OKLAHOMA GEOLOGICAL SURVEY
Charles J. Mankin, *Director*

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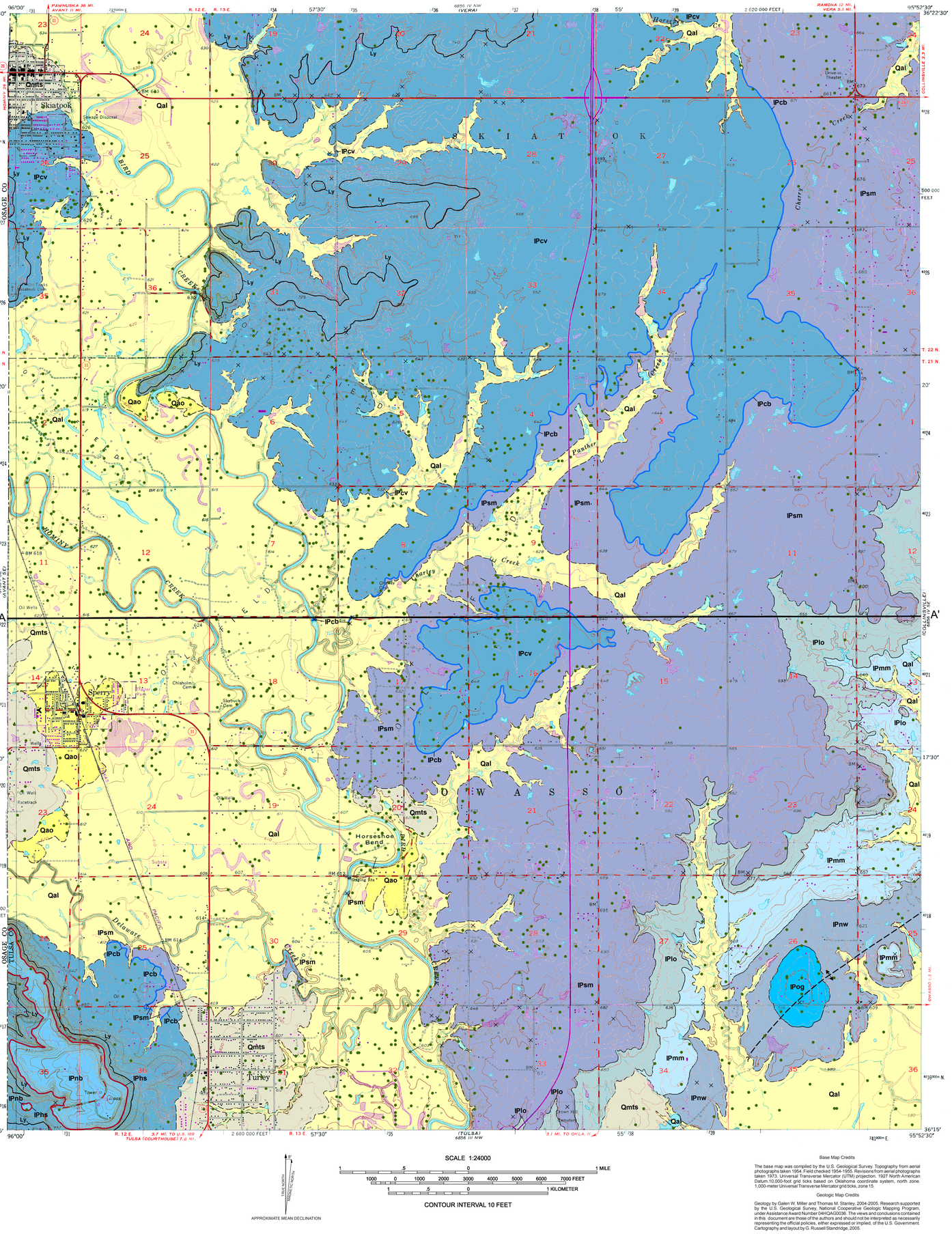


SCALE 1:24000

CONTOUR INTERVAL 10 FEET

APPROXIMATE MEAN DECLINATION

Base Map Credits

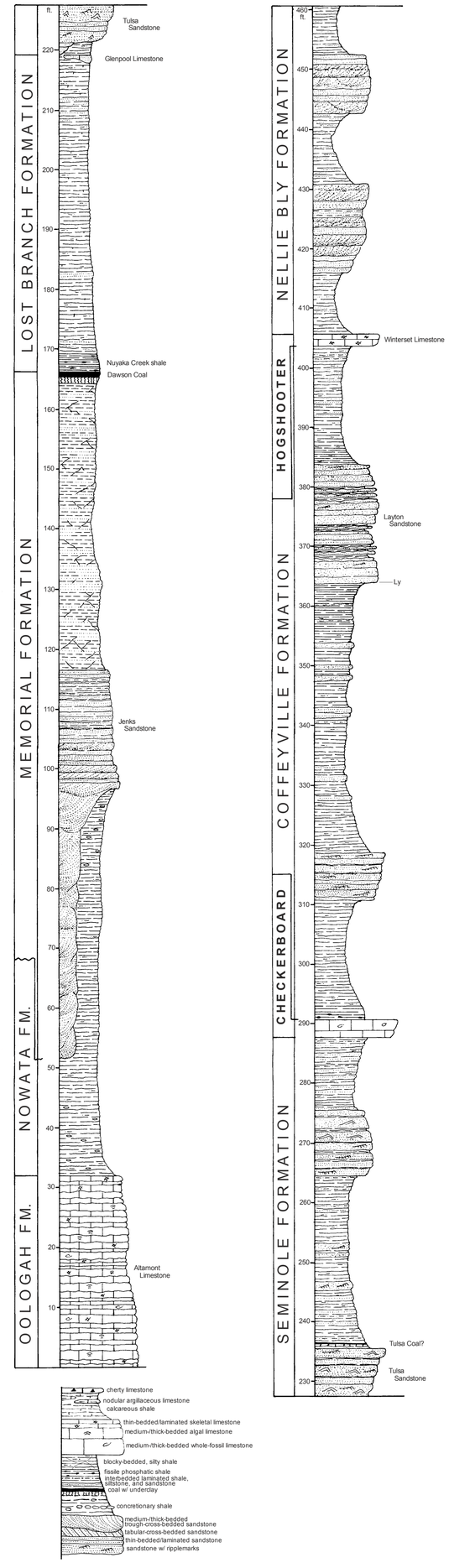
The base map was compiled by the U.S. Geological Survey. Topography from aerial photographs taken 1954. Field checked 1954-1955. Revisions from aerial photographs taken 1973. Universal Transverse Mercator (UTM) projection. 1927 North American Datum. 10,000-foot grid ticks based on Oklahoma coordinate system, north zone. 1,000-meter Universal Transverse Mercator grid ticks, zone 15.

Geologic Map Credits

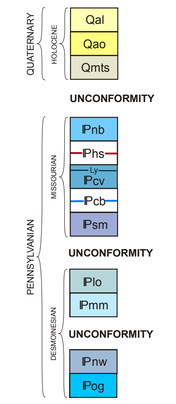
Geology by Galen W. Miller and Thomas M. Stanley, 2004-2005. Research supported by the U.S. Geological Survey, National Cooperative Geologic Mapping Program, under Assistance Award Number 04HQAG0036. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government. Cartography and layout by G. Russell Standridge, 2005.

STANDARD REFERENCE SECTION

Main stratotype section for the Sperry 7.5-minute quadrangle showing principal formations, members , and beds, their relative stratigraphic positions, general lithologic textures, and average thicknesses. Formal member and bed names are indicated by capitalization (i.e., Jenks Sandstone), while informal names are given in lowercase (i.e., Nuyaka Creek shale). Unit names followed by a '?' indicate that the member or bed was not observed in the field area, but has been reported in adjacent areas or in the subsurface.



CORRELATION OF MAP UNITS



DESCRIPTION OF UNITS*

Qal — ALLUVIUM (Holocene) - Clay, silt and sand, with minor gravel, in channels and on flood plains of modern streams. Includes terrace deposits of similar composition located directly above and adjacent to modern channels. Thickness: 0 ft to as much as 60 ft.

Qao — OLDER ALLUVIUM (Holocene) - Clay, silt, sand, and gravel situated adjacent, and just above, modern flood plains; areas probably subject to frequent flooding. Thickness: generally 0 ft to about 75 ft, rarely over 75 ft.

Qmts — MIDDLE TERRACE SANDS (Holocene) - Unconsolidated unit composed of locally and distally(?) derived sediment; consisting exclusively of fine- to medium-grained quartz sand, clay, and some silt. Top of unit is about 10 ft to 25 ft above modern flood plains and Qao deposits; area rarely subject to flooding. Thickness: 0 ft to 100 ft.

Pnb — NELLIE BLY FORMATION (Pennsylvanian, Missourian) - In the Sperry Quad the Nellie Bly is composed of 2-3 sandstone intervals separated by 3 clayshale intervals. Sandstones generally grayish orange (10YR7/4), grayish orange pink (5YR7/2), to locally yellowish gray (5Y7/2), moderately indurated to indurated, thin- to medium-trough-cross-bedded, fine- to medium-grained, siliceous, quartz-rich sandstones; grain size and bedding thickness generally increase toward top of exposure; tool marks, flute casts, and ripplemarks common on upper and lower bedding surfaces. Intervening clayshales are medium gray (N5), medium light gray (N6), to light brown (5YR6/4) and pale yellowish orange (10YR8/6), laminated, and non-calcareous; interlaminated with friable, very fine-grained, ripplemarked sandstones and minor siltstones; locally, a thin, calcite spar fracture filled limestone bed occurs 20 ft above basal contact within one of the clayshale intervals. Only basal 50 ft to 70 ft exposed in quad.

Phs — HOGSHOOTER LIMESTONE (Pennsylvanian, Missourian) - In the Sperry Quad, unit is represented by the Winterset Limestone Member, consisting of a thin, yellowish gray (5Y7/2), crinoidal, wackestone to packstone. Crinoidal debris mostly consists of short stems, and individual disarticulated ossicles. Thickness about 1 ft to 2 ft.

Pcv — COFFEYVILLE FORMATION (Pennsylvanian, Missourian) - Formation composed of a number of sandstone and shale intervals, the most prominent being the Layton Sandstone (Ly) situated in the upper part of the unit. In ascending order these intervals include:

A basal 3-5 ft (immediately above the Checkerboard Limestone), well-laminated, medium dark gray (N4), phosphatic clayshale; this dark gray shale grades upward into a wavy laminated, grayish orange (10YR7/4) to yellowish gray (5Y7/2), slightly silty, non-calcareous clayshale, with interlaminations of very fine-grained sandstone and some siltstone. Overall, this first shale interval varies between 15 ft to 30 ft thick, averaging about 21 ft thick.

Next is a 5-10 ft interval of moderate greenish yellow (10Y7/4) to dusky yellow (5Y6/4), weakly indurated, thin-bedded, slightly siliceous, very fine-grained sandstone; parting lineations and ripplemarked bedding surfaces common.

This is followed by a thick sequence (about 47 ft thick) of interbedded shale and sandstone, with shale as dominant lithology. Shales are pale yellowish orange (10YR8/6) to grayish orange (10YR7/4), friable, laminated, slightly silty and micaceous, non-calcareous clayshale; becoming weakly indurated and well-laminated in the upper 10-13 ft of interval. Interbedded sandstones are yellowish gray (5Y8/1) to grayish orange (10YR7/4), moderately indurated, siliceous, and very fine-grained; typically 2"-3" thick with some internal shale partings. Some thin siltstone beds occur, but are more common in upper third of interval. Wavy, ripple bedding common in sandstone and siltstone interbeds.

Layton Sandstone: About 20 ft of grayish orange (10YR7/4), dark yellowish orange (10YR6/6), to a very pale orange (10YR8/2), but locally weathers to a distinct moderate yellowish brown (10YR5/4) weakly to moderately indurated, thin wavy-bedded to locally wavy-laminated, weakly calcareous, micaceous, fine-grained sandstone; bedding from 0.5"-4" thick, but basal beds may be 12" thick; typically, tops of beds ripplemarked, while base of beds are planar, and each bed is separated by a shale parting.

Uppermost 20 ft of Coffeyville composed of laminated, slightly silty clayshale similar to shale interval below the Layton Sandstone.

Overall, the thickness of the Coffeyville Formation averages about 115 ft.

Pcb — CHECKERBOARD LIMESTONE (Pennsylvanian, Missourian) - Medium dark gray (N4) at base, becoming pale yellowish brown (10YR6/2) to light brown (5YR6/4) toward top. Lower half a hard, dense, skeletal carbonate mudstone that grades upward into a thin, wavy-bedded, whole-fossil to skeletal wackestone. Fossils dominated by large productid brachiopods and crinoid debris. Thickness about 2 ft to 3 ft.

Psm — SEMINOLE FORMATION (Pennsylvanian, Missourian) - Grayish orange (10YR7/4), light brown (5YR5/6) to moderate brown (5YR4/4), moderately indurated, fine-grained, siliceous sandstones, and dark yellowish orange (10YR6/6) to pale yellowish orange (10YR8/6), laminated, slightly silty, concretionary clayshales. Sandstones common in basal 20 ft (Tulsa Sandstone), and in upper third of formation; bedding thin, ranging from 1" to 4" thick, typically convoluted, exhibiting load casts along lower bed surfaces, and ripplemarks on upper bed surfaces. Clayshale with interlaminated siltstones and very fine-grained sandstones (also with ripplemarks, and convoluted bedding); coarser-grained clastics more common in lower half of formation compared with upper half. Concretionary material occurring as discontinuous lenses and beds within clayshale. Thickness of formation from 45 ft to 95 ft, averaging about 77 ft thick.

Plo — LOST BRANCH FORMATION (Pennsylvanian, Desmoinesian) - Mostly a light brown (5YR6/4) to pale yellowish brown (10YR6/2), locally medium light gray (N6), laminated, slightly calcareous, micaceous, silty clayshale; becoming sandy and less calcareous toward base. Basal 3 ft of formation, just above the Dawson Coal, consists of a medium dark gray (N4) to dark gray (N3), well-laminated to fissile, phosphatic clayshale called the Nuyaka Creek shale bed. Top of formation either occurs at the top of the Glenpool Limestone (if present), or at the base of the first prominent sandstone bed of the overlying Seminole Formation. When present, the Glenpool Limestone is a 5-8" thick, fossiliferous, sandy, carbonate mudstone. Thickness of the Lost Branch ranges from 20 ft to 85 ft, but averages closer to 55 ft thick.

Pmm — MEMORIAL FORMATION (Pennsylvanian, Desmoinesian) - In the Collinsville area, consists of three members: 1, the uppermost Dawson Coal; 2, an unnamed middle shale interval; and 3, the basal Jenks Sandstone. Thickness of the formation varies from as little as 40 ft to as much as 170 ft thick, averages closer to 115 ft thick; unit thins considerably to the west in the subsurface.

Dawson Coal: Poorly exposed in map area; where observed in old mine workings represented by a black (N1) to grayish black (N2), 1 ft to 2 ft thick coal bed overlying a comparably thick very light gray (N8) to light bluish gray (5B7/1) underclay.

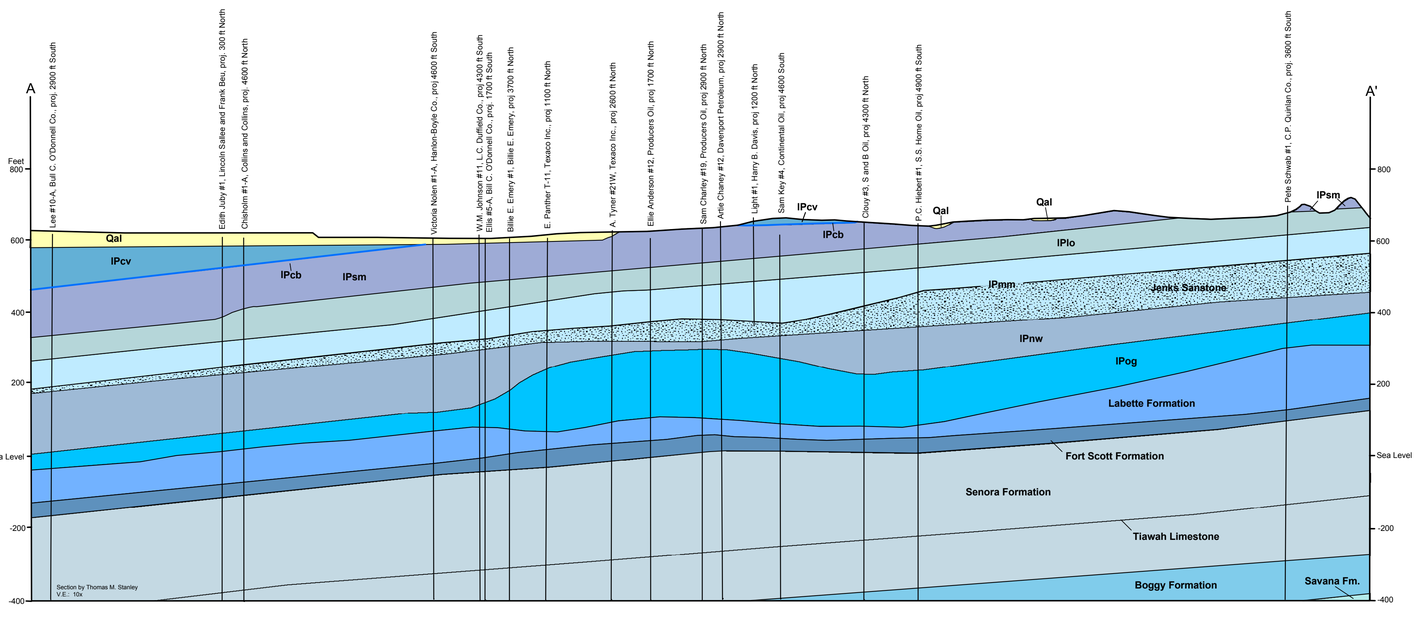
unnamed shale interval: consists of a light olive brown (5Y5/6), grayish orange pink (5YR7/2), to grayish yellow (5Y8/4), interbedded silty and sandy mudstone, and friable, fine-grained sandstone. Sandstones may have light brown (5YR6/4) oxide spots. Mudstone blocky bedded, with numerous concave fractures and slickensides that are indicative of paleosol development. Sandstones generally laminated, occurring as discontinuous beds and lenses within mudstones; sandstone cement most likely clay or a weak iron-oxide. Thickness of interval varies from 20 ft at outcrop, to as much as 115 ft in the subsurface, averages closer to 50 ft thick.

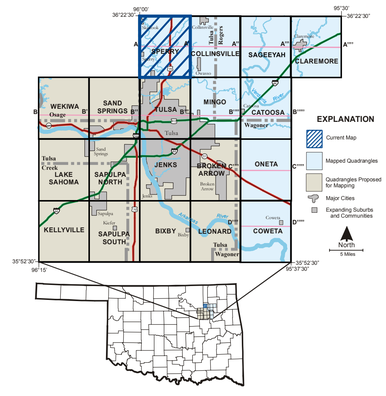
Jenks Sandstone: yellowish gray (5Y7/2), pale yellowish brown (10YR6/2), dark yellowish orange (10YR6/2), locally light brown (5YR5/6) to pale brown (5YR5/2), weakly indurated to moderately indurated, thin- to medium-bedded, fine-grained, locally medium-grained at base, micaceous sandstone. Lower third of sandstone indurated, thin to medium, trough-cross-bedded, with bedding varying from 3"-16" thick; rest of interval becoming weakly-indurated, thinner-bedded (with beds ranging from 0.5" to 4" thick, averaging closer to 2" thick), and having numerous shale partings and interbeds (flaser bedding). Clay-ball clasts, and flute casts common throughout member; some tabular cross-bedding in middle of unit. Thickness of the Jenks Sandstone varies from 17 ft in outcrop, to as much as 100 ft in the subsurface on the east part of quad; unit thins dramatically to the west in the subsurface to as little as 10 ft thick.

Pnw — NOWATA FORMATION (Pennsylvanian, Desmoinesian) - Grayish orange pink (5YR7/2) to medium light gray (N6), blocky bedded to weakly laminated, slightly silty, concretionary clayshale. Concretions more common in upper and lower third of formation, consisting of dark yellowish orange (10YR6/6), flat, ovoid-shaped dolomitic to sideritic(?) clasts, or as thin, discontinuous beds. Formation poorly exposed throughout map area. Thickness highly variable due to an irregular upper erosional unconformable contact with the Jenks Sandstone of the Memorial Formation; maximum exposed thickness about 45 ft to 60 ft, thinning to as little as 10 ft thick in the subsurface.

Pog — OOLOGAH FORMATION (Pennsylvanian, Desmoinesian) - The section exposed in the Sperry Quad is represented only by the Altamont Limestone. In exposures the limestone is a grayish orange pink (5YR7/2) to yellowish gray (5Y7/2), thin wavy-bedded, skeletal to whole-fossil, crinoidal wackestone, with local packstone textures. Little to no algal material occurs in the exposed section. Only the uppermost 25 ft to 30 ft is exposed in quad. Subsurface thicknesses of the Oologah Formation are highly variable, mostly due to the presence or absence of algal build-ups in the Altamont Limestone. Maximum thickness in the subsurface is close to 195 ft, occurring in the middle of the quad. The formation thins considerably to the west in the subsurface to about 45 ft.

*Detailed descriptions only include mappable units observed in the field. Formal member and bed names are indicated by capitalization (i.e., Jenks Sandstone), while informal names are given in lowercase (i.e., Nuyaka Creek shale). Color of units based on fresh surfaces, unless stated otherwise.





SYMBOLS

Unit contact; dashed where approximate

Axial trace of antiformal structure

Outcrop, geologic observation

Petroleum well. Includes oil, gas, oil and gas, dry service (water supply or injection), junked and abandoned, unknown. Modified from Natural Resources Information System database

GEOLOGIC MAP OF THE SPERRY 7.5′ QUADRANGLE, TULSA COUNTY, OKLAHOMA

Galen W. Miller and Thomas M. Stanley

2005