DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
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PREPARED IN COOPERATION WITH
THE COMMONWEALTH OF KENTUCKY, UNIVERSITY OF KENTUCKY
KENTUCKY GEOLOGICAL SURVEY
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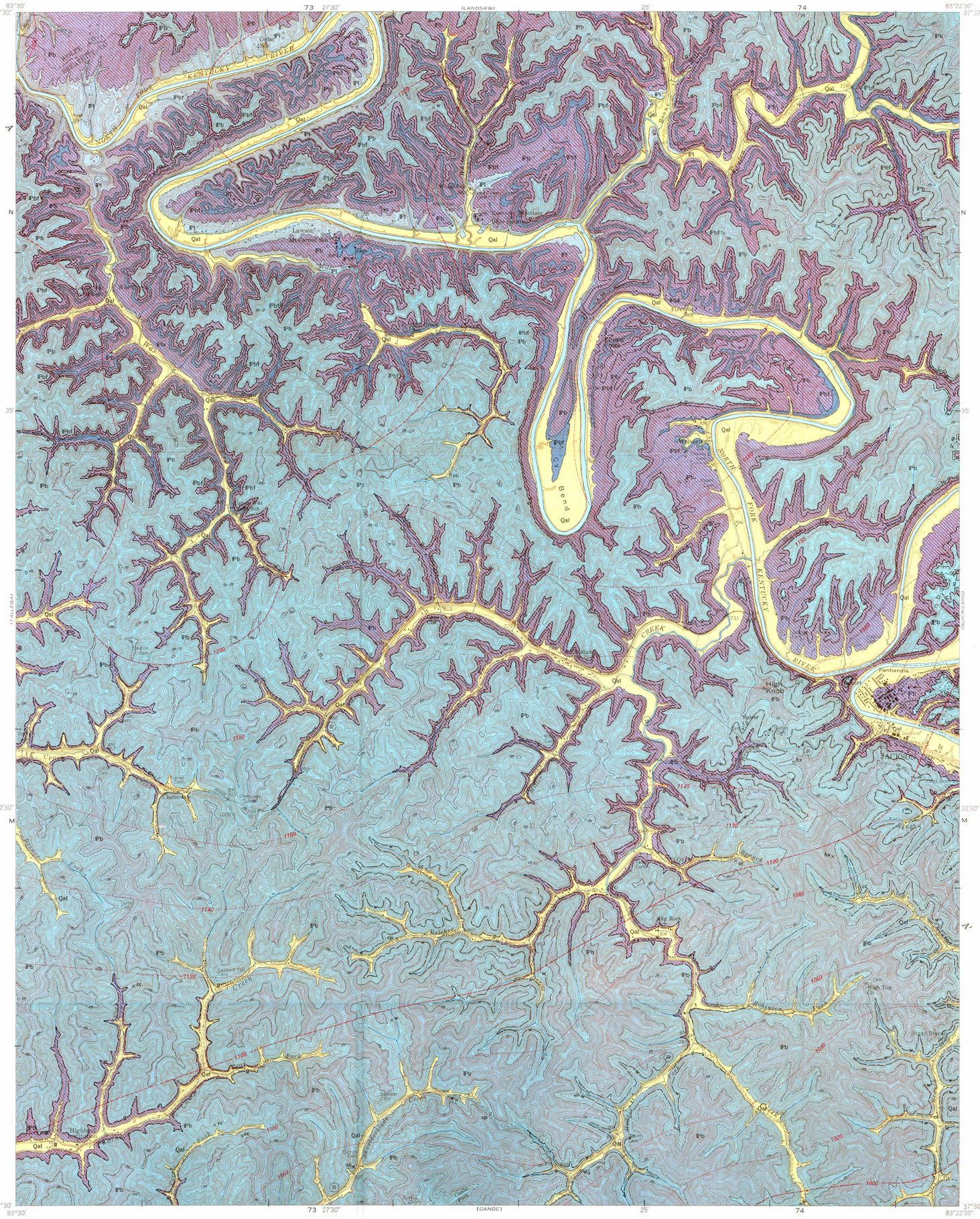
GEOLOGY OF THE JACKSON QUADRANGLE KENTUCKY

GQ-205

SYSTEM	SERIES	FORMATION, MEMBER, AND BED	LITHOLOGY	THICKNESS OF COAL BED, IN INCHES	THICKNESS IN FEET	DESCRIPTION
QUATERNARY		Alluvium			0–60	Silt, sand, and gravel along stream valleys.
CARBONIFEROUS — PENNSYLVANIAN	Middle Pennsylvanian	Breathitt Formation			210+	
					320+	Sandstone, siltstone, and shale: Sandstone is massive, locally argillaceous, fine to medium grained; occurs as lenticular beds or broad channel fills; forms prominent cliffs; locally cuts out Hazard and Haddix coal beds. Siltstone and shale generally poorly exposed; commonly form small benches at base of sandstone cliffs.
		Hazard coal bed		0–12		
					50–75	
		Haddix coal bed		0–48		
					25–60	
		Magoffin Beds of Morse (1931)			0–10	Siltstone, shale, and limestone: Siltstone is calcareous, medium gray, fossiliferous, commonly 5 to 10 feet thick; locally contains dark-gray finely crystalline limestone concretions. Shale is yellowish gray, fossiliferous, calcareous, typically 1 to 2 feet thick. Beds are commonly absent or poorly exposed over area.
		Copeland coal bed		0–6		
					70–90	Shale, siltstone, and sandstone: Shale is yellowish gray to olive gray, sandy; locally contains ironstone concretions 1 to 2 inches in diameter. Siltstone contains lenticular calcareous sandstone bodies. Sandstone is medium gray, medium grained, thick bedded; interbedded with sandy shale and siltstone; locally is dominant rock in unit.
		Fire Clay coal zone		5–16 0–5		
					22–60	Sandstone and siltstone: Sandstone is massive, fine to medium grained; locally agrillaceous, forms prominent cliff above Whitesburg coal bed in places. Shale is medium gray to yellowish gray, lenticular, silty; locally contains plant fragments; generally covered.
		Whitesburg coal bed		12–28	180–290	
					45–90	Shale, siltstone, and sandstone: Shale and siltstone dominant, locally contain lenticular or channel sandstone bodies; locally grades into or is replaced by channel fill; mostly covered. Uppermost bed commonly an agrillaceous sandstone or sandy siltstone. Lower part of unit commonly fissile to platy, dark-gray calcareous shale containing abundant oblate, calcareous siltstone concretions.
		Cannel City coal bed		0–20		
					35–55	Sandstone, shale, and siltstone: Sandstone is massive, fine to medium grained, crossbedded, locally iron stained; forms prominent cliffs. Siltstone and sandy shale occur locally as discontinuous lenses within sandstone.
		Little Caney coal bed		0–8		
					7–30	Siltstone, sandstone, and carbonaceous shale: Siltstone is dominant, contains discontinuous sandstone beds. Carbonaceous shale commonly occurs at base and above Grassy coal bed.
		Grassy coal bed		12–24		
					30–60	Siltstone and sandstone: Siltstone is medium to dark gray, carbonaceous; contains ironstone concretions 1 to 3 inches in diameter; locally shaly and sandy. Discontinuous agrillaceous sandstone beds occur irregularly within siltstone.
		Vires coal bed		18–54	80–190	
					15–130	Shale, siltstone, and sandstone: Medium- to dark-gray silty shale and siltstone dominant; contain abundant ironstone beds as much as 2 inches thick and thick-bedded, fine- to medium-grained, light-gray argillaceous sandstone beds at intervals of approximately 20 feet. To the north, sandstone beds become thin and discontinuous and ironstone beds are rare.
		Frozen Sandstone Member			25–60	Sandstone, light- to medium-gray, very thick bedded to massive, fine- to medium-grained, micaceous, calcareous, crossbedded; contains scattered carbonized plant fragments along bedding planes; commonly forms cliffs; contains interbeds of shaly siltstone which thicken locally. Unit thins to the south and may not extend beyond point where outcrop is concealed at base of steep slope along river.
					40–80	Shale and sandstone: Shale is fissile to platy, dark gray, calcareous, fossiliferous; is dominant lithology in northern part of area. Sandstone is massive, fine grained, light to medium gray; grades laterally into calcareous shale to north. A medium-grained, light-gray argillaceous sandstone commonly underlies the calcareous shale and rests on the Vancleve coal bed.
		Vancleve coal bed		16–31	60–110	
					20–30	Shale, sandstone, and siltstone: Interlensing bodies of clay, shale, argillaceous sandstone, silty and sandy shale.
	Lower Pennsylvanian	Lee Formation			140+	Sancstone, shale, and siltstone: Sandstone is thick bedded to massive fine to medium grained, light gray. Sandy shale and siltstone occur as discontinuous beds approximately 40 feet below upper contact. Formation forms prominent vertical cliffs along large streams. Lower contact not exposed.



EXPLANATION

QUATERNARY

Qal — Alluvium

PENNSYLVANIAN AND CARBONIFEROUS

Middle Pennsylvanian

hx, ₱b, m, cp, w, cc, ₱b, lc, g, ₱bf, ₱b, vc — Breathitt Formation

- *hx, Haddix coal bed (shown by outcrop symbol only)*
- *m, base of Magoffin Beds of Morse (1931)*
- *cp, Copeland coal bed (shown by outcrop symbol only)*
- *w, Whitesburg coal bed*
- *cc, Cannel City coal bed*
- *lc, Little Caney coal bed*
- *g, Grassy coal bed*
- *v, Vires coal bed*
- *₱bf, Frozen Sandstone Member*
- *vc, Vancleve coal bed*

Lower Pennsylvanian

₱l — Lee Formation

Contact
Dashed where approximately located; short dashed where inferred; dotted where concealed

Coal bed
Dashed where approximately located; short dashed where inferred; dotted where concealed

1100 — Structure contours
Drawn on base of Magoffin Beds of Morse (1931). Long dashed where control less accurate. Short dashed where datum is above land surface. Contour interval 20 feet

Adit
Letter symbol indicates coal bed

Outcrop
Letter symbol indicates coal bed

ECONOMIC GEOLOGY

The quadrangle is located near the western edge of the Eastern Kentucky coal field. Some of the thick coal beds that are mined commercially to the south and southeast extend into this area as thin beds. Present commercial mining in this area produces coal for local use. Coal beds 18 inches or more in thickness have been mined commercially, and coal beds only 12 inches thick have been mined for private use. Strip mining has been limited to small areas along streams.

Most of the commercial mining has been in coal beds which are stratigraphically below the Magoffin Beds of Morse (1931). The Vires coal bed has been most extensively mined. It is commonly about 30 inches thick, but locally it is as much as 48 inches thick excluding partings. A shale parting as much as 2 feet thick commonly occurs 1 to 10 inches above the base. The Vancleve coal bed has been mined over much of the northern part of the area. It is commonly about 28 inches thick and rarely exceeds 30 inches. The Whitesburg coal bed has also been mined, principally in the southern part of the quadrangle. Locally the Grassy coal bed has been mined, although it is rarely more than 22 inches thick. Coal beds of economically workable thickness also occur above the Magoffin Beds, but they have not been exploited within this area. These coals may be locally cut out by thick widespread channel sandstones.

Several oil wells and a few gas wells are located in the southwestern part of the quadrangle. Reportedly the production is from the "Big Six" of Silurian age, the "Corniferous" of Devonian age, and the "Big Lime" of Mississippian age. The structure contours drawn on the Magoffin Beds do not necessarily reflect the structure of rocks below the Breathitt Formation.

REFERENCE CITED

Morse, W. C., 1931, Pennsylvanian invertebrate fauna: Kentucky Geol. Survey, ser. 6, v. 36, p. 293-348.

Base map by Topographic Division, U. S. Geological Survey, 1951

The Carter Coordinate System letters and numbers used to designate five-minute divisions of latitude and longitude are shown along the margins; tick marks indicate one-minute divisions

SCALE 1:24 000

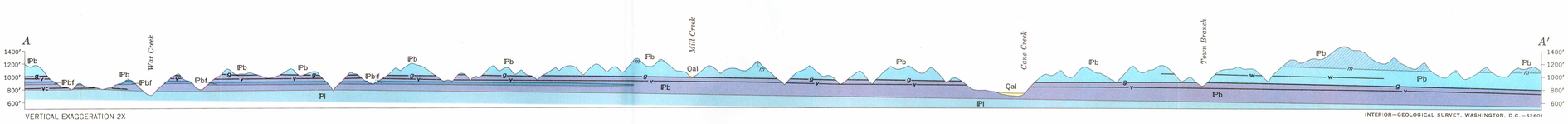
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

Geology mapped in 1961

APPROXIMATE MEAN DECLINATION, 1963

KENTUCKY
QUADRANGLE LOCATION



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