

SYSTEM	SERIES	FORMATION AND MEMBER	LITHOLOGY	THICKNESS IN FEET	DESCRIPTION	
QUATERNARY		Cahokia Alluvium and Equality Formation		0-120	Cahokia Alluvium: clay, silt, sand, gravel, and rock fragments in stream valleys and terraces; thin bedded to massive. Equality Formation: loessite, silt, sand, massive to well laminated, laminar and Wisconsinan on level lowlands in Eagle Valley and north of Wildcat Hill.	
		Parkland Sand		0-30	Parkland Sand: white to light gray, very fine to fine grained, well sorted, crossbedded; contains small rounded shells, bones, collared druse and of bone there in sec. 6, T10S, R9E.	
		Loess		0-30	Silt, highly friable, compact, nodular, containing calcareous tubules, marlites and sand surfaces; thicker north and east of Saline River.	
		Mauve Flood deposits		0-150	Clay, silt, and water-bearing sand and gravel.	
PENNSYLVANIAN	Mazonian	Chapel (No. 8) Coal Mbr.		6-30	Shale, siltstone, sandstone, limestone, thin coal and underlay. Shale and siltstone: medium to dark gray, carbonaceous, micaceous, silty, containing thin sandy laminae. Sandstone: very fine to coarse grained, argillaceous, carbonaceous, micaceous, fetid, thin bedded to massive. Limestone: light gray to brown, fine to coarse grained, crinoid, containing calcareous tubules, marlites and sand surfaces; thicker north and east of Saline River.	
		West Franklin Ls. Mbr.		160+	Chapel (No. 8) Coal: well-sorted but thin, contains black fissile shale and thin limestone. West Franklin Limestone: 1 to 3 discontinuous beds of limestone, up to 20 ft thick, interbedded with shale, siltstone and variegated red-brown claystone. Great Sandstone: fine to coarse grained, crossbedded or massive sandstone, laterally replaced West Franklin Limestone locally out down into Carboniferous; cap with a central portion of Eagle Valley.	
		Gimlet Ss. Mbr.				Carboniferous underlies valleys and forms gentle rounded hills in Eagle Valley and north of Shawneetown Fault Zone.
		Danville (No. 7) Coal Mbr.		12-28	Shale, siltstone, sandstone, limestone, micaceous coal, and underlay. Shale and siltstone: medium to dark gray, carbonaceous, micaceous, silty, containing thin sandy laminae. Sandstone: black fissile shale contains most coal seams. Sandstone: very fine to medium grained, argillaceous, carbonaceous, micaceous, fetid, generally thin to medium bedded, crossbedded or massive; locally interbedded with shale.	
	Carbidean Fm.	Arnal Rock Ss. Mbr.		38-62	Danville Coal Striped in conjunction with Herrin Coal near Gibsonia, Barkston Fork Limestone Member and Denton Limestone Member: medium to dark gray, sandy, fine to coarse grained, sandstone and thick bedded. Arnal Rock Sandstone Member: fine to coarse grained, crossbedded or massive sandstone; locally interbedded with shale.	
		Brar Hill (No. 5A) Coal Mbr.		3-30	Herrin Coal: strip-mined extensively and mined underground near Equality; contains "blue bent" claystone parting 1 to 3 in thick and about 12 to 18 in above base of coal. Springfield Coal: strip-mined extensively and also worked in drift mines; coal beds shale partings and is overlain by black fissile Turner Mine Shale Member and very thin St. David Limestone Member. Brar Hill Limestone: Creek, Spon and Colchester Coals are persistent throughout quadrangle, but have not been mined commercially.	
		St. David Ls. Mbr.		33-64		
		Turner Mine Sh. Mbr.		33-64		
		Springfield (No. 5) Coal Mbr.		33-64		
		Housch Creek (No. 4) Coal Mbr.		8-20		
DEMONSTRATION	Spoon Fm.	Colchester (No. 2) Coal Mbr.		4-18	Spoon Formation forms rounded hills along north and south sides of Eagle Valley. Shale, siltstone, sandstone, coal, underlay, and thin limestone. Shale and siltstone: medium to dark gray, carbonaceous, micaceous, silty, containing thin sandy laminae. Sandstone: very fine to medium grained, argillaceous, carbonaceous, micaceous, fetid, thin to thick bedded, crossbedded and ripple marks common.	
		Palzo Ss. Mbr.		20-45	Dens and Dekoven Coals occur throughout quadrangle but have been mined very little because they mainly underlie thick alluvial and lacustrine deposits in lowlands. Coals below Davis are thin and discontinuous, although many are known to be regionally persistent.	
		Dekoven Coal Mbr.		42-64	Shallow Limestone is widespread in subaquatic. Wide Ridge and Mt. Rash Coals are present in only a few localities. Ganges Sandstone Member is fine to medium grained, crossbedded or thin to medium bedded. Curlew Limestone Member is present in only a few localities and not definitely identified.	
		Davis Coal Mbr.		42-64	The Spoon About contact is poorly defined at the surface and in the subsurface; the definitive members are not continuously recognizable.	
	Spoon Fm.	Stonestaff Ls. Mbr.		4-20	Sandstone, siltstone, and shale. These sandstone members, separated by unmineralized shaly intervals, can be recognized in many places; however, the sandstones are lenticular and can grade locally into shale and siltstone. About 2000 feet of the Stonestaff Ls. Mbr. is present in the area, but only a few localities, but no coal has been observed in outcrop, and no named coal members have been identified.	
		Wise Ridge Coal Mbr.		300-380	Marys Hill Sandstone: subgranular to coarse grained, micaceous, silty, and clay matrix, although noticeably less than in sandstones of Spoon and younger formations; in the Wildcat Hills, very fine to fine grained, ripple marked and thin to medium bedded; south Eagle Valley, medium to coarse grained and thick bedded to massive.	
		Mt. Rash Coal Mbr.		12-18	Fine Sandstone: generally very fine to fine grained, thin to medium bedded, and heavily cemented with iron oxide. Limestone banding is prominent. Fines is cleaner sandstone than Marys Hill; mica and fetid framework and clay matrix are sparse. Siltstone and shaly shale are interbedded with Fines Sandstone in places.	
		Granger Ss. Mbr.				
		Curlew Ls. Mbr.				
		Murray Bluff Ss. Mbr.				
ALOKIAN	Abbott Fm.	Finnie Ss. Mbr.		300-375	Grindstaff Sandstone: fine to coarse grained, crossbedded to massive, clean; with rare mica and fetid framework and clay matrix, iron oxide common, although not as prominent as in the Fines.	
		Grindstaff Ss. Mbr.				
		Pounds Ss. Mbr.				
		Battery Rock Ss. Mbr.				
	Caseville Fm.	Lusk Sh. Mbr.		250-300	Sandstone, siltstone, and shale. Thick, resistant Caseville sandstones cap the Wildcat Hills and form hills and ridges on the north side of the hills. Pounds and Battery Rock Sandstones: thick bedded, crossbedded, or massive, nearly pure quartz, characteristically containing well rounded greenish and small pebbles of white quartz. Lusk Shale: locally very fine grained, white, very hard, coarse quartzose sandstone in thin to medium bedded beds; granular laminated or ripple marked shaly shale and siltstone are found within the Lusk and between Pounds and Battery Rock Sandstones. No coal or limestone has been observed in the Caseville.	
		Goreville Ls. Mbr.		10-40	Limestone and shale. Goreville and Negi Creek Limestones: gray, dense, fine to coarse grained, thick bedded, fossiliferous. Gore Hill Shale: thin to medium bedded, shaly, olive gray to dark gray, silty, and gray, partly silty, calcareous; interbedded with limestone, gray to yellow brown, fine grained, thin bedded, and argillaceous.	
		Cave Hill Ss. Mbr.		60-80	Shale: red brown, greenish gray, and gray, clayey to silty, well laminated; siltstone and very fine grained sandstone, yellow brown, hard, and calcareous.	
		Negi Creek Ls. Mbr.		30	Shale, limestone, and sandstone. Shale: medium to dark gray, greenish gray or olive, silty, and well laminated. Limestone: gray, silty, and well laminated; very fine grained, dense, commonly silty or argillaceous, in beds a few inches to about 8 in thick. Negi Sandstone: locally identified in outcrops, is less than 8 in thick.	
		Degonia Ss.		30	Sandstone: yellowish gray to brown, very fine grained, argillaceous, beds less than 1 inch to a few inches thick; interbedded with siltstone and dark gray silty shale.	
		Ford Station Ls. Mbr.		40-60	Limestone and shale. Limestone: generally gray, fine to medium grained, dense, shaly, fossiliferous, in beds up to 15 in thick; shale: medium to dark gray, silty, well laminated, partly calcareous.	
MORAVIAN	Caseville Fm.	Coras Ls. Mbr.		40-60	Limestone: dark gray brown, rippled, with commonly cherty, fine to coarse grained, fossiliferous. A white calcareous matrix.	
		Vienna Ls.		5-13	Sandstone: light gray to yellow gray, very fine to fine grained, thin to medium bedded, crossbedded and ripple marked; interbedded with gray siltstone and silty shale.	
		Tar Springs Ss.		65-100	Limestone and shale: typically two 20- to 25-ft limestone beds separated by shale. Limestone: light to medium gray, coarse grained, bioclastic with sparry cement, thick bedded. Shale: medium to dark gray, silty to calcareous.	
		Glen Dean Ls.		50-75	Sandstone: light gray to yellow gray, very fine to fine grained, shaly, interbedded with and grading laterally to siltstone and silty shale.	
	Mazonian Ls.	Hardsburg Ss.		70-105	Limestone: light gray, fine to coarse grained, bioclastic with sparry cement; locally calcic, highly fossiliferous, interbedded with gray calcareous shale.	
		Harey Ls.		30-40	Shale: gray and calcareous in the upper part, with thin beds of limestone; dark gray, silty, and finely laminated in lower part.	
		Fraley Sh.		50-80	Limestone: gray brown, coarse grained, fossiliferous, locally calcic. Widely used as subsurface datum ("Denton Line" or "at least terminology").	
		Cypress Ss.		80-130	Sandstone: light gray, very fine to fine grained, well cemented, thin to medium bedded, interbedded with silty shale and siltstone.	
		Ridgeway Fm.		0-40	Shale, with thin beds of bioclastic limestone.	
		Bethel Ss.		80-130	Sandstone: light gray, very fine grained, well cemented, thin to medium bedded; interbedded with silty shale and siltstone. Where Hickory Hill is absent, Bethel cannot be separated and the interval is called West Basin Coal.	
MISSISSIPPIAN	Glenadean Group	Downey Bluff Ls.		25-35	Limestone: light gray to white, coarse grained, thick bedded, calcic, and calcareous with sparry cement.	
		Yanketown Ss.		25-35	Shale: gray to olive or greenish gray, silty, well laminated.	
		Renaud Ls.		20-80	Limestone: light gray to white, coarse grained, calcic, and bioclastic with sparry cement; pink chert fragments characteristic; shaly interbeds common.	
		Aux Vases Ss.		15-35	Sandstone: light gray, very fine grained, calcareous, thin to medium bedded; some greenish gray shale.	
	Valmeyeran	Ste. Genevieve Ls.		100+	Limestone: white to light gray, calcic and bioclastic, commonly sandy with beds of calcareous sandstone; also partings and thin layers of greenish gray shale.	



EXPLANATION

- Qal: Cahokia Alluvium and Equality Formation
- Gsd: Parkland Sand
- Olis: Loess deposits, underlying bedrock indicated by ()
- Qmf: Mauve Flood deposits
- Pm: Pounds Sandstone Member
- Pmg: Modesto Formation
- Png: Gimet Sandstone Member
- Pcb: Carbondale Formation
- 6: Herrin (No. 6) Coal Member
- 5: Springfield (No. 5) Coal Member
- D: Spoon Formation
- Ps: Spoon Formation
- Ps: D = Davis Coal Member
- Pcv: Abbott Formation
- Pevp: Caseyville Formation
- Pev: Pounds Sandstone Member
- Pevl: Lusk Shale Member
- Mk: Kinkaid Formation
- Mdc: Degonia Sandstone and Clove Formation
- Mp: Palestine Sandstone
- Mn: Menard Limestone
- Mwv: Waltersburg Sandstone and Vienna Limestone
- Mcu: Chesterian Series, undifferentiated
- Mss: St. Genevieve Limestone
- Mvu: Valmeyeran Series, undifferentiated (in cross section only)

--- Contact
 - - - - - Dashed where inferred, dotted where concealed by Quaternary deposits
 - - - - - Dashed where inferred, dotted where concealed by Quaternary deposits
 - - - - - Teeth on upthrown side; Dashed where inferred, dotted where concealed by Quaternary deposits
 - - - - - Bar and ball on downthrown side; Dashed where inferred, dotted where concealed by Quaternary deposits
 - - - - - Monoclinial Flexure
 - - - - - Structure contours
 - - - - - Drawn on top of Springfield (No. 5) Coal Member of Carbondale Formation. Figure gives elevation of top of Springfield Coal with respect to mean sea level. Contour interval 100 ft. Not shown where datum is above land surface. Long dashed lines indicate anticlinal or synclinal axes; arrow indicates dip direction
 - - - - - Strike and dip of bedding (representative sample)
 - - - - - Number indicates degree of dip
 - - - - - Horizontal bedding
 - - - - - Joins or systematic fractures (strike indicated, dip inclined or near vertical)
 - - - - - Mine shaft or prospect
 - - - - - Mine slope or drift
 - - - - - Igneous rock in drill hole
 - - - - - Strip-mined area
 - - - - - Coal seams show prior to mining

Contributions to mapping of the Quaternary System: Paul V. Heilich, 1982. Geomorphology and Sedimentology of Pleistocene Lake Saline, Southern Illinois, Master's thesis, University of Illinois, Urbana-Champaign.

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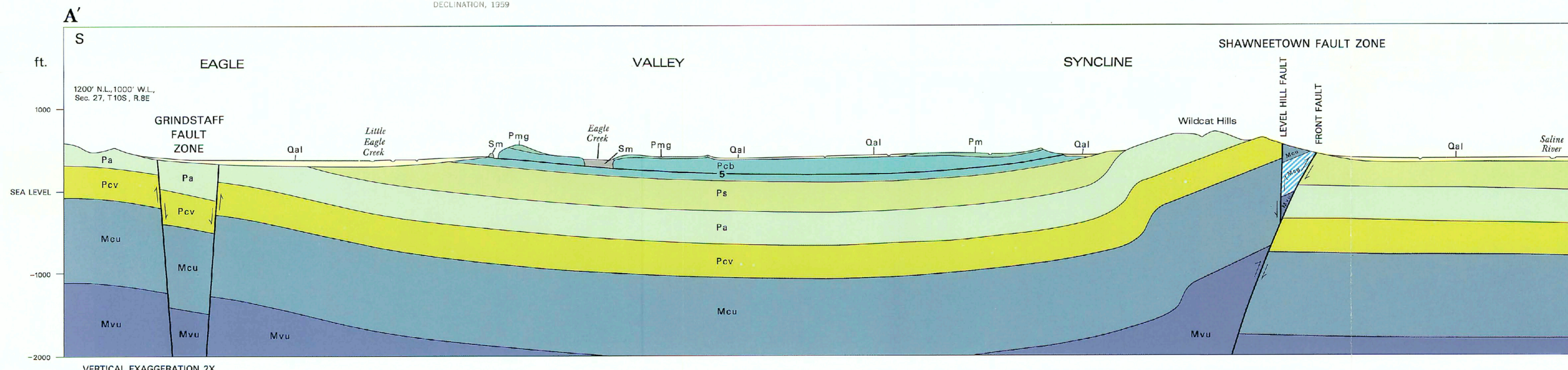
SCALE 1:24,000
 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 FEET
 0 1 2 3 4 5 6 7 8 9 10 MILES

CONTOUR INTERVAL 20 FEET
 DOTTED LINES REPRESENT 10-FOOT CONTOURS
 DASHED LINES MEAN SEA LEVEL

APPROXIMATE MEAN DECLINATION, 1959

ROAD CLASSIFICATION
 Heavy-duty Road
 Light-duty Road
 Unimproved dirt road
 State Route

GUADRANGLE LOCATION



Structural Geology
 The Shawneetown Fault bisects the quadrangle east to west. The master fault is high-angle reverse and is designated the front fault. This fault dips to the south. Stratigraphic displacement is down to the north; a maximum offset of 2,400 ft. is indicated by the juxtaposition of the Ste. Genevieve Limestone and the Spoon Formations in sec. 27, T9S, R9E. Secondary faults are normal, reverse, or vertical and may outline basins and grabens with the front fault. The secondary faults are offset 200 to 1,200 ft. Sharp flexures or monoclines in sec. 31 and 33, T9S, R9E, probably become faults at depth and join the front fault.

The Eagle Valley Syncline also bisects the quadrangle east to west. The north limb is represented by the southward-dipping strata of Wildcat Hills; the south limb, by northward-dipping rocks in the extreme western part of the quadrangle. Dips on the north limb are greater, averaging 15° to 25° S with local maximums of 40° S near flexures. Dips on the south limb range from 3° to 9° N, in sec. 15, T10S, R9E. Drilling indicates that the Grindstaff Fault Zone bisects the Pough Syncline, a deeper portion of the Eagle Valley Syncline, in sec. 1 and 2, T10S, R9E, before it dies out in the NE1/4 NW1/4 sec. 1.

The Cottage Grove Fault System enters the quadrangle from the southwest in sec. 13, T9S, R9E, where it is known to be a right lateral strike-slip fault with normal displacement. The fault crosses the abandoned workings of two abandoned underground coal mines. Coal-text drilling, mine maps, and conversations with former mine operators indicate that the fault is nearly vertical, with the Springfield Coal displaced about 5 ft. down to the north in sec. 18, T9S, R9E. This fault dies out west of the Saline River in the NW1/4 sec. 16, T9S, R9E.

The Ridgeway Fault trends nearly north-south and is an element of the Wahash Valley Fault System. Drilling in the extreme northeastern part of the quadrangle indicates displacement of about 150 ft. down to the east. An igneous dike was reported in the easternmost workings of the abandoned B & W Coal Company Mine (E1/2 SE1/4 NW1/4, sec. 18, T9S, R9E), and in close proximity to the Ridgeway Fault. This fault dies out on the NE1/4 sec. 25, T9S, R9E.

The oldest coal mined in the quadrangle is the Davis Coal Member of the Spoon Formation. The Davis Coal is consistently about 4 ft. thick; it has been mined in tandem with the Dekoven Coal, which overlies the former by 20 to 25 ft. The Dekoven Coal averages approximately 3/8 ft. thick. Both coals are laterally continuous and have been strip-mined south of Maher Hill in sec. 18 and 19, T10S, R9E.

The Springfield (No. 5) Coal, which averages about 4 1/2 ft. thick, crops out on the north and south limbs of the Eagle Valley Syncline and on the low lying bedrock islands at Equality and Hickory Hill. It has been strip-mined at Maher Hill, in the hills east of Maher Hill, in the hills south of Equality and east of Gibsonia, at the Berkel Mine in sec. 5, T10S, R9E, in the hills of the extreme south half of sec. 33, T9S, R9E, in the hills north of the Saline River and south of Cockle Branch at the western boundary of the quadrangle, on Cockle Branch west of the junction with the Saline River, and on the southern parts of the bedrock islands at Equality and Hickory Hill. The Springfield Coal has been mined underground by drift entrance in the hills in the NW1/4 sec. 15, T10S, R9E, in the SE1/4 sec. 33 and the SW1/4 sec. 34, T9S, R9E, in the south-facing hillslopes of the bedrock islands at Equality and Hickory Hill, and by shaft operations in the NW1/4 sec. 18 and in the NE1/4 sec. 17. Most underground mines were small and served local trade only.

The Brar Hill (No. 5A) Coal locally reaches 2 1/2 ft. thick; it has been strip-mined along with the Springfield Coal in at least two localities, one southeast of Equality and the other just southeast of Gibsonia.

The Herrin (No. 6) Coal is 2 1/2 to 5 ft. thick in the quadrangle and crops out on the higher bedrock knobs and ridges in the Eagle Valley Syncline and east of the village of Equality. Large strip mines were operated in this seam in sec. 9, 10, and 15, T10S, R9E, in the hills east and west of Gibsonia and east of Equality. A few small drift mines also have exploited the Herrin Coal.

The Danville (No. 7) Coal is known to have been mined from only one location, an abandoned strip mine in sec. 18, T10S, R9E. The Danville Coal measures 18 in. thick and was mined in conjunction with the Herrin Coal. The Danville Coal is discontinuous elsewhere in the quadrangle.

Extensive stripable and deep-minable coal resources remain in the Equality Quadrangle. The Herrin Coal lies at shallow depth in the western half of Eagle Valley and near the northern edge of the quadrangle. This coal is consistently 2 1/2 ft. thick or more, but locally shows some erosion by palaeochannels or disruption by palaeolanding. Large stripable tracts of Davis, Dekoven, and Springfield Coals exist, particularly on the north side of Eagle Valley and north of the Shawneetown Fault Zone. Coals pitch as steeply as 25° at the outcrop south of Wildcat Hills, but the dips rapidly decrease southward. When maximum surface recovery is achieved, operators can produce additional coal by augering or from highwall drift mines. In bottomland areas, however, hazards of seasonal flooding and thick, water-bearing unconsolidated overburden may deter surface mining. For underground mining, the Davis and Springfield Coals have favorable thicknesses, irregularities, and competent roof strata. The Herrin and Dekoven Coals are thick enough for underground mining in some areas, but not in others.

Limestone aggregate or roadstone has been quarried from fault slices of the Shawneetown Fault Zone along the north side of the Wildcat Hills. The Ste. Genevieve Limestone was quarried in the SE1/4 NW1/4 SE1/4 sec. 27, T9S, R9E, and the Kinkaid Limestone was taken from a small pit in the SE1/4 SE1/4 SE1/4 sec. 29, T9S, R9E. Both limestones are dense and partly cherty. Sandstone of the Caseyville Formation was quarried for road material adjacent to Illinois Highway 1 in the SE1/4 SW1/4 SE1/4 sec. 25, T9S, R9E. At least 56 test borings for oil have been made in the quadrangle; nearly all are located north of the Shawneetown Fault Zone. The greater concentration of borings is located in sec. 25, T9S, R9E, where the Lawler Field has produced over 10,000 barrels since discovery in 1982. Pennsylvanian sandstone is the reported reservoir.