OKLAHOMA GEOLOGICAL SURVEY
G. Randy Keller, *Director*

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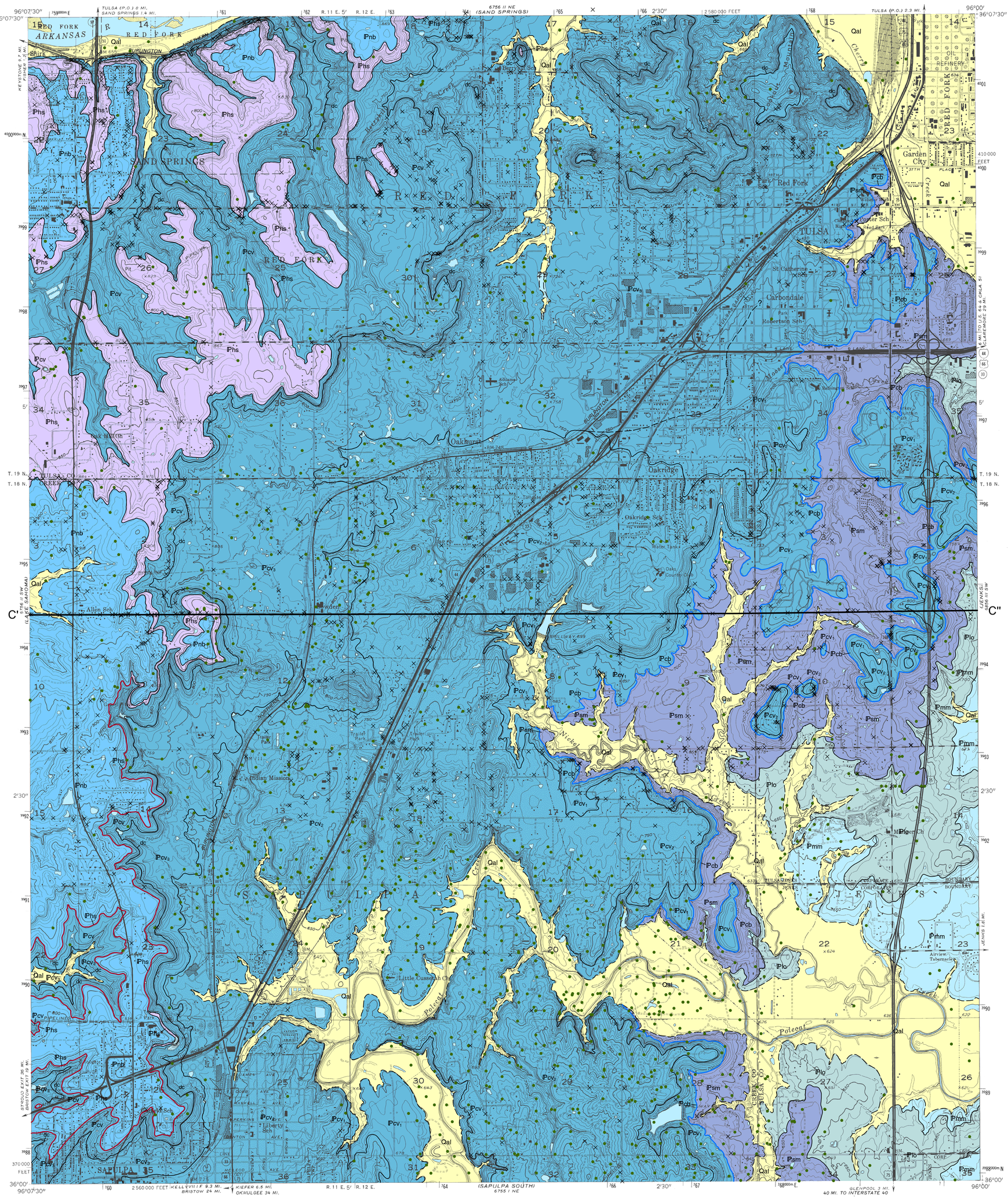
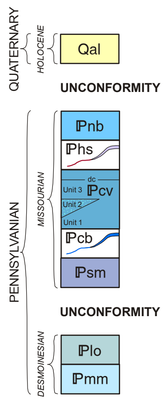
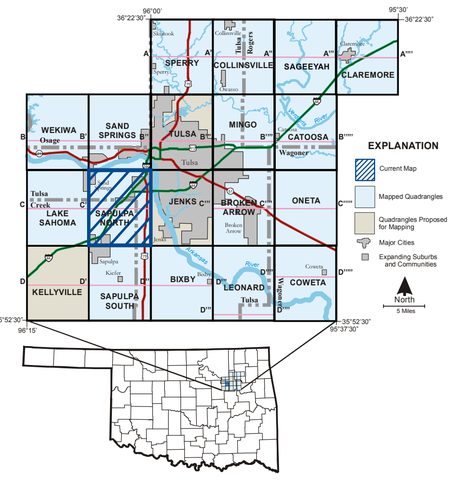
Oklahoma Geologic Quadrangle OGQ-83
Geologic Map of the Sapulpa North 7.5′ Quadrangle



CORRELATION OF MAP UNITS





DESCRIPTION OF UNITS*

Qal — ALLUVIUM (Holocene)—Clay, silt, sand, and gravel in channels and on flood plains of modern streams. Includes terrace deposits of similar composition located directly above and adjacent to modern channels and flood plains. Thickness: 0 to about 30 ft.

Pnb — NELLY BLY FORMATION (Pennsylvanian, Missourian)—In the Sapulpa North quad, unit consists mostly of interbedded sandstone and shale, with shale lithology being the predominant lithology near base. Shales are olive gray (5 Y 4/1) to light olive gray (5 Y 6/1), well-laminated, slightly micaceaous clayshales. Sandstones are very pale orange (10 YR 8/2) to moderate yellowish brown (10 YR 5/4), rarely yellowish gray (5 Y 7/2), indurated, thin- to medium-bedded, very fine- to fine-grained, but becoming medium-grained near base of sandstone intervals, trough-cross-bedded to wavy-bedded, argillaceous sandstones; bedding and cross-bed sets vary from 2" to 3' thick but average closer to 5" thick; calcite cement common, although parts may exhibit a weak silica or iron-oxide cement; trace fossils and mud clasts common along bedding contacts.

Only the basal 70 ft of formation exposed in quad.

Phs — HOGSHOOTER LIMESTONE (Pennsylvanian, Missourian)—In the northern half of quad, formation composed of an upper, thin Winterset Member and a lower, thicker Lost City Member. The Lost City member pinches out in the southern half of the map area. Total thickness of formation varies from as much as 52 ft thick to as little as 2.5 ft thick, depending on the presence or absence of the Lost City Member.

The Winterset Member is usually represented by a single bed (< 3' thick) of whole fossil packstone, with lesser amounts of wackestone and carbonate mudstone textures; thin (1"-3" thick) wavy bedding may be observed in the upper half of the member, locally. Fossils include abundant crinoid stems and ossicles, brachiopods, clams, bryozoans, corals, and algae. Packstone colors include light olive gray (5Y6/1), olive gray (5Y4/1), medium light gray (N6) and medium gray (N5). Weathered surfaces include dusky yellow (5Y6/4), moderate yellowish brown (10YR 5/4), and dark yellowish orange (10YR6/6). Carbonate mudstone is light olive gray (5Y6/1) and weathers grayish orange (10YR7/4), dark yellowish orange (10YR6/6), and light brown (5YR5/6), is well indurated, and contains few, if any, fossils; locally, carbonate mudstones may be slightly sandy or contain carbonaceous matter. Ironstone nodules are sometimes observed where internal bedding is present in the member.

The Lost City Member consists of a medium light gray (N6) to medium gray (N5) fresh, locally weathered to a light brown (5YR5/6) or moderate yellowish brown (10YR5/4) color along fractures and bedding planes, whole fossil to locally skeletal wackestone or carbonate mudstone; bedding thin to thick, varying from 1" to as much as 3' thick; thinner bedding more common in the middle third of member, where bedding is commonly wavy and varies between 1" to 5" thick, the upper and lower third of member is typically medium to thick bedded, with bedding varying from 2' to 3' thick. Enclosed fossil assemblages similar to that of the Winterset Member. Overall, member thickness between 40 to 50 ft thick.

Pcv — COFFEYVILLE FORMATION (Pennsylvanian, Missourian)—In the southern part of quad, the Coffeyville can be segregated into four informal units including the Dodds Creek Member (base designated by 'dc'). The overall thickness of the formation in this quad varies from about 235 ft to as much as 410 ft thick. The individual units are described in descending order:

Dodds Creek Sandstone (dc): A 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 at base, argillaceous, micaceous, fine-grained sandstone with local interlaminated and interbedded siltstones and clayshales; bedding from 0.5"-4" thick, but basal beds may be as much as 12" thick; typically, tops of beds ripple-marked, while base of beds are planar, and each bed is separated by a shale parting. Unit formally mapped as the "Layton Sandstone" by Bennison and others (1972).

Member about 40 ft thick.

unit 3 (IPcv3): A light olive gray (5Y6/1), dusky yellow (5Y6/4), to medium gray (N5), well-laminated to fissile, slightly silty, concretionary clayshale; concretions occur as discontinuous beds and elongated nodules of no more than 2-3" thick; typically pale yellowish orange (10YR8/6) to dark yellowish orange (10YR6/6) in color. Laminated, micaceous, very fine-grained sandstone and siltstone intervals occur in the upper half of unit locally and become more prevalent in the northern part of the quad; intervals usually yellowish gray (5Y 7/2) but may be grayish orange (10YR 7/4), dusky yellow (5Y 6/4), moderate yellowish brown (10YR 5/4), or dark yellowish brown (10YR 4/2), wavy- to planar-laminated with bedding from 0.5" to 2" thick, with ripple mark bedding surfaces.

Unit about 120 to 130 ft thick.

unit 2 (IPcv2): This unit is extensive in the southern and central parts of the Sapulpa North quad and pinches out in the northern third of the quad. Unit consists predominantly of planar, thin- to locally medium-bedded, fine-grained sandstone with intervals of interbedded mudstone and siltstone between major sandstone intervals.

Sandstones are yellowish gray (5Y7/2) to grayish orange (10YR7/4) but weather a distinct dark yellowish orange (10YR6/6) to light brown (5YR5/6), are friable to moderately-indurated, planar-bedded with bedding ranging from 1-14" thick, although locally some beds may be up to 24" thick; grain texture is fine, although it may be medium-grained to rarely coarse-grained near base of sandstone sequences; in general, sandstones are coarser-grained and thicker-bedded at the base of each interval and may contain a well-developed chert-pebble conglomerate; cement is a weak silica to iron oxide and clay, although rare calcareous cement does occur; current lineations and current ripples (including linguoid ripples) common. The rocks contain variable amounts of horizontal trace fossils, and a Calamites fossil was also observed.

Mudstones within unit 2 are light olive gray (5Y6/1), weakly laminated to blocky-bedded, non-calcareous, and may contain grayish red purple (5RP4/2) nodular iron concretions. Discontinuous intervals of a yellowish gray (5Y7/2), laminated siltstone may occur locally within mudstones, and just below contacts with major sandstone intervals.

Thickness of unit 2 ranges from a maximum of 165 ft in the south, thinning to 0 ft thick to the north.

unit 1 (IPcv1): Primarily a shale-dominated unit. Lower 5 to 10 ft, just above the Checkerboard Limestone, consists of a dark gray (N3) to medium dark gray (N4), weathers to an olive black (5Y2/1), well-laminated to fissile, phosphatic clayshale, which grades upward into a yellowish gray (5Y7/2), light olive gray (5Y5/2), olive gray (5Y4/1), to medium gray (N5), blocky-bedded, concretionary, silty claystone to mudstone with local occurrences of interbedded sandstone; concretions are dark yellowish orange (10YR6/6) to light brown (5YR5/6), nodular to discontinuously bedded, and primarily composed of hematite; sandstones are grayish orange (10YR7/4) to grayish orange pink (5YR7/2), friable to weakly indurated, thin-bedded, fine-, to less frequently, medium-grained; individual sandstone layers typically 2" to 3 ft thick, although some may attain a thickness of over 8 ft in some exposures; sandstone interbeds within unit appear to increase in the northern part of quad, and north of where unit 2 of Coffeyville pinches out.

Thin coal beds and streaks occur sporadically throughout, with one prominent, 8" thick coal bed occurring near the top of the unit.

Overall thickness of unit 1 about 75 ft thick.

Pcb — CHECKERBOARD LIMESTONE (Pennsylvanian, Missourian)—The Checkerboard Limestone is medium gray (N5), greenish gray (5GY6/1), to dark greenish gray (5GY4/1), but weathers to a distinct moderate yellowish brown (10YR5/4) to dark yellowish orange (10YR6/6) color. Texturally, it is a skeletal to whole-fossil carbonate mudstone to wackestone; bedding is commonly absent in the formation at most exposures, although thin, planar to wavy beds of about 2" to 3" thick have been observed locally, occurring above the main, basal bed. Fossils include crinoid stems, corals, and bivalves. Thin calcite veins (~ 1 cm wide), are present in some exposures.

Thickness a consistent 3 ft.

Psm — SEMINOLE FORMATION (Pennsylvanian, Missourian)—Formation consists of a lower sandstone interval, called the Tulsa Sandstone, and a basal and upper suite of interbedded laminated, concretionary, silty clayshales, mudshales and siltstones. The Tulsa coal also occurs within the uppermost shale interval, just above the top of the Tulsa Sandstone.

The Tulsa Sandstone starts anywhere from 6 to 15 ft above the base of the formation and consists of a pale yellowish orange (10YR8/6), light brown (5YR5/6), grayish red (5R4/2), very pale orange (10YR 8/2), to yellowish gray (5Y7/2), with dark yellowish orange (10YR6/6) spots, weak- to moderately-indurated, thin- to medium-bedded, very fine- to fine-grained argillaceous and micaceous sandstone; sandstone mostly siliceous but may have a weak calcite cement within some bedding intervals. Unit appears as a series of stacked channel sequences, where an individual sequence may vary between 2 to 4 ft thick, and which are separated by a 6-12" thick interval of interlaminated calcareous, silty clayshale and siltstone; bedding at base of each sequence is thicker (varying from 12-24") and has channel-form lower surfaces, which grade up into a thinner (3-5" thick), planar-bedded sequence. Horizontal burrows and tool marks common along the base of beds, while tabular cross-bedding evident within bed interiors. Beds often appear pitted due to the weathering out of horizontal burrows. Thickness of the member varies from 5 to 10 ft.

Dark yellowish orange (10YR6/6), pale yellowish orange (10YR8/6), to light olive gray (5Y6/1), laminated, slightly silty, concretionary clayshales interlaminated with mudshales and siltstones occur above and below the Tulsa Sandstone. Siltstone intervals are ripple-marked and also have abundant horizontal trace fossils. Concretionary material occur as discontinuous lenses and beds within clayshales that vary from 1-6" thick.

Float chips of the Tulsa coal have been observed in various localities near the upper contact with the Tulsa Sandstone.

Thickness of the Seminole Formation about 80 ft thick.

Plo — LOST BRANCH FORMATION (Pennsylvanian, Desmoinesian)—Poorly exposed, except for the Glenpool Limestone bed. Overall, a light brown (5YR6/4) to pale yellowish brown (10YR6/2), locally medium light gray (N6), laminated, slightly calcareous, micaceous, silty clayshale. 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 mudshale to clayshale called the Nuyaka Creek shale bed. The top of the formation is marked at the top the Glenpool Limestone, which is a dusky yellow (5Y6/4) to pale olive (10Y6/2), 1-1.5 ft thick, laminated, wavy-bedded packstone to whole fossil wackestone in upper half, grading down into an argillaceous unfossiliferous carbonate mudstone in lower part of bed; brachiopods, gastropods, and crinoid debris the most common fossils. Thickness of the Lost Branch ranges from 35 to 40 ft thick, but averages closer to 35 ft thick across the map area.

Pmm — MEMORIAL FORMATION (Pennsylvanian, Desmoinesian)—Poorly exposed in quad. The top of the formation is represented by the Dawson Coal, which was unobserved in map area except for the presence of a few workings and a reclaimed strip pit in the southeast part of map, as well as reports of its occurrence by Oakes (1952) and Bennison and others (1972). The rest of the formation consists of a light olive brown (5Y5/6), grayish orange pink (5YR7/2), to grayish yellow (5Y8/4), interbedded sandy, weakly calcareous mudstone and friable, fine-grained sandstone. Sandstones may have light brown (5YR6/4) oxide spots. Mudstone is 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.

Only the upper 30-40 ft of the Memorial Formation is exposed in the quad.

LENAPAH FORMATION (Pennsylvanian, Desmoinesian)—A thin, skeletal to whole-fossil wackestone- to packstone-textured limestone; found only in the subsurface.

NOWATA FORMATION (Pennsylvanian, Desmoinesian)—A blocky-bedded to weakly laminated, slightly silty, concretionary clayshale; found only in the subsurface.

OOLOGAH FORMATION (Pennsylvanian, Desmoinesian)—A thin- to medium-bedded, skeletal carbonate mudstone to wackestone; found only in the subsurface.

LABETTE FORMATION (Pennsylvanian, Desmoinesian)—Laminated, very silty to sandy, micaceous, concretionary clayshales, interbedded with fine-grained sandstones near top; found only in the subsurface.

FORT SCOTT FORMATION (Pennsylvanian, Desmoinesian)—Thin- to medium-, wavy-bedded whole-fossil wackestones and mudstones, interbedded with fissile, phosphatic clayshale; found only in the subsurface.

SENORA FORMATION (Pennsylvanian, Desmoinesian)—Complex sequence of silty and concretionary clayshales, interbedded with very fine-grained sandstones and siltstones; includes the Verdigris Limestone; found only in the subsurface.

REFERENCES CITED

Bennison, A.P.; Chenoweth, P.A.; Desjardins, L.A.; and Ferris, C., 1972, Surface geology and Bouguer gravity of Tulsa County, Oklahoma, *in* Bennison, A.P. (ed.), Tulsa's Physical Environment: Tulsa Geological Society Digest, 37, 1 sheet, scale 1:63,360.

Oakes, M.C., 1952, Geology and mineral resources of Tulsa County, Oklahoma (includes parts of adjacent counties): Oklahoma Geological Survey Bulletin, 69, 234 p.

*Detailed descriptions only include mappable units observed in the field. Formal member and bed names are indicated by capitalization (i.e., Glenpool Limestone), whereas informal names are given in lowercase (i.e., Nowata flagstone). Color of units based on fresh surfaces, unless stated otherwise.

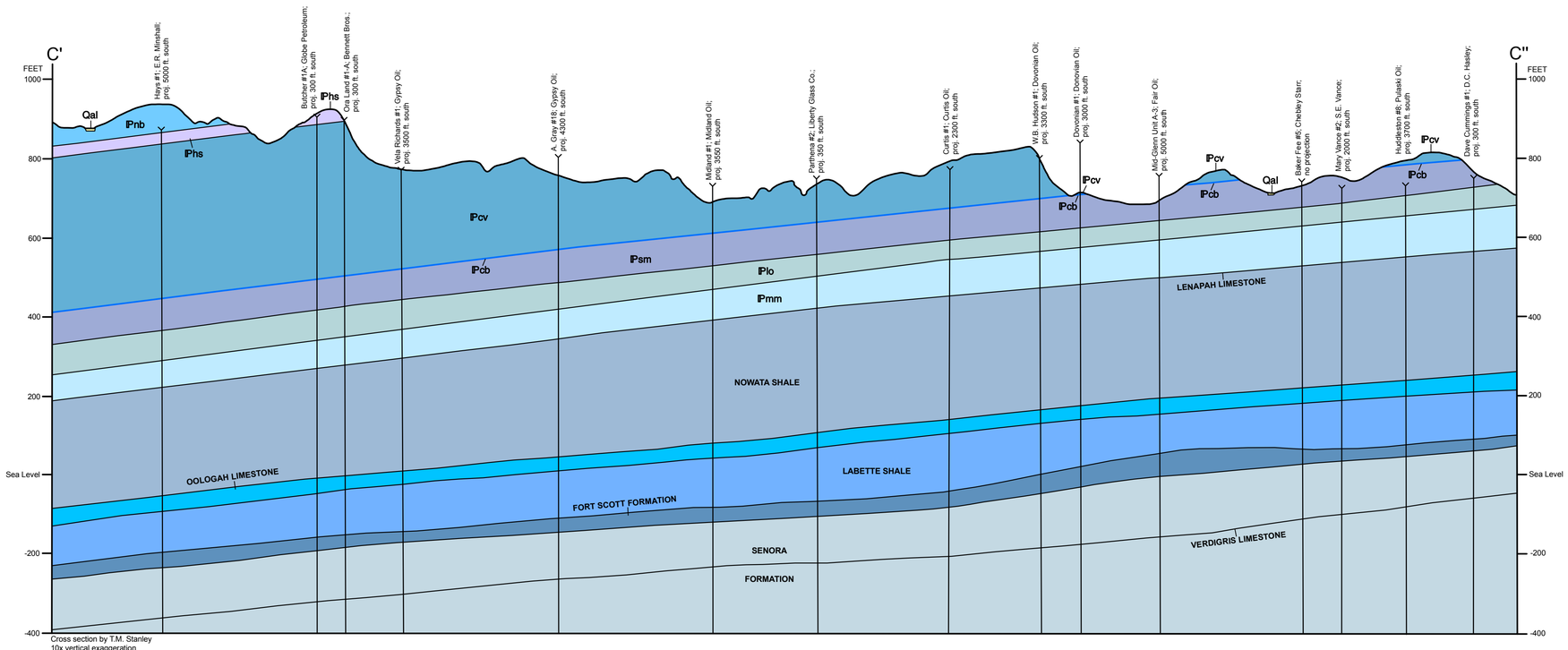
Produced by the Oklahoma Geological Survey. Geology by Julie M. Chang and Thomas M. Stanley, 2010-2011. Base map from USGS topographic map of the Sapulpa North quadrangle, dated 1956 and photorevised 1983. Universal Transverse Mercator projection. 1927 North American Datum. Research supported by the USGS, National Cooperative Geologic Mapping Program, under G10AC00272. 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 prepared by G. Russell Standridge, 2011.

APPROXIMATE MEAN DECLINATION
TRUE NORTH
MAGNETIC NORTH

SCALE 1:24000
1 .5 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER
CONTOUR INTERVAL 10 FEET

SYMBOLS

- Unit contact; dashed where approximate
- 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
- Drill hole with well number, lessee, and projection (cross section only)



Cross section by T.M. Stanley
10x vertical exaggeration

GEOLOGIC MAP OF THE SAPULPA NORTH 7.5′ QUADRANGLE, CREEK AND TULSA COUNTIES, OKLAHOMA

Julie M. Chang and Thomas M. Stanley

2011