and at D, the stream was present throughout the time of peat accumulation.

Figure III-2.—Vertical distribution of coal within three types of rocks sequences. (From Cassidy, 1973, figs. 5, 6, 12)