KANSAS GEOLOGICAL SURVEY
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PRELIMINARY GEOLOGY FIELD MAPS AND STRAIGRAPHIC COLUMN, JEFFERSON-ATCHISON COUNTIES, KANSAS, WHITING, ARRINGTON, HALF MOUND, AND POTTER QUADRANGLES, 1:24,000 SCALE

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Jefferson - Atchison County Stratigraphy

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CENOZOIC
Quaternary Period
Pleistocene and Holocene Epochs

Qal

Alluvium – Alluvial deposits include clay, silt, sand, and gravel which underlying the active channels and flood plains of the major streams. Deposits 5 ft to 40 ft in thickness are included in this unit.

Ql

Loess – Wind deposits consisting of very fine sand, silt and clay, which mantle a portion of the uplands. This unit includes the Nortonville Clay, a probable lacustrine clay deposit. Deposits 5 ft or more in thickness are included in this unit, and thickness ranges up to 70 ft near the town of Nortonville.

Qg

Glacial till – Cedar Bluffs and Nickerson tills of pre-Illinoian age are locally separated by glaciofluvial deposits composed of silty clay and fine sand underlain by chert and limestone gravel. Locally the till is oxidized with calcium carbonate accumulation joint systems at depth. Deposits 5 ft or more in thickness are included in this unit, and thickness ranges up to 110 ft.

PALEOZOIC
Carboniferous Period
Pennsylvanian Epoch

Wabaunsee Group

Pzpsr

Root Shale, Stotler Limestone, Pillsbury Shale, and Zeandale Limestone

The Root Shale in Atchison County is only comprised of the Friedrich Shale member, a gray to yellowish-brown calcareous micaceous sandy shale.

Stotler Limestone consists of three members: Grandhaven Limestone, Dry Shale, and Dover Limestone. The limestone members are massive, tannish-gray fossiliferous layers while the Dry Shale is gray calcareous sandy shale.

The Pillsbury Shale is a light-brown to bluish-gray noncalcareous sandy shale interbedded with brown sandstone.

The Zeandale Limestone consists of three members: Maple Hill Limestone, Wamego Shale, and Tarkio Limestone. Maple Hill is a tannish gray fossiliferous limestone. Wamego Shale is brown silty and sandy shale with a thin coal bed. The Tarkio Limestone is grayish-brown, fossiliferous, and massive.

Locally, units' exposure thickness ranges up to 50 feet.

Pwn
Willard Shale, Emporia Limestone, Auburn Shale, and Bern Limestone
The Willard Shale is a brownish-gray noncalcareous micaceous sandy shale containing sandstone in the upper portion.

The Emporia Limestone consists of three members: Elmont Limestone, Harveyville Shale, and Reading Limestone. The Elmont and Reading members are bluish-gray to brown fossiliferous limestone. The Harveyville is a gray to greenish-gray fossiliferous shale.

The Auburn Shale is gray to light gray, limy, with a silty and sandy middle section that also contains black platy shale.

The Bern Limestone consists of three members: Wakarusa Limestone, Soldier Creek Shale, and Burlingame Limestone. The Wakarusa is a bluish-gray to brown fossiliferous hard limestone. The Soldier Creek Shale is gray to greenish-gray and the Burlingame is a gray to brown fossiliferous medium-hard limestone.

Locally, units' exposure thickness ranges up to 70 feet.

Pws
Scranton Shale, Howard Limestone, and Severy Shale
Scranton Shale consists of five members: Silver Lake Shale, Rulo Limestone, Cedar Vale Shale, Happy Hollow Limestone, and White Cloud Shale. The limestone members are 1 to 3 feet thick fossiliferous, gray, and silty. The shale members are tan to bluish-gray with a thin coal bed at the top of the Cedar Vale Shale.

The Howard Limestone consists of four members: Utopia Limestone, Winzeler Limestone, Church Limestone, and Aarde Shale. The members are alternating beds of bluish-gray fossiliferous hard limestone and dark-gray to tannish-gray calcareous silty shale with the Nodaway coal bed in the Aarde Shale Member.

Severy Shale is gray to tan sandy shale that is clayey and noncalcareous in the upper portion and silty and calcareous in the lower portion.

Locally, units' exposure thickness ranges up to 95 feet.

Shawnee Group

Pdcct

Topeka Limestone, Calhoun Shale, and Deer Creek Limestone

The Topeka Limestone consists of nine members: Coal Creek Limestone, Holt Shale, Du Bois Limestone, Turner Creek Shale, Sheldon Limestone, Jones Point Shale, Curzon Limestone, Iowa Point Shale, and Hartford Limestone. Coal Creek, Du Bois, Sheldon and Curzon limestone members are hard gray and bluish-gray limestone which weathers brown or brownish-gray. Upper shale member, Holt Shale, is black and fissile. The middle shale members (Turner Creek, Jones Point) are clayey and light gray, and the lower shale member, Iowa Point, is gray clayey shale containing a persistent sandstone bed.

The Calhoun Shale is bluish-gray sandy shale in the upper part and gray sandy shale in the lower part, with minor amounts of limestone and one or more thin coal beds.

Deer Creek Limestone is a notable escarpment-making formation consisting of five members: Ervine Creek Limestone, Larsh-Burroak Shale, Rock Bluff Limestone, Oskaloosa Shale, and Ozawkie Limestone. The Ervine Creek limestone member is thick, irregular, wavy bedded and gray. Underlying Larsh-Burroak Shale member is gray in the upper part and black and fissile in the lower part. The middle Rock Bluff Limestone is bluish-gray, hard and dense. Oskaloosa Shale is gray to yellowish-gray and blocky. The basal Rock Bluff Limestone member is a gray, massive-bedded well-jointed limestone, which weathers brown or brownish gray.

Locally, units' exposure thickness ranges up to 80 feet.

Ptl

Tecumseh Shale and Lecompton Limestone

The Tecumseh Shale is gray to green micaceous shale interbedded with light-gray to brown fine-grained sandstone.

The Lecompton Limestone consists of seven members: Avoca Limestone, King Hill Shale, Beil Limestone, Queen Hill Shale, Big Springs Limestone, Doniphan Shale, and Spring Branch Limestone. The limestone members are tan to gray, blocky, hard, and slightly fossiliferous. The shale members are yellowish tan, olive green, gray, and black in color and are silty or clayey.

Locally, units' exposure thickness ranges up to 70 feet.

Pko

Kanwaka Shale and Oread Limestone

The Kanwaka Shale member consists of three members: Stull Shale, Clay Creek Limestone, and Jackson Park Shale. The shale members are gray, bluish-gray, or grayish-green in color and are silty or clayey with localized coal seams. The Stull Shale member contains tan, thin-bedded, fine-grained, shaly sandstone. Clay Creek is a gray fossiliferous limestone.

The Oread Limestone consists of seven members: Kereford Limestone, Heumader Shale, Plattsmouth Limestone, Heebner Shale, Leavenworth Limestone, Snyderville Shale, and Toronto Limestone. The limestone members are dark gray-brown, dense and fossiliferous with the

Plattsmouth being a wavy bedded to massive and thick, while the Leavenworth and Toronto are thin, single bedded limestone layers. The shale members are gray to black and silty to clayey.

Locally, units' exposure thickness ranges up to 75 feet.

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