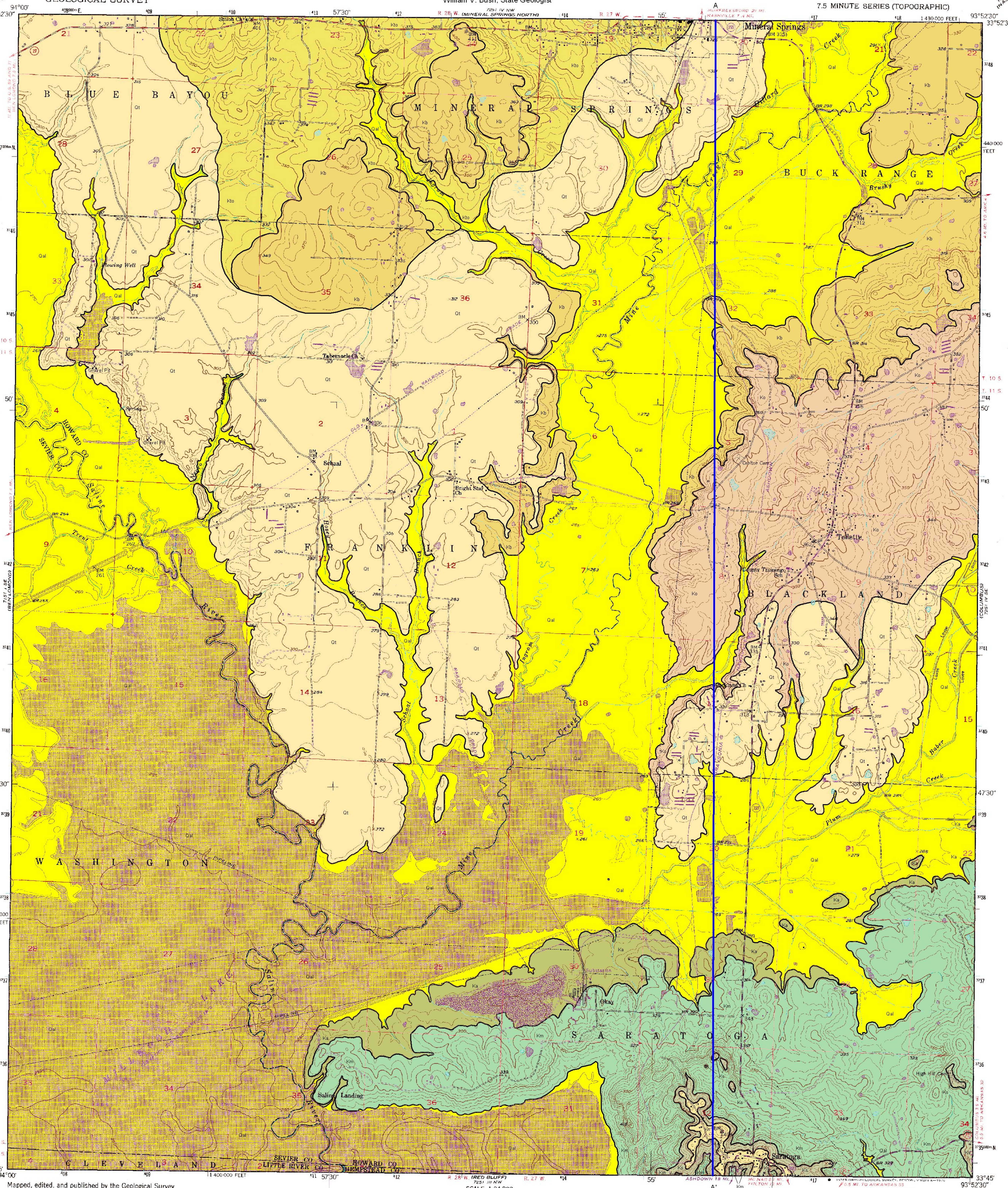
GEOLOGIC MAP OF THE MINERAL SPRINGS SOUTH QUADRANGLE, HOWARD, SEVIER, AND LITTLE RIVER COUNTIES, ARKANSAS

DIGITAL GEOLOGIC QUADRANGLE MAP
MINERAL SPRINGS SOUTH QUADRANGLE, ARKANSAS
DGM-AR-00569

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Geology by William D. Hanson and Benjamin F. Clardy
1995
Arkansas Geological Commission
William V. Bush, State Geologist

MINERAL SPRINGS SOUTH QUADRANGLE
ARKANSAS
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey
Control by USGS, USC&GS, and USCE
Culture and drainage in part compiled from aerial photographs taken 1949. Topography by plane-table methods 1950-1951
Polyconic projection. 1927 North American datum
10,000-foot grid based on Arkansas coordinate system, south zone
1000-metre Universal Transverse Mercator grid ticks, zone 15, shown in blue
Revisions shown in purple compiled from aerial photographs taken 1975. This information not field checked

UTM GRID AND 1975 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

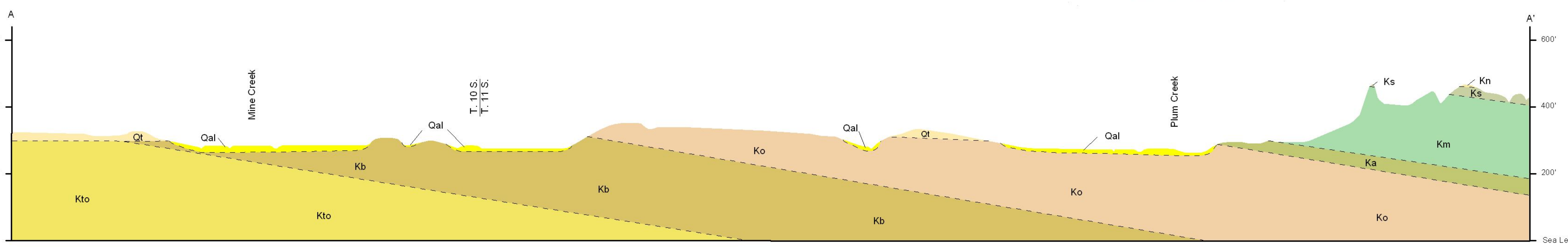
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
AND ARKANSAS GEOLOGICAL COMMISSION, LITTLE ROCK, ARKANSAS 72204
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

Funded by the Arkansas Geological Commission in cooperation with the United States Geological Survey, STATEMAP Project No. 1434-94-A-1223

ROAD CLASSIFICATION
Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
U. S. Route — State Route

MINERAL SPRINGS SOUTH, ARK.
N3345— W9352.5/7.5
1951
PHOTOREVISED 1975
AMS 7251 IV SW—SERIES V884



GEOLOGIC CROSS SECTION A-A'
Horizontal scale 1"= 2000'
Vertical scale 1"= 200'

CORRELATION OF MAP UNITS

- Qal, Qt — Quaternary — Cenozoic
- UNCONFORMITY
- Kn
- UNCONFORMITY
- Ks
- UNCONFORMITY
- Km
- UNCONFORMITY
- Ka
- UNCONFORMITY
- Ko
- UNCONFORMITY
- Kb
- UNCONFORMITY
- Kto

(Kn through Kto — Upper Cretaceous — Mesozoic)

DESCRIPTION OF MAP UNITS

Qal — **Alluvium (Quaternary)** - Variably sized gravel overlain by unconsolidated sand, silt, and clay comprises the unit. This unit occurs in the floodplains of streams and rivers. The sediments form a rich loam and are excellent for agriculture. Gravels, primarily novaculite, originated in the Ouachita Mountain region and from local Cretaceous formations. Thickness varies from 0 to 25 feet. Areas of alluvium are presently receiving sediment deposition.

Qt — **Terrace Deposit (Quaternary)** - Terrace deposits generally grade from basal gravel to silt and clay at the top. Gravels, primarily novaculite, originated in the Ouachita Mountain region and from local Cretaceous formations. Thicknesses are generally less than 50 feet. Terraces are topographic features which are former floodplains of nearby streams and/or rivers. The sediments form a rich loamy soil. The basal gravel is sometimes utilized for water-well production and gravel-mining operations.

Kn — **Nacatoch Sand** *(Upper Cretaceous)* - The Nacatoch Sand is composed of unconsolidated, cross-bedded, yellowish and gray fine quartz sand, hard fossiliferous sandy limestone, coarse highly glauconitic sand, fine argillaceous blue-black sand, and bedded light-gray clay and marl. Hard fossiliferous limestones are found near the base of the unit. Thin bedded gray clay is interbedded with fine sands at the top of the unit. The Nacatoch Sand is approximately 300 to 350 feet thick in the mapped area. The unit strikes to the northeast and has a dip of approximately 80 feet per mile to the southeast in this quadrangle. Fossils found in the unit include corals, echinoderms, bryozoa, annelids, bivalves, gastropods, cephalopods, crab remains, and shark teeth. The Nacatoch Sand was deposited in a nearshore marine environment and rests unconformably on top of the Saratoga Chalk.

Ks — **Saratoga Chalk** *(Upper Cretaceous)* - The Saratoga Chalk is a fossiliferous, hard, glauconitic chalk with beds of marly chalk and sandy chalk. It is blue-gray when freshly exposed and weathers white, light gray, and light brown. The Saratoga Chalk is 30 to 40 feet thick in the mapped area. The unit strikes to the northeast and has a dip of approximately 80 feet per mile to the southeast in this quadrangle. Fossils found in the unit include sponges, bryozoa, echinoderms, annelids, bivalves, gastropods, cephalopods, crustaceans, and fish teeth. The Saratoga Chalk was deposited in a nearshore marine environment and rest unconformably on top of the Marlbrook Marl.

Km — **Marlbrook Marl** *(Upper Cretaceous)* - The Marlbrook Marl is a uniform chalky marl that is blue-gray when freshly exposed and weathers white to light brown. The unit is moderatly fossiliferous in the upper part and slightly fossiliferous in the lower part. Notable fossils include *Exogyra, Gryphaea, and Ostrea* oyster species and reptile remains. The Marlbrook Marl is approximately 220 feet thick in the mapped area. The unit strikes to the northeast and has a dip of approximately 80 feet per mile to the southeast in this quadrangle. The Marlbrook Marl was deposited in a nearshore marine environment and rests unconformably on top of the Ozan Formation.

Ka — **Annona Chalk** *(Upper Cretaceous)* - The Annona Chalk is a hard, massive, thick-bedded, fossiliferous chalk. The chalk is gray-blue when fresh and weathers white. Notable fossils occuring in the unit are *Gryphaea, Echinocory texana,* and *Inoceramus*. The unit outcrops from north of Columbus, AR, southwest to the Arkansas-Oklahoma state line near Foreman, AR, and dips to the south approximately 80 feet per mile. The thickness in the area is about 40 feet. The unit was deposited in a nearshore marine environment following an unconformity separating it from the underlying Ozan Formation.

Ko — **Ozan Formation** *(Upper Cretaceous)* - The Ozan Formation consists of sandy marl, marl, and a sandy glauconitic marl. The unit is fossiliferous, micaceous, and weathers to a yellow-brown sticky clay. The basal sandy glauconitic marl, known as the Buckrange Sand Lentil, has shark teeth and phosphate nodules, and is about 15 feet thick. Thickness in the quadrangle is about 260 feet. Notable fossils are the *Exogyra ponderosa* and *Gryphaea*. The outcrop belt extends from west of Arkadelphia, southwest to the Arkanas-Oklahoma border, and dip approximately 80 feet per mile to the southwest. The unit was deposited in a nearshore marine environment and rests unconformably on the Brownstown Marl.

Kb — **Brownstown Marl** *(Upper Cretaceous)* - The Brownstown Marl consists of dark-gray calcareous clay, marl, and sandy marl. The unit is fossiliferous and weathers yellow to gray in color. Notable fossils are the *Exogyra ponderosa* and *Inoceramus*. The outcrop belt extends from east of Arkadelphia AR, southwest to the Arkansas-Oklahoma state line, and dips approximately 80 feet per mile to the south. The approximate thickness in the quadrangle is 220 feet. The unit was deposited in a nearshore marine environment and rests uncomformably on the Tokio Formation (Upper Cretaceous).

Kto — **Tokio Formation** *(Upper Cretaceous)* - The Tokio Formation consists of cross-bedded sand, gravel, gray clay, and volcanic ash. Basal cross-bedded gravels are approximately 30 feet thick. Minor sand and clay lenses occur within the gravel, while sand commonly fills the interstitial spaces around the gravel. Thinner beds (less than 1 foot in thickness) and lenses of gravel occur within the formation's sand intervals. The gravels range from pea-size to 6 inches in diameter and are composed of quartz, novaculite, sandstone, and quartzite. Iron-oxide-cemented conglomerates may be present locally. The cross-bedded sands are medium-to-fine-grained quartz with minor amounts of heavy minerals, glauconite, iron-oxide concretions, and rip-up clasts of gray clay. Sands weather yellow to orange-red in color. Gray clays are lignitic, pyritic, fossiliferous, and may contain leaf imprints. The volcanic ash is light gray to white and has altered to kaolinitic clay. The source area for much of the formation's sediment was the Ouachita Mountain region. The formation outcrop belt extends from near Arkadelphia, southwest to the Arkansas-Oklahoma state line, and dips to the south at approximately 80 feet per mile. The approximate thickness in the quadrangle is 80 feet. The unit was deposited in a nearshore marine environment on an unconformable surface which separates it from the underlying Woodbine Formation (Upper Cretaceous).

SYMBOLS

CONTACTS
GRAVEL PIT

REFERENCES

Bush, W. V., and Clardy, B.F., 1976, Geologic Map of the Washington Quadrangle, Hempstead County, Arkansas: Arkansas Geological Commission Open-File Report, scale 1: 24,000.

Dane, C.H., 1929, Upper Cretaceous Formations of Southwestern Arkansas: Arkansas Geological Survey Bulletin 1, 215p.

McFarland, J.D., 1998, Stratigraphic Summary of Arkansas: Arkansas Geological Commission Information Circular 36, 39p.

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