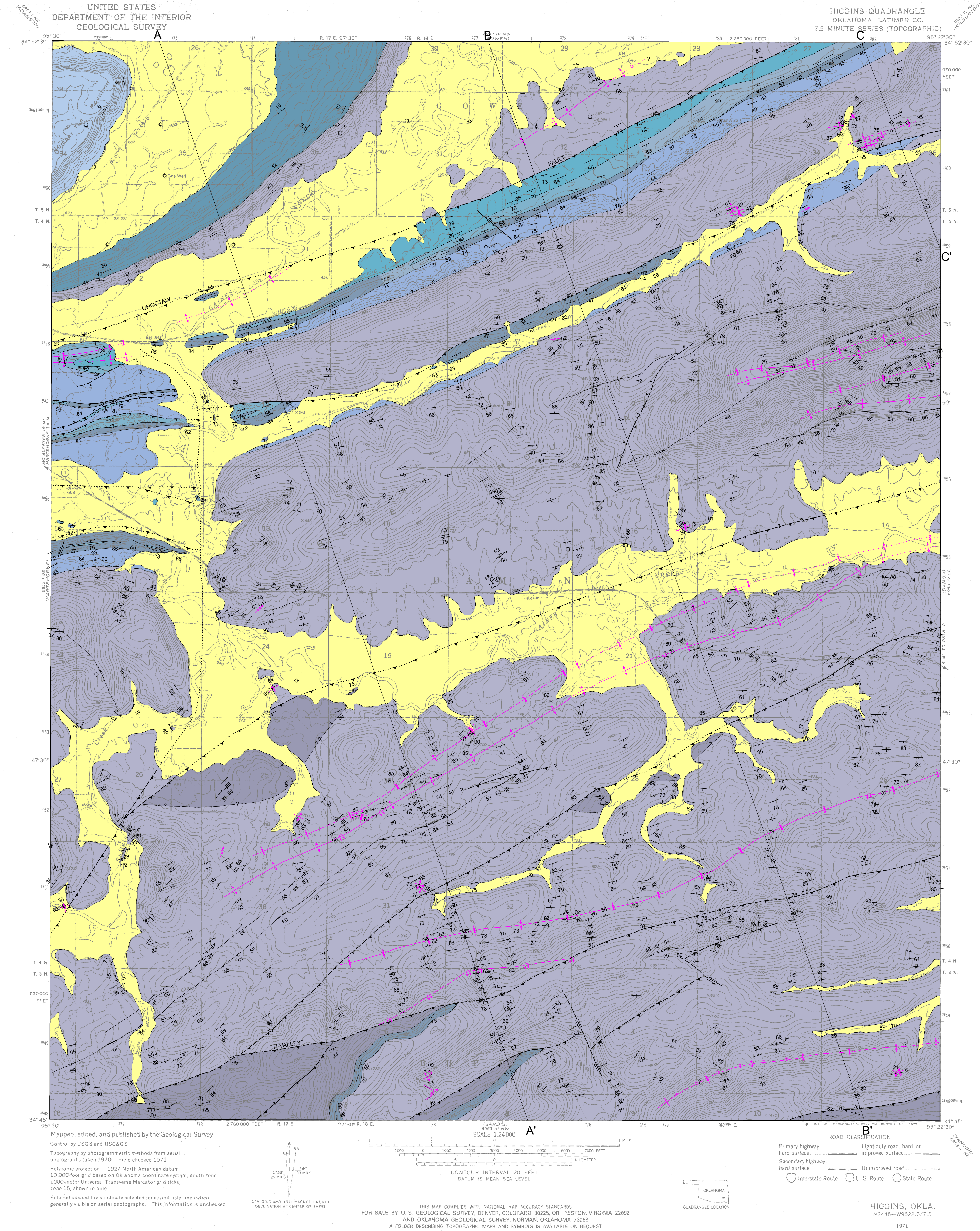
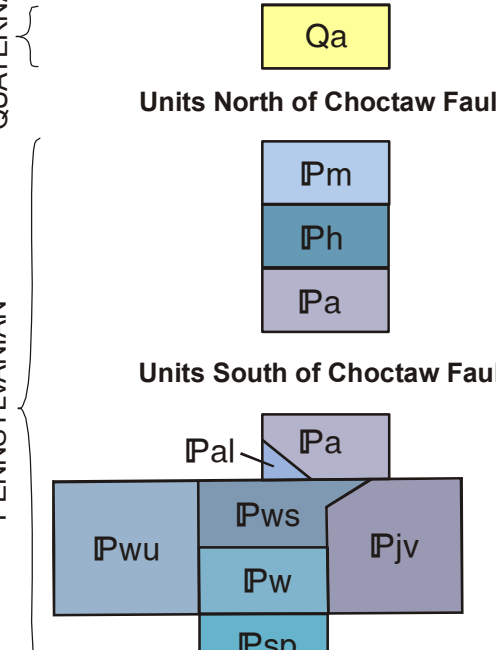




OKLAHOMA GEOLOGICAL SURVEY
Charles J. Mankin, Director



CORRELATION OF MAP UNITS



DESCRIPTION OF UNITS

- Qa** ALLUVIUM — Unconsolidated silt, sand, and gravel
- Pm** MCALESTER FORMATION (PENNSYLVANIAN) — Lower part consists mostly of poorly exposed and easily eroded shale, with upper Hartshorne coal near base and local thin sandstones and coal beds throughout. Shale is dark, firm, platy, and contains abundant clay-ironstone concretions. Middle part characterized by as many as five sandstone members that form low ridges separated by valleys developed on shale. Sandstones are buff, fine-grained, thin and regularly bedded, ripple-marked, and locally separated by thin, discontinuous shale beds. Shale varies from light gray and sandy to dark and carbonaceous. Upper part not exposed in quadrangle. Approximately 210 ft (64 m) exposed north of Choctaw fault (Description from Hendricks, 1937).
- Ph** HARTSHORNE FORMATION (PENNSYLVANIAN) — Consists of lower sandstone, middle shale, and upper sandstone. Lower sandstone is ash-gray on fresh surfaces and varies from massive, medium-grained, and pure to thin-bedded, shaly, ripple-marked, and fine-grained. Shale contains lower Hartshorne coal bed and numerous relatively thin, shaly sandstone beds; locally, shale slightly sandy, gray, and micaceous. Upper sandstone massive, coarse-grained, white, and poorly cemented. Both sandstones are well exposed and form ridges; middle shale is poorly exposed and forms valleys. Approximately 750 ft (230 m) exposed north of Choctaw fault (Description from Hendricks, 1937).
- Pa** ATOKA FORMATION (PENNSYLVANIAN) — Predominantly poorly exposed dive-gray (5Y3/2) to grayish-olive (10Y4/2), slightly silty, noncalcareous, poorly laminated shale and mudstone. Contains thin beds of laminated siltstone and thicker beds of sandstone. Lower shale (Pal) in northern part of area locally mapped separately. Laminated siliceous shale near base of formation in southern part of area. Sandstone is light olive gray (5Y5/2) and grayish orange (5Y7/2) where fresh, and grayish orange (10YR7/4) where weathered. Mostly fine-grained, rarely medium-grained, poorly to moderately sorted, noncalcareous, and composed of about 85% quartz, 3% feldspar and lithic fragments, and conspicuous white mica parallel to laminations. Individual beds vary from several centimeters to several meters thick and average about 60 cm. Amalgamated beds common, forming resistant ridges and dip slopes easily identifiable on aerial photographs; some of these marker beds are mapped. One calcareous sandstone bed is present in the southwestern part of the quadrangle. Thicker beds are generally massive corresponding to Ta of (Bourne turbidite sequence) to parallel laminated (Td); thinner beds commonly are ripple cross-laminated (Tc). Sole marks (flute, groove, and load casts, trace fossils) at base of sandstone beds locally common. Dish-and-pillar structures typical of ripple marks typical of ripple marks. Unconformities except for lowermost sandstone beds immediately above Johns Valley Formation that contain molds of bryozoans, brachiopods, corinoids, and rare corals; local concentrations of plant debris on bedding planes throughout the formation. Approximately 400 ft (125 m) of upper part exposed north of Choctaw fault; maximum thickness of lower part approximately 11,000 ft (3,350 m) south of Choctaw fault.
- Pal** LOWER ATOKA SHALE (PENNSYLVANIAN) — Poorly exposed, olive-gray (5Y3/2) to grayish-dive (10Y4/2), noncalcareous, poorly laminated shale and mudstone with thin siltstone beds. Locally mapped separately from Atoka Formation (Pa).
- Pwu** WAPANUCKA FORMATION, UNDIFFERENTIATED (PENNSYLVANIAN) — Includes Spiro sandstone member (informal) and Wapanucka Formation, described below.
- Pws** SPIRO SANDSTONE MEMBER (INFORMAL) OF WAPANUCKA FORMATION (PENNSYLVANIAN) — Well-exposed, light-brown (5Y5/6) to very pale-orange (10YR8/2) or pale-yellowish-orange (10YR8/6), mostly well-sorted, porous, medium-grained, stratified quartz arenite. Quartzose, mostly noncalcareous, locally with abundant trace fossils (Asteroserial) and fragments of corinoids, corals, and brachiopods. Beds typically 2 cm to 1 m thick, amalgamated, and mostly parallel-stratified, but locally planar-tabular cross-stratified. Spicular in western part of area. Granule sandstone beds with abundant shale clasts rare. Weathers to very waxy appearance. Forms ridge and dip slope throughout area. Maximum thickness approximately 700 ft (200 m) south of Choctaw fault.
- Pw** WAPANUCKA FORMATION (PENNSYLVANIAN) — Predominantly poorly to moderately well-exposed, medium-gray (N5) to medium-dark-gray (N4), wavy-bedded, sparsely fossiliferous corinoids, brachiopods, gastropods, corals) micrite and parallel to rarely cross-stratified packstone and bioclastic limestone. Locally slightly spicular, interbedded with spiculite in western part of area. Micrite locally nodular, slightly felted; packstone locally sandy. Limestone interbedded with poorly exposed shale similar to that in Atoka Formation, mostly underlying but also interfingering with Spiro Sandstone Member (informal). Maximum thickness approximately 750 ft (230 m) south of Choctaw fault.
- Piv** JOHNS VALLEY FORMATION (PENNSYLVANIAN) — Predominantly poorly exposed, medium-dark-gray (N4) to pale-brown (5Y5/2), mostly noncalcareous, poorly laminated slightly silty shale and mudstone. Contains thin beds of noncalcareous laminated siltstone and thin to medium-bedded sandstone similar to Atoka Formation (Pa). Sandstones mostly light brown (5Y6/4) to grayish orange (10YR7/4), varying from fine to coarse-grained, with rare granule conglomerates, rarely calcareous or feld, and massive to parallel- or ripple cross-laminated. Sole marks and dish-and-pillar structures typical of some beds. Some sandstone marker beds mapped. Shale locally contains slightly to well-rounded pebbles, cobbles, and boulders of chert and a wide variety of limestone lithologies (micrites to bioclastic grainstones and packstones). Other lithologies within the shale include large masses of platy to very fissile, hard, grayish-black (N2) shale with calcareous concretions, phosphatic(?) nodules, and disseminated pyrite. Limestone dasts have been correlated with lower and middle Paleozoic limestone units exposed to the north and west; chert dasts may be Woodford Formation (Devonian), and many black shale masses may correlate with the Caney Formation (Mississippian). Maximum thickness approximately 2,600 ft (800 m) south of Choctaw fault.
- Psp** SPRINGER 1 FORMATION (PENNSYLVANIAN) — Poorly exposed, dark-gray (N3) to dive-gray (5Y4/1), locally slightly silty, mostly calcareous shale with lesser amounts of interbedded laminated siltstone. Siltstone beds locally contain abundant macrofossils (gastropods, brachiopods, nautiloids). West of mapped area unit contains 2-cm phosphatic(?) concretions, 2-cm to 38-cm limonitized siltstone concretions, and local traces of pyrite. Maximum thickness approximately 1,150 ft (350 m) south of Choctaw fault.

SYMBOLS

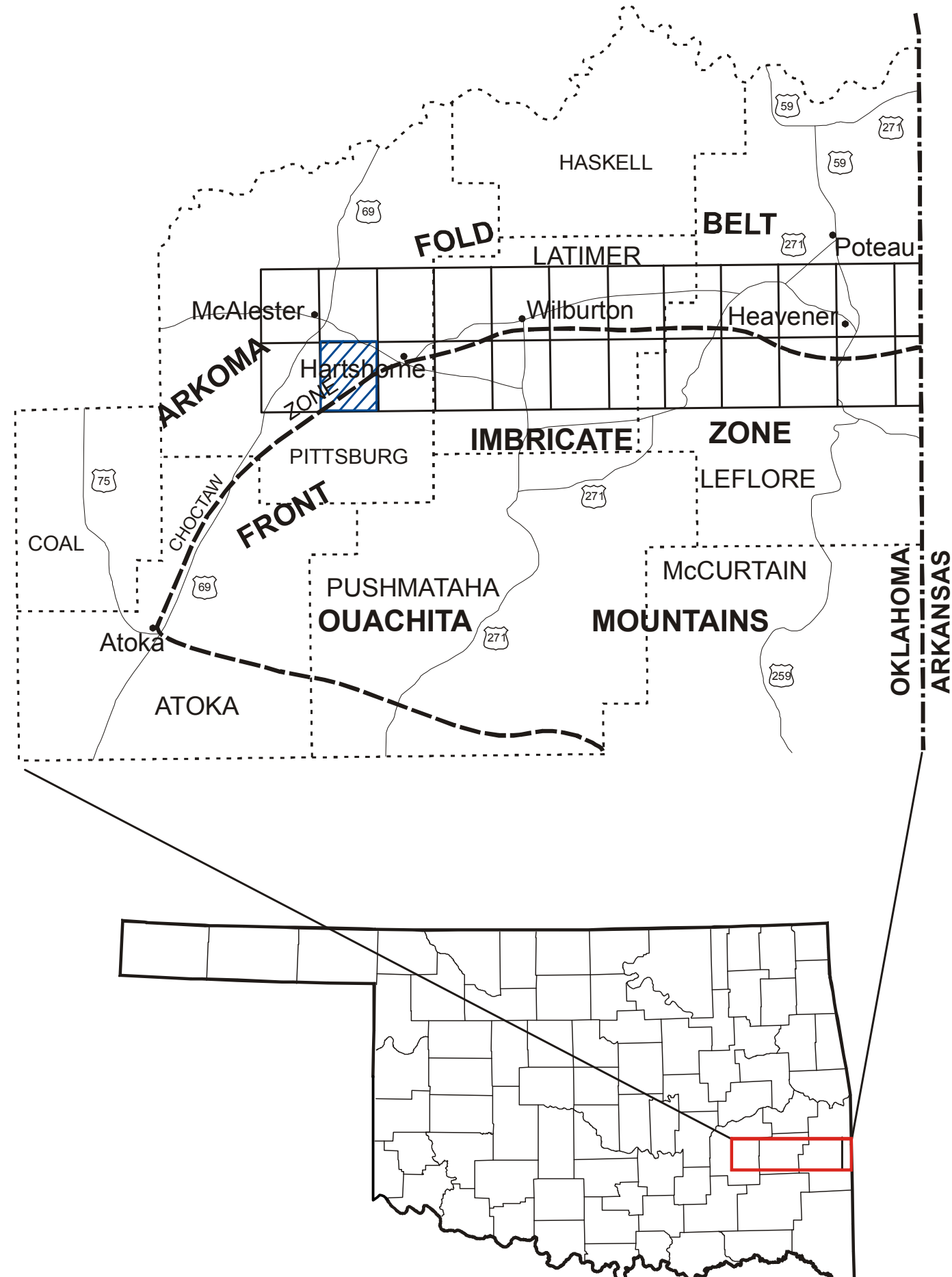
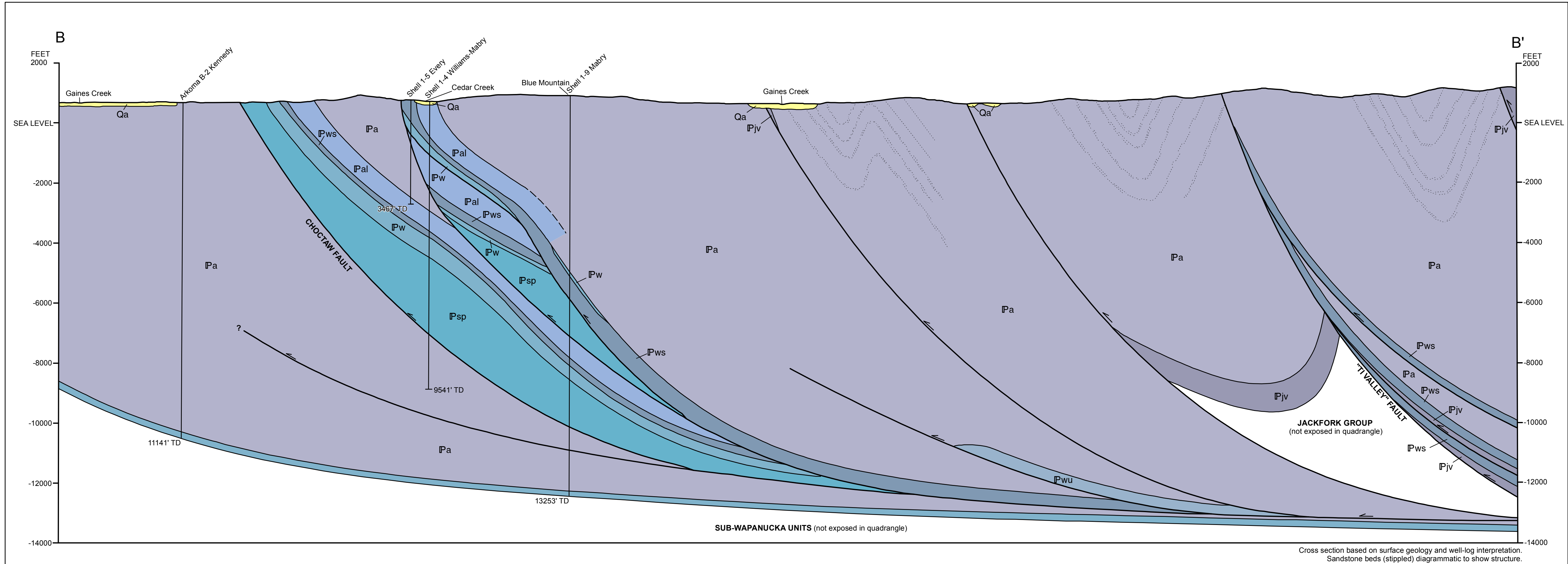
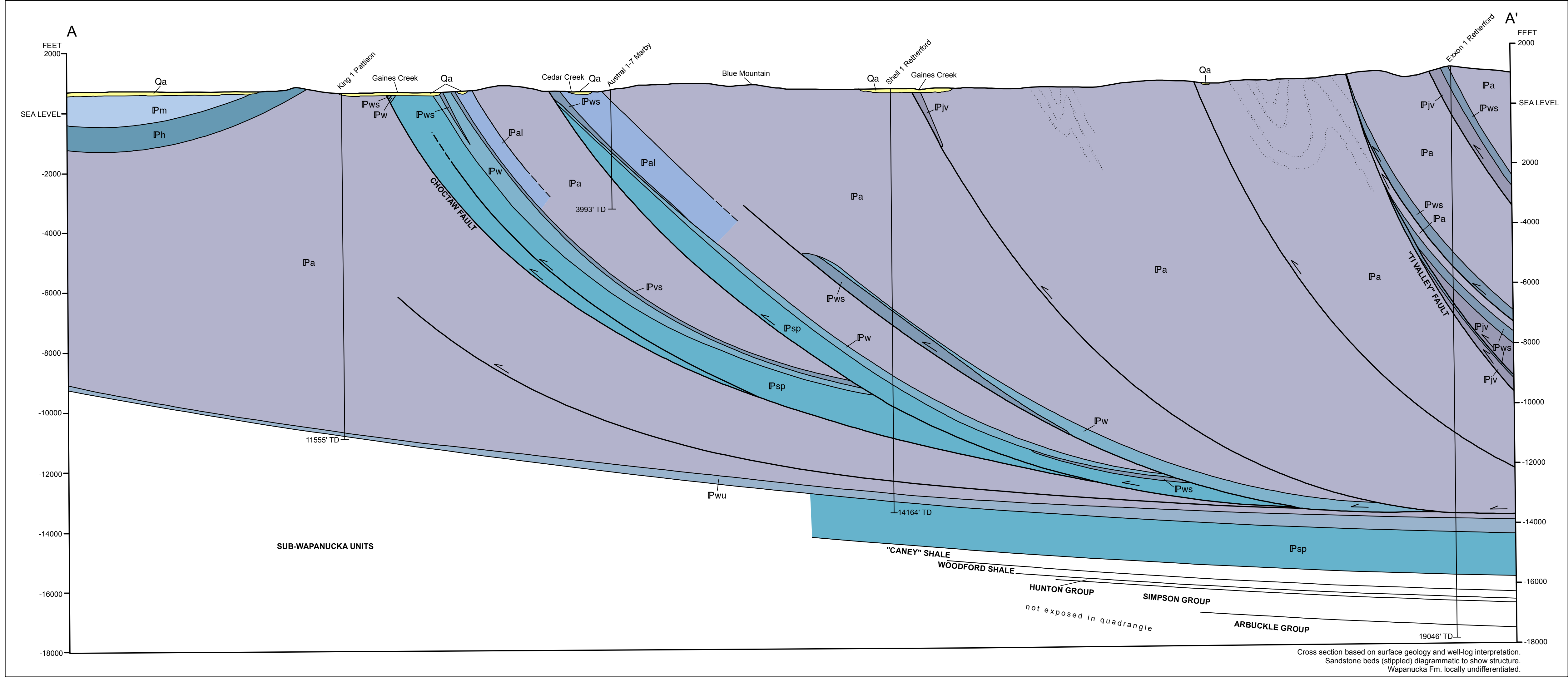
- CONTACT-Dashed where approximately located
- MARKER BED
- THRUST FAULT-Sawtooth on upper plate, dashed where approximately located; dotted where concealed
- FAULT-Arrows show relative horizontal movement; dashed where approximately located
- ANTICLINE-Showing crestline; arrow shows direction of plunge; dashed where approximately located; dotted where concealed
- OVERTURNED ANTICLINE-Arrows show direction of dip of limbs; dashed where approximately located
- SYNCLINE-Showing troughline; arrow shows direction and amount of plunge where known; dashed where approximately located
- OVERTURNED SYNCLINE-Arrows show direction of dip of limbs; dashed where approximately located
- MINOR ANTICLINE-Arrow shows direction and amount of plunge where known; bar shows dip of axial plane (crossbar if vertical)
- MINOR SYNCLINE-Arrow shows direction and amount of plunge where known; bar shows dip of axial plane (crossbar if vertical)
- MODERATE ANTICLINE-Showing dip of limbs
- DEXTRAL (Z) ASYMMETRIC MINOR FOLD-Arrow shows direction of plunge
- SINISTRAL (S) ASYMMETRIC MINOR FOLD-Arrow shows direction and amount of plunge where known
- STRIKE AND DIP OF BEDS
- Strike and dip of beds, facing direction unknown
- Vertical beds, facing direction unknown
- Strike and dip of beds, upright
- Vertical beds, ball indicates top of beds
- Strike and dip of beds, overturned
- Horizontal beds
- Inclined, contorted
- OIL AND GAS WELLS (Spudded before January 1, 1988)
- Gas well
- Dry hole, abandoned

- LIST OF WELLS
1. Arkoma 2 Whitney, Spud 4/2/83, TD 11,760'
 2. Arkoma 3 Whitney, Spud 9/22/84, TD 11,020'
 3. Arco 2 Kuriko, Spud 2/11/85, TD 11,683'
 4. Atlantic Richfield 1 Kuriko, Spud 1/25/70, TD 11,260'
 5. Sinclair 1 LeBlance, Spud 8/6/85, TD 10,675'
 6. Arco 2 LeBlance, Spud 4/1/85, TD 12,631'
 7. Trig 1 Hunter-Tucker, Spud 1/13/76, TD 10,290'
 8. Arkoma 2 Hunter-Tucker, Spud 11/2/87, TD 11,800'
 9. Arkoma B-1 Kennedy, Spud 3/13/83, TD 3,495'
 10. Arkoma B-2 Kennedy, Spud 6/3/83, TD 11,141'
 11. Tipco 1-32 Kennedy, Spud 10/17/70, TD 11,059'
 12. Sinclair 1 M.C. Watts, Spud 8/27/63, TD 11,468'
 13. Coquina 1 Mose Watts, Spud 1/14/74, TD 11,680'
 14. Samson 1 Mose, Spud 3/20/84, TD 11,815'
 15. Samson 1 Watts, Spud 1/3/82, TD 9,770'
 16. King 1-2 McCasin, Spud 3/20/89, TD 11,555'
 17. King 1-1 Pattison, Spud 8/7/89, TD 11,556'
 18. Tenneco 1-5 Mabry Trust, Spud 11/13/83, TD 12,389'
 19. Shell 1-5A Every, Spud 2/22/65, TD 3,467'
 20. Shell 1-5 Mabry, Spud 2/15/65, TD 53'
 21. Shell 1-4 Williams-Mabry, Spud 5/23/64, TD 9,541'
 22. Sinclair 1 Mose Watts, Spud 2/25/65, TD 3,795'
 23. Whitmar 1-11 Silver Bullet, Spud 9/25/81, TD 13,036'
 24. Austral 1-7 Mabry, Spud 10/31/66, TD 3,993'
 25. Shell 1-9 Mabry, Spud 7/5/65, TD 13,253'
 26. Shell 1 Retherford, Spud 3/16/80, TD 14,164'
 27. Exxon 1 Retherford, Spud 7/25/84, TD 19,046'

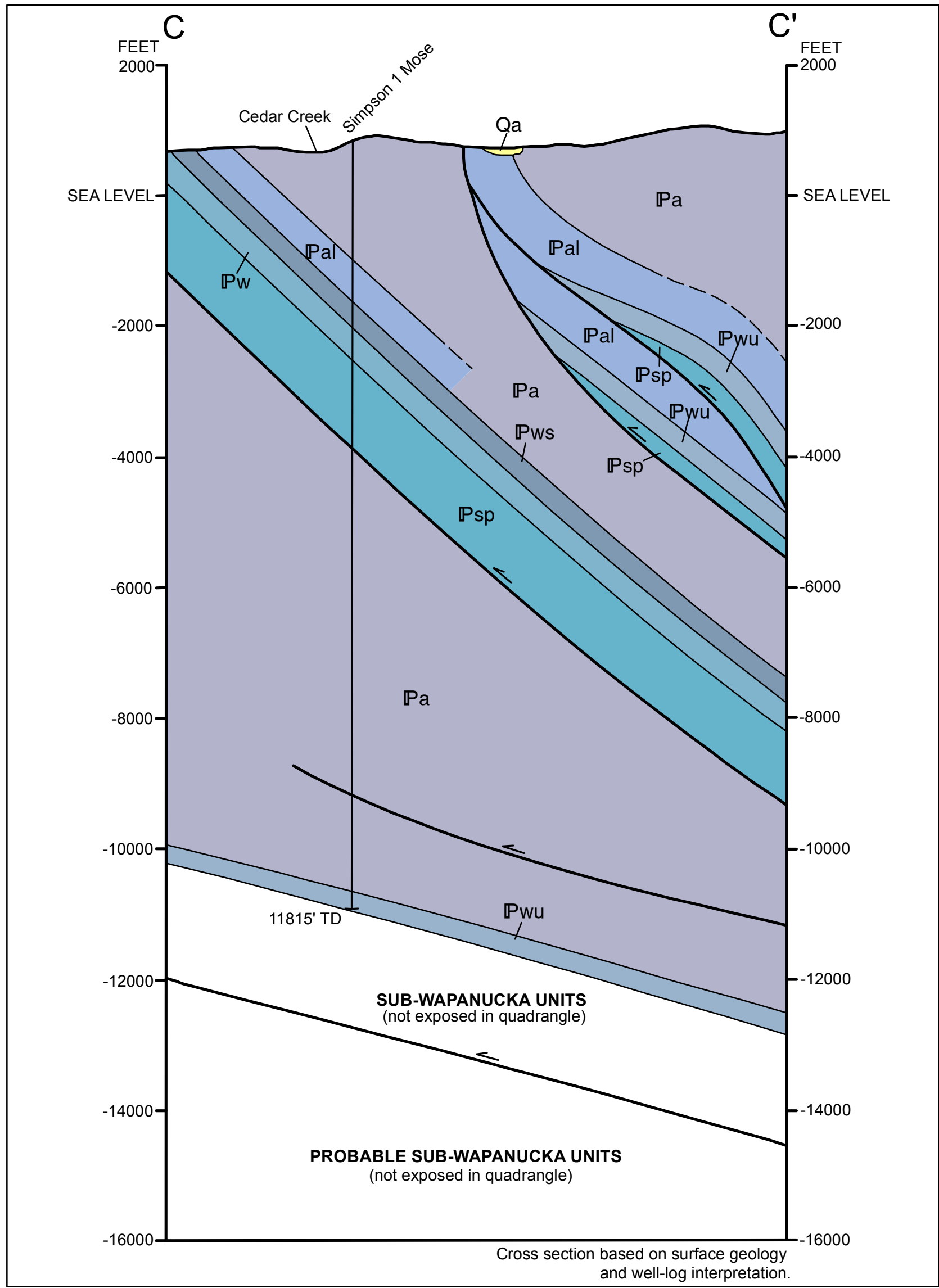
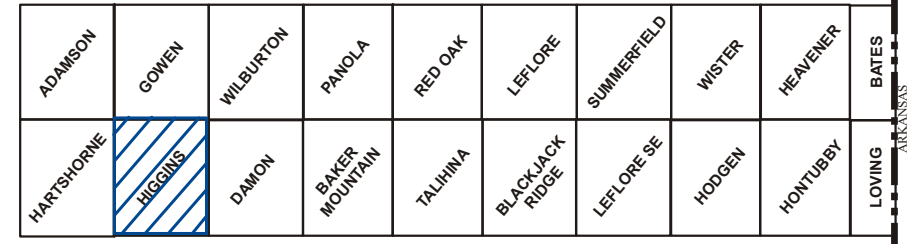
REFERENCES

Hendricks, T.A., 1937, Geology and fuel resources of the southern part of the Oklahoma coal field, Part 1, The McAlester district, Pittsburg, Atoka, and Latimer Counties: U.S. Geological Survey Bulletin 874-A, 90p.

Prepared in cooperation with the U.S. Geological Survey and the Arkansas Geological Commission.



INDEX TO QUADRANGLES AND CROSS SECTIONS



GEOLOGIC MAP OF THE HIGGINS 7.5' QUADRANGLE LATIMER COUNTY, OKLAHOMA

By

Neil H. Suneson and Charles A. Ferguson, 1989

Digitized by Jacob Hernandez, 2014
Minor revisions by S.C. Evans, 2018