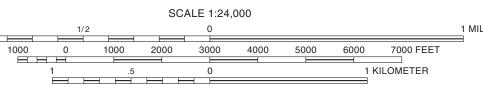


Denny, F.B., J.A. Devera, and A. Kittler, 2013, Bedrock Geology of Saline Mines Quad-rangle, Gallatin and Hardin Counties, Illinois: Illinois State Geological Survey, Illinois Geologic Quadrangle Map, IGQ Saline Mines-BG, 2 sheets, 1:24,000; report, 10 p.



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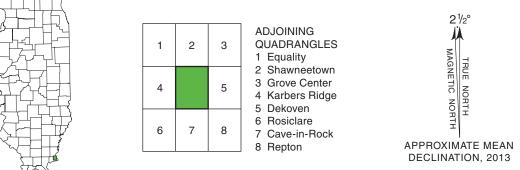
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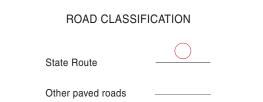
Note: Well and boring records are on file at the ISGS Geological Records Unit and are available online from the ISGS website.



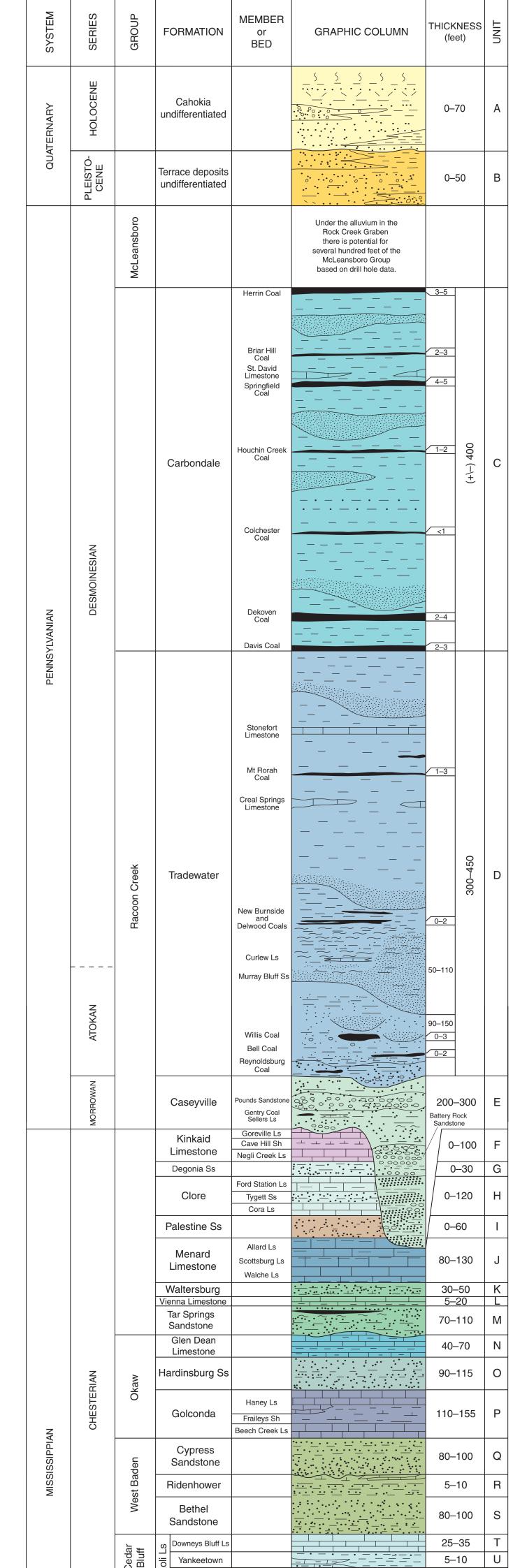


Prairie Research Institute Illinois State Geological Survey 615 East Peabody Drive Champaign, Illinois 61820-6964 (217) 244-2414 http://www.isgs.illinois.edu





IGQ Saline Mines-BG Sheet 1 of 2



A Cahokia Formation Clay, silt, sand, and gravel. Clay is medium gray to light gray and may be silty. The sand is light brown medium-to coarse-grained quartz. The gravel is pre-dominantly chert and sandstone pebbles and cobbles derived from nearby outcrops. The sand and gravel along the Ohio River may have been transported considerable distances.

B Terrace Deposits Clay, silt, and sand. The clay is light gray, and the silt and sand are light gray to brown. There may be a lower terrace usually occurring between 340 and 350 feet and an upper terrace above 350 feet. The higher terrace may be the remnants of a Pleistocene age terrace, whereas the lower younger terraces are Holocene age. These terraces are combined and mapped together on the geologic map.

C Carbondale Formation Shale, sandstone, siltstone, coal, and limestone. Shale is the dominant lithology in this unit, ranging from gray to dark gray to black. Shales of this formation are typically fissile above the coals and massive, nonfissile underclays below the coals. Sandstones are sublitharenites composed of tan to brown, well-sorted to moderately sorted, fine to medium grained, micaceous, and clay-rich from weathered feldspar. Siltstones are light green-gray to brown and range from laminated to thick-bedded. Coal is bright banded and vitreous. Limestones are thin, dark gray to black, argillaceous, ferruginous, brachiopod wackestones and lime mudstones. This formation contains most of the minable coals in the Illinois Basin. The base of the unit is defined by the Davis Coal, which is sharp but conformable with the underlying Tradewater Formation. The top the formation is defined by the Herrin Coal.

D Tradewater Formation Sandstone, siltstone, shale, conglomerate, limestone, and coal. The sandstones are composed of white to tan-brown, fine- to coarse-grained quartz arenite and sublithic arenite. Mica is usually present, and a small percentage of clay is present in the sublitharenite. Sandstones are cross-bedded and rippled. Ichnofossils are common and include both burrowing and feeding or grazing patterns. The siltstones are gray, and mica may be present on the bedding surfaces. The shale is gray to black and thinly bedded. The few conglomerate layers were probably reworked quartz pebbles from the underlying Caseyville Formation into which the lower portion of this unit incises. Thin and discontinuous coal seams are reported in this unit. The Tradewater is unconformable with the underlying Caseyville, but where the lower quartz arenite is deposited over an upper Caseyville quartz arenite, it is difficult to define the contact.

E Caseyville Formation Sandstone, shale, siltstone, and conglomerate. The sandstone is usually white to gray on fresh surfaces and weathers to a brown or orange-brown. It is composed of wellrounded to subangular coarse- to medium-grained quartz ("quartz arenite") that has a sugary appearance. The Caseyville may be cross-bedded and also occurs in thin beds and massive ledges. Outcrops are usually well-exposed bluffs showing diverse fluvial and tidal patterns, including stacking channels and unidirectional and bidirectional cross-beds. Iron Liesegang bands may be very common in some sandstone outcrops. Occasional plant remains, such as stigmaria, are present but are rare in the sandstone and are more common within the shale. The shale is dark gray laminated to thinly bedded. Plant debris is common, and iron nodules or concretions may be present. Siltstone occurs as thin beds, usually with the shale. Conglomerates occur as shale pebbles within sandstone and more commonly as guartz pebbles within a coarse guartz sand. The guartz pebbles are very well-rounded and are usually white. The quartz pebbles may be several inches in diameter. The lower contact is unconformable with the Mississippian contacts.

critic limestone. Fossils within the Menard include brachiopods, bryozoans, and disarticulate crinoidal debris. Where found in the shale layers above the Walche, the crinoid *Pterotocrinus menardensis* is diagnostic of this limestone.

K Waltersburg Formation Sandstone, shale, and siltstone. The unit is mainly dark gray, thinly laminated clay shale that becomes silty upward and grades into siltstone. Sandstone is olive-gray to brownish gray, very fine grained, shaly, and thinly bedded. Thin coal and greenish shale may be present near the top of this unit.

L Vienna Limestone Limestone, shale, and chert. Limestone is largely dark gray to brownish gray, siliceous lime mudstone and wackestone. A few thin interbeds of sandy dark gray shale are present. Dark brown chert nodules are numerous and commonly weather with a porous rind. The white to brown weathered, porous blocks of fossiliferous chert are diagnostic.

M Tar Springs Sandstone Sandstone, siltstone, shale, and thin coal. Sandstone is white to light gray and greenish gray, very fine- to medium-grained quartz that is slightly micaceous. It varies from thinly bedded to massive and displays ripple marks, cross-bedding, small load casts, indistinct burrows, and shale rip-up clasts. Shale and siltstone are medium to dark gray, micaceous, and thinly laminated. Thin coal commonly less than one foot thick occurs near the top; the coal rests on dark gray mudstone. Dark gray claystone also occurs in the lower Tar Springs. The lower contact is sharp in some localities, but may grade into the underlying unit.

N Glen Dean Limestone Limestone and shale. The unit is generally composed of an upper limestone, a middle shale, and a lower limestone. The upper limestone is medium to dark gray crinoidal, red to gray packstone, and grainstone and may be oolitic. Fossils include crinoidal debris, fenestrate bryozoans, brachiopods, blastoids, and corals. The middle shale is thin, medium to dark gray and greenish gray, fossiliferous, and calcareous. The middle shale beds grade into the lower limestone. The lower contact appears to be gradational.

O Hardinsburg Sandstone Sandstone, siltstone, and shale. Sandstone is light-gray to buff, very fine- to medium-grained quartz arenite that is thinly bedded to massive. Ripple marks and crossbedding are common. Siltstone and shales are medium to dark gray or greenish gray and are interbedded, rippled, and laminated. The lower contact is generally conformable with the underlying unit.

P Golconda Formation Limestone, shale, and mudstone. The formation is divided into three members. The Haney Limestone Member at the top is largely light to dark gray, fine to coarse crinoidal wackestone to cross-bedded grainstone and is in places oolitic. *Pterotocrinus capitalis* is highly characteristic of the Haney Limestone Member, and the wing plates of this crinoid are commonly found in the shaly part of this member. The lower part of the Haney comprises limestone and shale interbedded in roughly equal proportions, which grade into the underlying Fraileys Shale Member. The Fraileys Shale Member is largely olive to greenish gray to dark gray, calcareous, thinly fissile clay shale with limestone beds of varied texture as thick as several feet. Red shale or mudstone may occur near the top. The Beech Creek Limestone Member at the base is dark gray to brown, partly dolomitic, argillaceous limestone. The lower contact is sharp.

F Kinkaid Limestone Limestone, shale, and mudstone. Where this unit is well developed, it consists of three members, which in descending order are Goreville Limestone, Cave Hill Shale, and Negli Creek Limestone. The Goreville is a packstone to lime mudstone with a few thin shale breaks. It contains diverse marine fossils, including fenestrate, trepostome, and fistuliporid bryozoans, spiriferids and other brachiopods, rugose corals, and crinoids. The bryozoan Archi*medes* can be abundant in the upper beds, and *Pterotocrinus* wing plates have been described and studied in the formation (Gutschick 1965). The Cave Hill is composed of shale and mudstone with thin beds of limestone. The shale is dark gray, soft, fissile, and calcareous and may be laminated. The shale may grade to limestone that is mainly lime mudstone. The Negli Creek is primarily a dark gray lime mudstone to wackestone. Fossils include brachiopods, fenestrate bryozoans, blastoids, bellerophontid gastropods, and Girvanella spheroids. The lower contact is generally sharp, but rarely well exposed.

G Degonia Sandstone Shale, sandstone, and siltstone. The Degonia is mostly shale that is dark gray to greenish gray, partly silty and moderately to highly fissile. Greenish gray siltstone to silty mudstone in the middle of the Degonia may be massive. Sandstone is light-brown, very fine-grained, clean quartz arenite with thin, wavy bedding and ripple marks. More distinctive is very fine sandstone to siltstone that is dark olive to greenish gray, weathering rusty orange. This rock has planar lamination and erodes out as long rectangular and wedge-shaped blocks bounded by joints. The unit is thin and poorly exposed and is mapped together with the underlying Clore Formation. The contact with the Clore is sharp to gradational.

H Clore Formation Limestone, shale, sandstone, siltstone, and chert. Limestones are mainly lime mudstones that are several feet thick, medium-dark gray to olive-gray, and weather to a light gray or orange-brown. Spiriferids, productid, and compositid brachiopods are common. The Ford Station Limestone Member is dark gray, calcareous, and fossiliferous limestone, ranging from a platy clay shale to silty shale having laminae and thin interbeds of light gray siltstone and limestone. The Tygett Sandstone Member is light gray to light brown, very fine- to medium-grained quartz arenite. The sandstone is thin-bedded with wavy ripple-marked bedding surfaces. Laminated sandstone in turn grades downward to siltstone and shale. The Cora Member contains thin beds and lenses of highly fossiliferous limestone and greenish gray, silty, and weakly fissile shale or mudstone. A limestone bed at the top is a dark gray, very argillaceous brachiopod-bryozoan lime mudstone to wackestone that weathers yellowish gray. The lower contact is sharp.

I Palestine Sandstone Sandstone, siltstone, shale, mudstone, and

Q Cypress Formation Sandstone, shale, and siltstone. The sandstone is white to light gray, fine- to medium-grained subangular quartz sandstone. The upper portion contains thin beds of siltstone and interbedded sandstone and shale. The lower portion is primarily thick beds of sandstone. A red-and-green shale may be present near the top of the formation. Locally, the contact with the underlying unit is unconformable.

R Ridenhower Formation Shale, limestone, and sandstone. The shale is dark gray with a green tint and may be fossiliferous. It is thinbedded and silty to finely sandy. Limestone up to several feet thick is locally present at the top of this formation. This unit is highly variable but is dominantly a dark gray shale with interbeds of gray-green siltstone and fine-grained sandstone containing molds of brachiopods.

S Bethel Sandstone Sandstone with minor shale. White to light gray, fine- to coarse-grained quartz sandstone. The shale occurs as greenish thin interbeds between thicker beds of sandstone. Near the base, shale and quartz pebbles may be present.

T Downeys Bluff Limestone Limestone, dolostone, shale, and chert. The limestone is light gray crinoidal grainstone; the dolostone is brownish gray. Disarticulate crinoids may be replaced by pink chert, which is diagnostic for this unit. The upper portion is generally cherty, and the lower may be silty. Shale occurs in thin interbeds and constitutes a minor portion of the unit.

U Yankeetown Shale, limestone, and siltstone. The shale is dark gray to green fossiliferous shale with interbedded dolomitic siltstone and thin beds of limestone. The contact with the underlying unit is gradational.

V Renault Limestone Limestone, siltstone, and shale. The Renault is pre-dominantly a fossiliferous light gray to brown-gray, sandy to oolitic limestone. The siltstone is coarse grained and calcareous and occurs near the base. The shales are calcareous and interbedded with limestone and siltstone. Numerous *Pentremites* sp. along with the diagnostic crinoid *Talarocrinus* sp. occur at this horizon.

W Aux Vases Sandstone Sandstone, shale, and siltstone. The sandstone is light green-gray, fine grained, and rippled. The sandstone beds are thin to medium; the thicker beds are usually cross-bedded. Siltstones are also greenish-gray and interbedded with the sandstone and dark gray shale. This unit is locally mapped as the Rosiclare member of the Aux Vases Sandstone. Some of the sandstone may be calcareous, and this unit grades into the underlying limestone.

X Ste. Genevieve Limestone Limestone, dolostone, shale, and chert. The limestone is light gray to medium gray, oolitic to micritic, and sandy in places. Beds are thick- to thin-bedded, and the oolitic beds are usually cross-bedded. A sandy limestone, the Spar Mountain Sandstone Member, is locally present about 60 feet below the

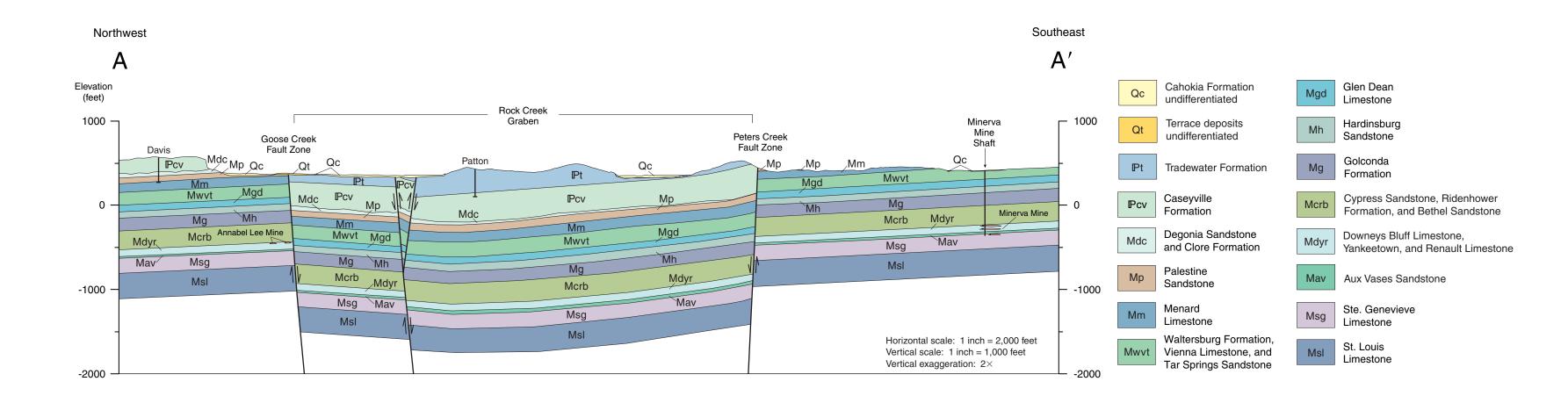
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VALMEYERAN			St. Louis Limestone		Δ Δ Δ - - - Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ	

minor coal. Sandstone is light gray to white, very fine to fine quartz arenite. In most places the upper part is cross-bedded, and the lower portion has thin, flaggy, and ripple bedding. Siltstone is dark olivegray and thinly laminated. Carbonaceous black shale and coal were observed at the top of the Palestine, overlying a rooted siltstone grading downward into laminated shaly sandstone. The contact was not observed.

J Menard Limestone Limestone and shale. The upper limestone is called the Allard Limestone Member. It is usually a gray lime mudstone and fine to coarse skeletal wackestone and packstone with thin shale interbeds and scattered chert nodules. The Scottsburg Limestone Member is a light to dark gray, sublithographic lime mudstone separated by thin shale layers. The lowest member is the Walche Limestone Member, which is composed of argillaceous mibase of the Aux Vases Sandstone (Baxter et al. 1963). The dolomite is fine grained, and the shale is gray. The entire formation is composed of a diverse marine fauna, with crinoidal debris being the most common. Chert is a minor component. The unit is gradational with the underlying limestone.

Y St. Louis Limestone Limestone, dolostone, shale, and chert. The limestone is medium to dark gray and crystalline to micritic. The unit is cherty with gray to blue-gray chert nodules along bedding planes and contains a diverse marine fauna including brachiopods, crinoids, and corals. *Acrocyathus* sp. is an index fossil, a colonial coral indicative of this unit. Shales are thin and separate the thick limestone and dolostone beds.

Note: See accompanying report for references.



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