

Prepared in cooperation with the U.S. Geological Survey, Dallas L. Peak, Director, under the Cooperative Geologic Mapping Program (COGEMAP)									
SYSTEM	SERIES	FORMATION	MEMBERS AND BEDS	GRAPHIC COLUMN	THICKNESS OF COAL (in)	THICKNESS (ft)	DESCRIPTION		
QUATERNARY	Holocene	Pleistocene	alluvium	loess	0-10	0-10	0-10	A	Alluvium - Stratified silty deposits in yellow; range from brown to dark gray, gravel rich at base, fines powdery, clayey in upper part, weathered; correlates to Cahokia Alluvium and includes mass weathering deposits. Lower, weathered silt rich in clay in upper part, typically brown, lower part reddish brown; correlates to Pavia Loess and Pavia Silt. Lacustrine deposits - Stratified silty deposits with rounded and gravelly sand in upper part and weathered lower part gray; correlates to Tensileville Silt; proglacial lacustrine deposits of Glasford Formation; Glasford Formation. Disconformity between loess and clay loam, most of unit is weathered brown, lower part is gray loess. Residual - Weathered bedrock "residuals," red brown or gray clay shaly loam with common bedrock clasts; included here as lower facies of Glasford Formation.
			Glasford Formation		0-50	0-10	0-10		
			sub-Davis sandstone lentil		5-60	0-10	0-10		
			Carrier Mills Shale Member			0-4	0-4		
			Standard Limestone Member		2-12	90			
			Wise Ridge Coal Bed			30			
			Mt. Rorah Coal Member			100			
			Coal Burnsville		6-54	150			
			Murphyshoro Coal Member			24-27			
			New Burnside Coal Bed			100			
PENNSYLVANIAN	Desmoinesian	Spoon Formation	Delwood Coal Bed		0-10	90		B	Sandstone, light and medium gray to tan, weathers brownish gray to orange brown and deep reddish brown, fine to medium grained, micaceous, argillaceous, crossbedded, thick bedded to massive in upper part, thin bedded near base, interbedded with shale and siltstone. Lower part local contact transitional with interbedded sandstone and silt shale to unconformable with massive sandstone downcutting into underlying shales as far as Carrier Mills Shale Member.
			Old Town Coal Bed			30			
			Murray Bluff Sandstone Member			10			
			Cedar Creek sandstone lentil			30			
			Ozark sandstone lentil			140			
			Tunnel Hill Coal Bed		12-29				
			Sugar Creek sandstone lentil			0			
			Reynoldsburg Coal Bed		4-32	80			
			Pounds Sandstone Member			30			
			Duery Member			100			
MISSISSIPPIAN	Cretaceous	Kinkaid Limestone	Cave Hill Shale Member			30		C	Shale, siltstone, sandstone, coal, and limestone. Shales typically gray, silty and micaceous, grading into gray siltstone and gray, argillaceous, micaceous sandstone. Black, well-sorted, fine to medium grained, crossbedded argillaceous, micaceous, channel-fill units containing coal and shale clasts. Silty shale and siltstone, medium to dark gray, micaceous, slightly carbonaceous, locally interbedded with sandstone. Lenticular clay, concretionary, polymorphically to Hermon and Rock Island Coal Beds, underlain by gray, silty sandstone grading into silty shale and siltstone.
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GEOLOGIC MAP OF THE CREAL SPRINGS QUADRANGLE, ILLINOIS

C. Brian Trask and Russell J. Jacobson
1990

Contributions by
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D. K. Lum, and H. H. Damberger. Quaternary
description based on field mapping by M. H. Riggs.

STRUCTURAL GEOLOGY

The Creal Springs Quadrangle is located on the southern edge of the Illinois Basin. In the northern part of the quadrangle, strata dip at 5° or less to the north and northeast. The New Burnside Anticline traverses northeast-southwest through the center of the quadrangle. It is an asymmetrical anticline with the steep limb on the northwest side. Near New Burnside, maximum dips are 35° to the northwest and 25° to the southeast. West of Parker, the anticline turns more southerly and both limbs become less steep as it flattens out northwest of Tunnel Hill. The anticline is offset by four high-angle, dip-slip faults. These faults are believed to be high-angle reverse faults because of the intense deformation of the strata in and near the fault plane. Bedding along the fault southeast of New Burnside dips as steeply as 65°. Small-scale overturned bedding occurs on the northwestern side of the structure near the eastern edge of the map (center of west line, SW ¼ of SW ¼ of SE ¼ of Section 3, T11S, R4E.) beyond the mapped extent but on the strike of this fault.

The McCormick Anticline, passing south of the quadrangle, is reflected by the northward and northwestern dip of the strata along the southern edge of the map.

The orientation of Little Cache Creek in the southwestern corner of the quadrangle is related to a graben in that area. Less resistant Abbott sandstone has been offset downward against more resistant Caseyville and Abbott sandstones that form bluffs paralleling both sides of the stream. Dragfolding is present along a fault that crosses Larkin Creek south of Lake of Egypt (SE ¼ of Section 15, T11S, R3E.) This fault lines up with, and has displacement similar to that of the western bounding fault of the graben. It also is west of a syncline that may be related to the graben.

Small northwest-trending faults in the northeastern part of the quadrangle are mapped on the basis of abrupt changes in elevations of coal and limestone beds. Although the fault planes are not exposed, we believe that these faults are high-angle, normal faults. Claystone dikes in nearby coal mines may be related to these faults. Mineral springs in the village of Creal Springs may be structurally controlled. Abnormally high calcium, magnesium, chloride, and sulfate contents (Barrow, et al., 1909) suggest a source at depth (within Pennsylvanian and Mississippian rocks) rather than in the glacial till where the springs occur.

ECONOMIC GEOLOGY

Coal. Six coal beds have been mined in the past. The Reynoldsburg Coal was mined along Cedar Creek in the southeastern part of the quadrangle, where it was reported to be as thick as 3 ft. Small surface mines operated during the 1930s (according to a local farmer) and two larger surface mines worked the coal more recently. Herd Mining Company mined coal west of Reynoldsburg along tributaries to Cedar Creek (SE ¼ of Section 32, T11S, R4E.) Farther west (SE ¼ of Section 31, T11S, R4E.) Energy Exploration, Inc., mined Reynoldsburg Coal from the Ozark Mine. This coal ranges in thickness from 0.3 to 2.7 ft. Drill-hole data suggest that the deposit is lenticular.

Holy Mining Corp. mined the Tunnel Hill Coal at the head of Cedar Creek (NW ¼ of NW ¼ of Section 6, T12S, R4E.) This coal also crops out in the headwaters of Sugar Creek, and in the water gap south of Parker; the coal is not shown on the map in these locations because of space limitations. Russel A. Peppers (personal communication) describes the coal as paleogeologically similar to the Bell Coal in western Kentucky. Exposed Tunnel Hill Coal ranges from 1.0 to 2.4 ft in thickness; drill-hole data suggest that it is discontinuous.

The Delwood, New Burnside, and Murphyshoro (?) Coals were mined west of New Burnside. Delwood and New Burnside Coals have also been extracted in the headwaters of Grassy Creek. Delwood Coal was mined on the southeastern side of Wise Ridge. Prospect pits in the New Burnside Coal occur in the headwaters of Brushy Creek, where the coal ranges in thickness from 0.5 to 4.5 ft. The Delwood Coal is persistent and may be present over broad areas in the northeastern quarter of the quadrangle. There it is 2.0 to 4.75 ft thick and contains a persistent middle claystone parting.

Mt. Rorah Coal was mined in the SW ¼ of the NW ¼ of Section 33, the SW ¼ of Section 28, and along tributaries to Brushy Creek in Section 29, T10S, R4E. Prospect pits in the Mt. Rorah Coal occur around knolls in the NW ¼ of Section 5 and NE ¼ of Section 6, T11S, R4E. This coal is persistent and may underlie major portions of T10S, R4E., in the Williamson County part of the map. It is 0.25 to 3.2 ft thick and, like the Delwood Coal, contains a persistent middle claystone parting.

Oil and Gas. Eleven known oil and gas test holes have been drilled in the Creal Springs quadrangle; all were dry. Eight of these were drilled on or near the New Burnside structure. These test holes penetrated strata as deep as Mississippian St. Louis Limestone (Valmeyeran Series). Work by Bostick and Damberger (1971) and Damberger (1974) indicates that coals near the surface are of high-volatile A bituminous rank; this suggests that the likelihood of oil decreases with depth. Thus "dry" gas would be the hydrocarbon more likely to be encountered with increasing depth.

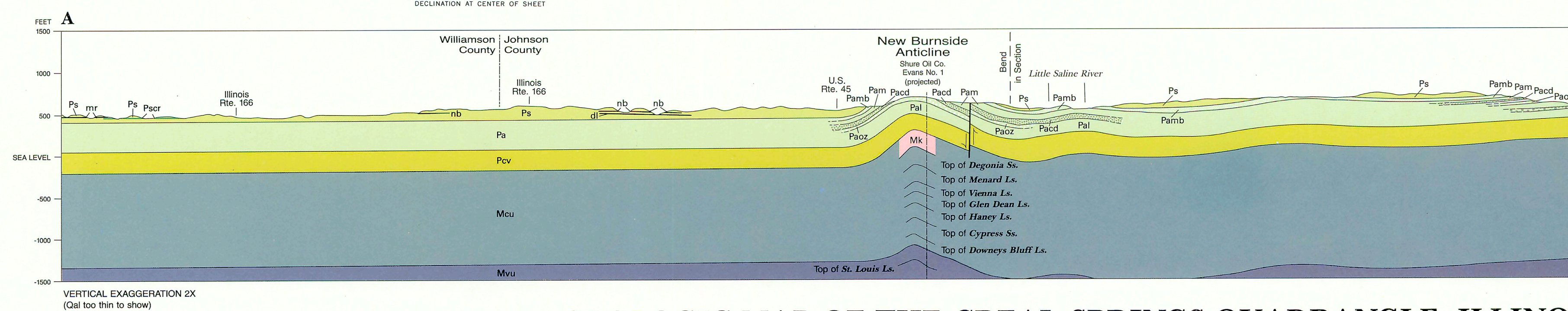
Petroliferous black shale occurs at the stratigraphic horizon of the Reynoldsburg Coal along Ozark Creek (Section 27, T11S, R4E.). Barrett (1922) reported 37 to 45 gallons of "crude tar" per ton of shale and indicated that it was being mined for local use in cooking and heating. Barrett also reported occurrences of the shale in Sections 34 and 35, T11S, R4E.

Building Stone. Sandstone was quarried on the southern side of Sugar Creek east of Creal Springs (SE ¼ of SE ¼ of Section 25, T10S, R3E.). This sandstone, which occurs between the New Burnside Coal and the Creal Springs Limestone, is lenticular but present throughout the northeastern part of the quadrangle.

Limestones mapped in this quadrangle are probably too thin to be of economic interest. Sand and gravel occur in stream valleys in small quantities, mainly in inaccessible areas.

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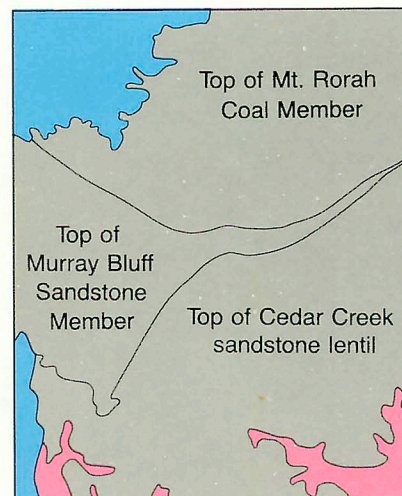
CREAL SPRINGS QUADRANGLE, ILLINOIS

IGQ-4

EXPLANATION

- Quaternary**
- Qal Alluvial deposits; may be underlain by lacustrine deposit.
 - Qg Glasford Formation
- Desmoinesian**
- Psd, sub-Davis sandstone lentil
 - Pacm, Carrier Mills Shale Member
 - mr, Mt. Rorah Coal Member
 - Pac, Creal Springs Limestone Member
 - msh, Murphyshoro Coal Member
 - nb, New Burnside Coal Bed
 - di, Delwood Coal Bed
- Arcadian**
- Pamb, Murray Bluff Sandstone Member
 - Pam, middle Abbott
 - Pacd, Cedar Creek sandstone lentil
 - Pa, lower Abbott
 - Pacz, Ozark sandstone lentil
 - th, Tunnel Hill Coal Bed
 - Pal, Sugar Creek sandstone lentil
 - r, Reynoldsburg Coal Bed
- Morrowan**
- Pcov, Caseyville Formation
 - Pcovr, Pounds Sandstone Member
 - Pcovr, Drury Member
 - Pcovr, Battery Rock Sandstone Member
 - Pcovs, Wayside Member
- Cretaceous**
- Mk Kinkaid Limestone
- Mississippian**
- Mcu Chesterian undifferentiated
 - Mvu Valmeyeran undifferentiated

- LINE SYMBOLS:** Dashed where inferred; dotted where concealed
- Contact
 - Coal bed
 - Fault: bar and ball on downthrown side.
 - Anticline
 - Syncline
 - Line of cross section
 - Structure contour (see index map below)
- SYMBOLS**
- Strike and dip of bed
 - Horizontal bed
 - Abandoned mine prospect pit and small surface mine
 - Abandoned coal adit
 - Coal exposure with ISGS coal maceration and palynological analysis
 - Outcrop of special note, shown where contact, map unit, or fault was well exposed at time of mapping
 - Surface-mined area
- DRILL HOLES FROM WHICH SUBSURFACE DATA WERE OBTAINED**
- ISGS cored test hole
 - Oil test hole, with ISGS county number
 - Water well, with ISGS county number



Index map showing different horizons used for structure contours. Blue indicates insufficient data and a point indicates where top of Cedar Creek sandstone lentil was projected from top of Pounds Sandstone Member. Contour interval 50 ft.