OKLAHOMA GEOLOGICAL SURVEY
Charles J. Mankin, *Director*

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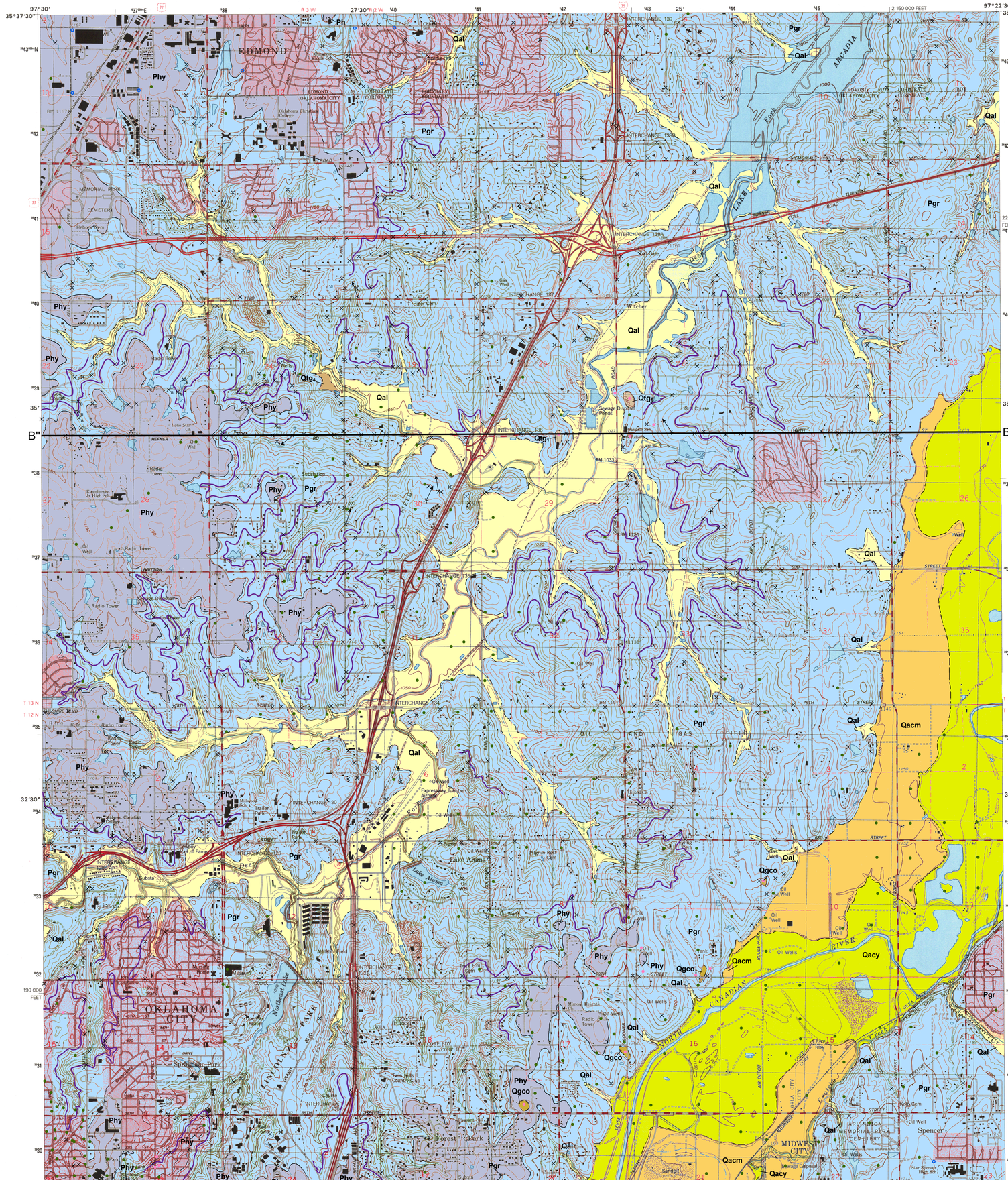
Oklahoma Geologic Quadrangle **OGQ-50**
Geologic Map of the Spencer 7.5′ Quadrangle
(previously Open-File Report OF6-2004)



CORRELATION OF MAP UNITS

Qal	Qacy	HOLOCENE	QUATERNARY
Qtg_4	Qacm		
Qtg_1	Qgco	PLEISTOCENE	
UNCONFORMITY			
Phy		LEONARDIAN	PERMIAN
Pgr			

SYMBOLS

- Unit contact; dashed where approximate
- Mappable bed
- Outcrop, geologic observation
- Outcrop, bearing of paleocurrent direction
- Outcrop, location used for composite measured section
- Exotic (quartz, quartzite) pebbles and cobbles
- 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
- Test hole by Oklahoma Department of Transportation
- Municipal water well
- Quarry

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

Qacy ALLUVIUM OF NORTH CANADIAN RIVER (Holocene)–Clay, silt, sand, and gravel in channels and on modern flood plain of North Canadian River. Area probably subject to frequent flooding. Thickness: generally 0 to about 40 ft, rarely over 40 ft

Qacm ALLUVIUM OF NORTH CANADIAN RIVER (Holocene)–Clay, silt, sand, and gravel on Recent flood plain of North Canadian River about 5-10 ft above Qacy. Area rarely subject to flooding. Thickness: unknown, possibly as much as 50 ft

Qtg_4 TERRACE DEPOSITS (Holocene)–Clay, silt, sand, and gravel on terraces immediately above and adjacent to modern channels and flood plains. Consists entirely of locally derived sediment. Thickness: unknown, possibly 0 to about 20 ft

Qtg_1 REMNANTS OF TERRACE DEPOSITS (Pleistocene)–Concentrations of distally derived sediment, mostly subrounded quartz and quartzite cobbles and pebbles, more than 50 ft above modern flood plains. Deposits are in Cimarron River drainage basin. May represent former course of North Canadian River or eroded and redeposited Pleistocene gravel similar to Qgco. Thickness: 0 to about 10 ft

Qgco REMNANTS OF OLDER TERRACE DEPOSITS (Pleistocene)–Clay, silt, sand, and gravel adjacent to the flood plain of the North Canadian River. Sand commonly is medium- to coarse-grained and very light colored; gravel locally consists of concentrations of distally derived pebbles and cobbles, mostly subrounded quartz and quartzite. Base of unit is about 40-60 ft above the modern flood plain and ranges in elevation from 1190 ft above sea level to 1220 ft above sea level. Top of the unit is as much as 65 ft above the modern flood plain and is as high as 1245 ft above sea level. Unit includes small amount of sand and gravel washed down into small north-flowing streams. Present only on west side of the North Canadian River. Thickness: 0 to 10 ft

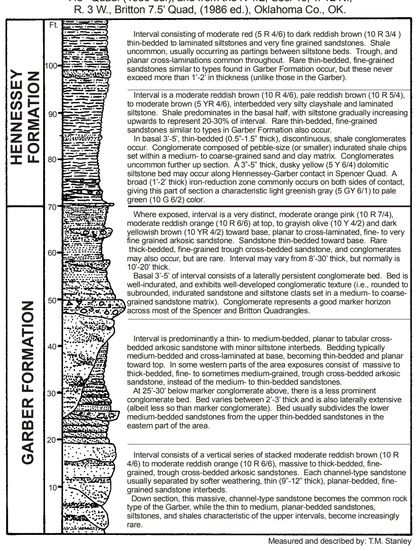
Phy HENNESSEY FORMATION (Permian)–Shale and siltstone, poorly exposed, mostly moderate reddish brown (10R4/6), moderate red (5R4/6), to moderate reddish orange (10R6/6) with conspicuous light greenish gray (5GY8/1) iron-reduction spots. The lower 20-30 ft is predominantly a blocky-weathering silty shale and clayshale that exhibits good paleosol development. A dusky yellow (5Y6/4) to moderate orange pink (10R8/2) dolomitic siltstone bed, 3-5 in. thick, overlain by shale with rare root clasts, is present locally near contact with the Garber Formation. Above the lower part, thin-bedded to laminated siltstones and very fine grained sandstones are more common. Occurs on tops of hills and ridges, generally expressed as highly weathered, muddy soil.

The lower part of the Hennessey Formation probably correlates with the Fairmont Shale Formation (Hennessey Group) of Bingham and Moore (1975), which is not recognized in this work because it is not mappable on a regional basis. Thickness: 0-60 ft, top eroded.

Pgr GARBER FORMATION (Permian)–Sandstone, mostly fine-grained to less commonly very fine to medium-fine-grained; appears to be very fine grained near base; moderate reddish brown (10R4/6), moderate reddish orange (10R6/6), moderate red (5R5/4), light brown (5YR5/6), and dark yellowish orange (10YR6/6); minor sandstone- and siltstone-pebble conglomerate and/or breccia, dolomite conglomerate and/or breccia, siltstone, and shale. Sandstone typically porous and friable. Commonly weathers to smooth, rounded outcrops; locally with platy to flaggy to rarely slabby appearance. Locally weathers to hard, dark-colored (grayish black [N2]) beds completely cemented with hematite, calcite, and/or silica. Dark-colored sandstone blocks locally form lag deposit over weathered outcrops. Large- and small-scale crossbeds, trough crossbeds common; many outcrops characterized by inclined beds and channelform deposits, although plane-parallel stratification also present. Shale and/or siltstone rip-up clasts uncommon; burrows extremely rare; one plant fossil observed. Sandstone locally color-banded (e.g. moderate reddish brown (10R4/6), grayish red purple (5RP4/2), and grayish yellow green (5GY7/2)) or with mottled appearance. Small calcareous iron-oxide spheres occur locally on weathered surfaces. Sandstone locally contains calcite-, dolomite-, and/or barite-cemented septarian nodules. Circular iron-reduction spots very rare. Sandstone, siltstone, and dolomite conglomerate and breccias appear to be of two types; one is clearly sedimentary, the other appears to be diagenetic and may represent incipient paleosol development on a sand. Conglomerates and breccias common near base of formation. A widespread moderate red (5R6/2) to pale red (5R3/2), 3-, to rarely 7-ft-thick conglomerate bed is also present near top of formation. The bed consists of coarse-granule to pebble-size siltstone, shale, and dolomite(?) clasts in a medium- to coarse-grained sandstone matrix. Siltstone and shale sandy, color-banded (e.g., moderate reddish brown (10R4/6) and yellowish gray (5Y7/2)), stratified to unstratified, and with uncommon iron-reduction spots as large as 2 in. in diameter. Typically soft, weather to "badlands"- type topography. Locally contain abundant septarian nodules similar to those found in sandstone. Siltstone and shale common near base and top of formation. In places, siltstone and shale contain evidence of paleosol development such as blocky weathering, fractures with fracture surfaces marked by small slickensides, through-going curved fractures, and calcareous concretions. Thickness: about 600 ft, based on cross section

Composite Profile 'B' Across The Garber-Hennessey Contact

Sections measured in S 1/2, Secs. 23 and 24, T. 13 N., R. 3 W., Spencer 7.5′ Quad. (1986 ed.); and from the N 1/2, Sec. 10, T. 12 N., R. 3 W., Britton 7.5′ Quad, (1986 ed.), Oklahoma Co., OK.



Interval consisting of moderate red (5 R 4/6) to dark reddish brown (10 R 3/4) thin-bedded to laminated siltstones and very fine grained sandstones. Shale uncommon, usually occurring as partings between siltstone beds. Trough, and planar cross-laminations common throughout. Rare thin-bedded, fine-grained sandstones similar to types found in Garber Formation occur, but these never exceed more than 1'-2' in thickness (unlike those in the Garber).

Interval is a moderate reddish brown (10 R 4/6), pale reddish brown (10 R 5/4), to moderate brown (5 YR 4/6), interbedded very silty clayshale and laminated siltstone. Shale predominates in the basal half, with siltstone gradually increasing upwards to represent 20-30% of interval. Rare thin-bedded, fine-grained sandstones similar to types in Garber Formation also occur.

In basal 3'-5', thin-bedded (0.5'-1.5' thick), discontinuous, shale conglomerates occur. Conglomerate composed of pebble-size (or smaller) indurated shale chips set within a medium- to coarse-grained sand and clay matrix. Conglomerates uncommon further up section. A 3'-5' thick, dusky yellow (5 Y 6/4) dolomitic siltstone bed may occur along Hennessey-Garber contact in Spencer Quad. A broad (1'-2' thick) iron-reduction zone commonly occurs on both sides of contact, giving this part of section a characteristic light greenish gray (5 GY 6/1) to pale green (10 G 6/2) color.

Where exposed, interval is a very distinct, moderate orange pink (10 R 7/4), moderate reddish orange (10 R 6/6) at top, to grayish olive (10 Y 4/2) and dark yellowish brown (10 YR 4/2) toward base, planar to cross-laminated, fine- to very fine grained arkosic sandstone. Sandstone thin-bedded toward base. Rare thick-bedded, fine-grained trough cross-bedded sandstone, and conglomerates may also occur, but are rare. Interval may vary from 8'-30' thick, but normally is 10'-20' thick.

Basal 3'-5' of interval consists of a laterally persistent conglomerate bed. Bed is well-indurated, and exhibits well-developed conglomeratic texture (i.e., rounded to subrounded, indurated sandstone and siltstone clasts set in a medium- to coarse-grained sandstone matrix). Conglomerate represents a good marker horizon across most of the Spencer and Britton Quadrangles.

Interval is predominantly a thin- to medium-bedded, planar to tabular cross-bedded arkosic sandstone with minor siltstone interbeds. Bedding typically medium-bedded and cross-laminated at base, becoming thin-bedded and planar toward top. In some western parts of the area exposures consist of massive to thick-bedded, fine- to sometimes medium-grained, trough cross-bedded arkosic sandstone, instead of the medium- to thin-bedded sandstones.

At 25'-30' below marker conglomerate above, there is a less prominent conglomerate bed. Bed varies between 2'-3' thick and is also laterally extensive (albeit less so than marker conglomerate). Bed usually subdivides the lower medium-bedded sandstones from the upper thin-bedded sandstones in the eastern part of the area.

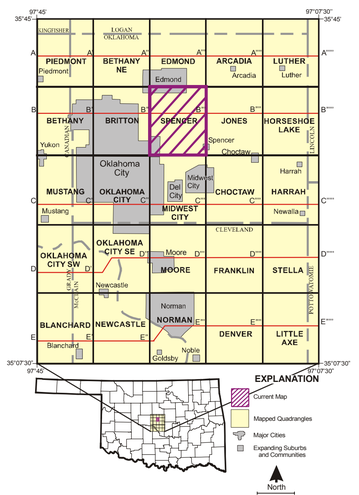
Interval consists of a vertical series of stacked moderate reddish brown (10 R 4/6) to moderate reddish orange (10 R 6/6), massive to thick-bedded, fine-grained, trough cross-bedded arkosic sandstones. Each channel-type sandstone usually separated by softer weathering, thin (9'-12' thick), planar-bedded, fine-grained sandstone interbeds.

Down section, this massive, channel-type sandstone becomes the common rock type of the Garber, while the thin to medium, planar-bedded sandstones, siltstones, and shales characteristic of the upper intervals, become increasingly rare.

Measured and described by: T.M. Stanley

References

Bingham, R.C.; and Moore, R.L., 1975, Reconnaissance of the water resources of the Oklahoma City quadrangle, central Oklahoma: Oklahoma Geological Survey Hydrologic Atlas 4, 4 sheets, scale 1:250,000.

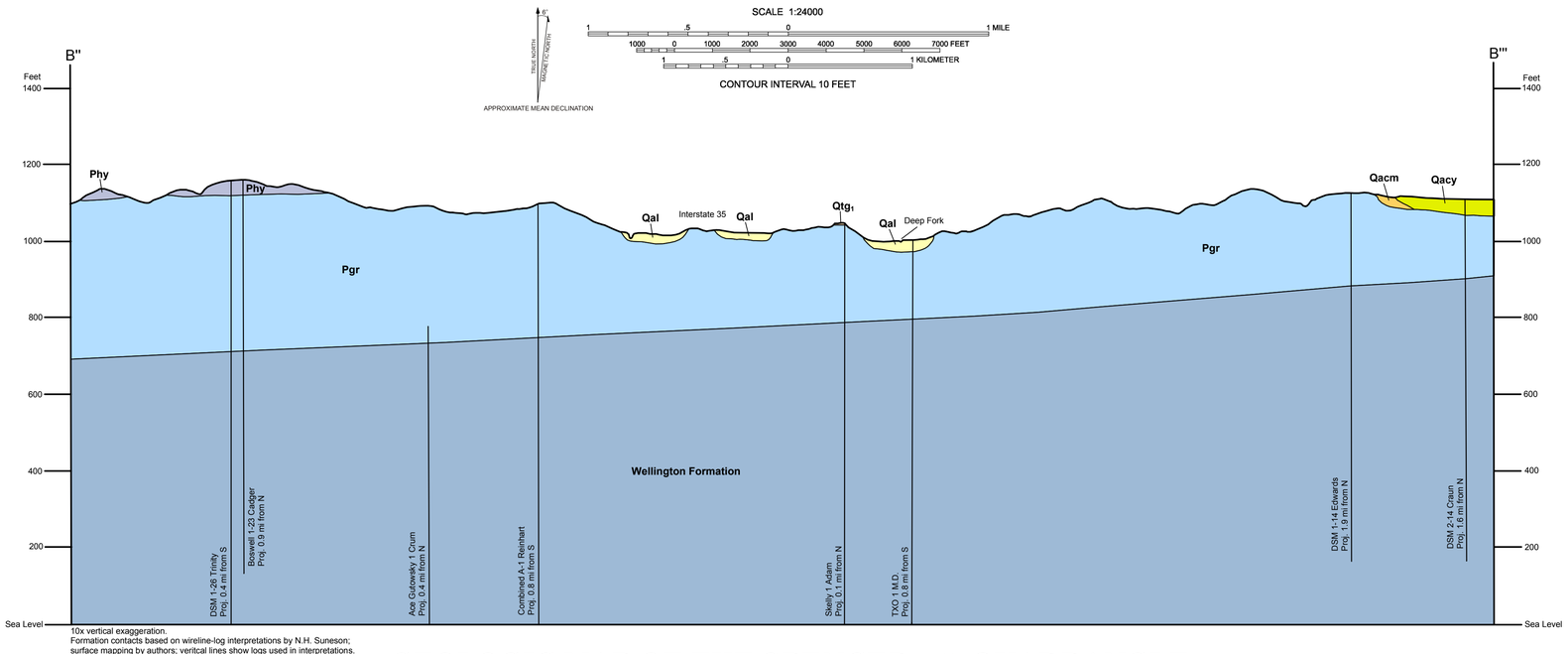


Base Map Credits

The base map was compiled by the U.S. Geological Survey. Topography compiled 1956. Planimetry derived from imagery taken 1995 and other sources. Public Land Survey System and survey control current as of 1985. Universal Transverse Mercator (UTM) projection. 1983 North American Datum. 10,000-foot grid ticks based on Oklahoma coordinate system, north and south zones. 1,000-meter UTM grid, zone 14.

Geologic Map Credits

Geology by Thomas M. Stanley and Neil H Suneson, 1998-1999. Research supported by the U.S. Geological Survey, National Cooperative Geologic Mapping Program, under Assistance Award Number 98HQAG2060. 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. Published originally as Open-File Report 3-99 as an author-prepared, black-and-white paper map. Digitally reproduced in color as Open-File Report OF6-2004. Map revised and published as OGQ-50. Cartography and layout prepared by G. Russell Standridge, 2002.



10x vertical exaggeration.
Formation contacts based on wireline-log interpretations by N.H. Suneson; surface mapping by authors; veritcal lines show logs used in interpretations.

GEOLOGIC MAP OF THE SPENCER 7.5′ QUADRANGLE, OKLAHOMA COUNTY, OKLAHOMA

Thomas M. Stanley and Neil H. Suneson

1999