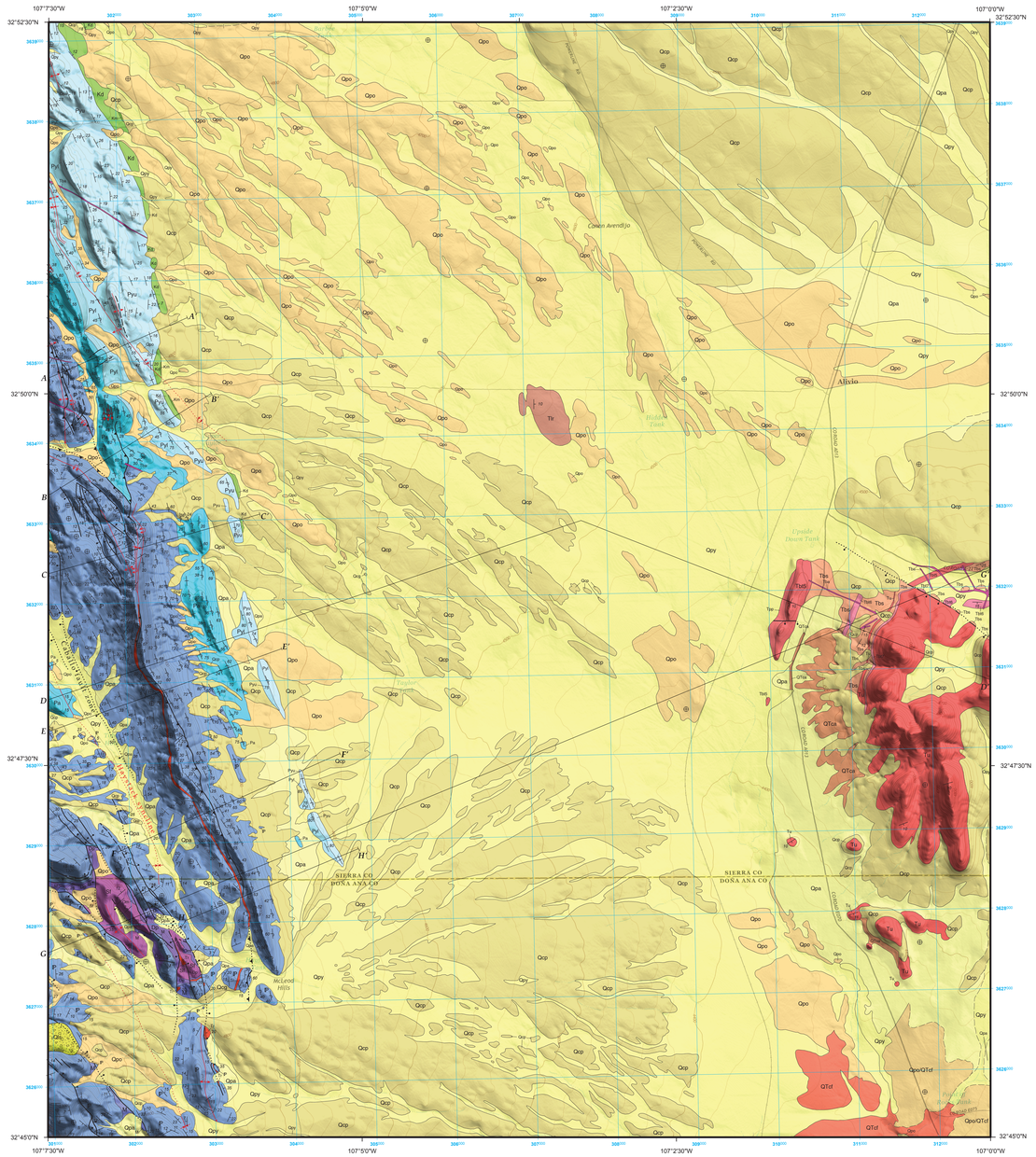

Base map from U.S. Geological Survey 1970, from photographs taken 1965, field checked in 1970, edited in 1993.
1927 North American datum, UTM projection — zone 13N
1000-meter Universal Transverse Mercator grid, zone 13, shown in blue

QUADRANGLE LOCATION

1:24,000

1 0.5 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0.5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

New Mexico Bureau of Geology and Mineral Resources
Open-file Geologic Map 204

New Mexico Bureau of Geology and Mineral Resources
New Mexico Tech
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Socorro, New Mexico
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This and other STATEMAP quadrangles are available for free download in both PDF and ArcGIS formats at:

http://geoinfo.nmt.edu

Geologic Map of the Alivio 7.5-Minute Quadrangle, Sierra and Doña Ana Counties, New Mexico.

May 1995

by
William R. Seager

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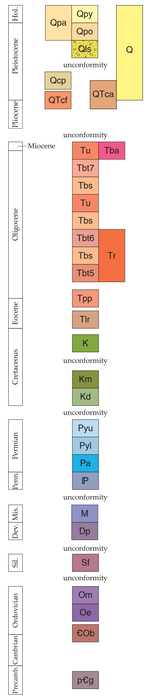
Correlation Diagram



Map Symbols

- Geologic contact—solid where exposed or known, dashed where approximately known.
- Normal fault—bar-and-ball on downthrown side. Solid where exposed, dashed were approximately known, dotted where concealed.
- Strike-slip fault, right-lateral offset.
- Thrust fault—sawteeth on upper plate.
- Anticline—solid where exposed, dashed where approximately known, dotted where concealed.
- Syncline—solid where exposed, dashed where approximately known, dotted where concealed.
- Overturned anticline
- Overturned syncline
- Inclined fold hinge of small, anticline—showing bearing and plunge
- Inclined fold hinge of small, syncline—showing bearing and plunge
- Strike and dip of overturned bedding
- Strike and dip of vertical bedding
- Strike and dip of bedding
- Horizontal bedding
- A A' Location of geologic cross sections

COMMENTS TO MAP USERS

A geologic map displays information on the distribution, nature, orientation, and age relationships of rock and deposits and the occurrence of structural features. Geologic and fault contacts are irregular surfaces that form boundaries between different types or ages of units. Data depicted on this geologic quadrangle map may be based on any of the following: reconnaissance field geologic mapping, compilation of published and unpublished work, and photogeologic interpretation. Locations of contacts are not surveyed, but are plotted by interpretation of the position of a given contact onto a topographic base map; therefore, the accuracy of contact locations depends on the scale of mapping and the interpretation of the geologist(s). Any enlargement of this map could cause misunderstanding in the detail of mapping and may result in erroneous interpretations. Site-specific conditions should be verified by detailed surface mapping or subsurface exploration. Topographic and cultural changes associated with recent development may not be shown.

Cross sections are constructed based upon the interpretations of the author made from geologic mapping, and available geophysical, and subsurface (drillhole) data. Cross-sections should be used as an aid to understanding the general geologic framework of the map area, and not be the sole source of information for use in locating or designing wells, buildings, roads, or other man-made structures.

The map has not been reviewed according to New Mexico Bureau of Geology and Mineral Resources standards. The contents of the report and map should not be considered final and complete until reviewed and published by the New Mexico Bureau of Geology and Mineral Resources. 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 State of New Mexico, or the U.S. Government.

Map Unit Descriptions

Quaternary

Quaternary sediments—Cross-section only.

Younger piedmont-slope alluvium—Gravel, sand, and silt of shallow drainageways cut below older fans, as well as sand, silt, and clay of alluvial fans at the mouths of such drainageways that are graded to the Jornada del Muerto basin floor, as much 20ft (6m) thick.

Older piedmont-slope alluvium—Gravel to loamy fan deposits, piedmont-valley fills, and erosion-surface veneers, associated with surfaces graded to the basin floor of the Jornada del Muerto, uppermost beds commonly contain stage II or III pedogenic carbonate, as much 30ft (9m) thick.

Landslide debris—Debris slide consisting of unconsolidated, chaotic blocks of limestone overlying, and derived from, dip slopes of Pennsylvanian strata; blocks range from pebble-size to more than 20ft (6m) in length.

Younger (**Qpy**) and older (**Qpo**) piedmont-slope alluvium.

Camp Rice Formation, upper piedmont-slope deposits—Boulder to pebble gravel with zones of stage IV pedogenic carbonate in the upper part; distal parts of deposits contain more gravelly sand as well as silt and clay; at least 20ft (6m) thick.

Camp Rice Formation, fluvial facies—Gray, calcareous sandstone and pebbly sandstone and red to green claystone and shale that represent fluvial-channel and overbank environments of deposition, at least 20ft (6m) thick.

Camp Rice Formation, alluvial-flat facies—Red siltstone and mudstone deposited on alluvial flats.

Undifferentiated Camp Rice and younger deposits—shown only in cross sections.

Tertiary

Uvas Basaltic Andesite—Flows of vesicular, dark-gray to dark-brown basaltic andesite interbedded with minor cinder deposits, at least 500ft (152m) thick.

Dikes—Altered basaltic-andesite dikes. 3.4 to 10ft (1 to 3m) thick.

Dike—Cream-colored, aphyric-rhyolite dike.

Bell Top Formation, ash-flow tuff 7—Gray, fine-grained, vitric ash-flow tuff, approximately 9ft (3m) thick.

Bell Top Formation, conglomerate and sandstone member—White, thin-bedded, volcaniclastic sandston, interbedded, brown, boulder conglomerate, and conglomeritic sandstone. Clasts include reworked Palm Park detritus as well as Kneeling Nun Tuff, flow-banded rhyolite, and Precambrian granite, unit contains ash-flow tuff 6 near the middle and an Uvas Basaltic Andesite flow near the top, approximately 401ft (122.2m) thick.

Bell Top Formation, ash-flow tuff 6—Gray to pink, moderately- to densely-welded, crystal-rich, ash-flow tuff interbedded with **Tbc**, approximately 45ft (13.5m) thick.

Bell Top Formation, ash-flow tuff 5—Light-gray, moderately-welded, crystal-rich, ash-flow tuff containing conspicuous white pumice lumps and dipyramidal quartz. Approximately 70ft (21m) thick.

Palm Park Formation—Only upper few feet of gray, volcanic mudstone and white, tuffaceous sandstone exposed in Alivio quadrangle, may be approximately 1,800ft (550m) thick in subsurface.

Love Ranch Formation—Only a few tens of feet (20m) exposed in Alivio quadrangle, consists of red, arkosic sandstone and conglomeritic sandstone, clasts include all Paleozoic formations as well as Precambrian granite, may be approximately 2,000-2,500ft (610-762m) thick in subsurface.

Cretaceous

Gallup Sandstone, D-Cross Tongue of Mancos Shale, and Crevasse Canyon Formation—Not exposed but presumably present in subsurface, probably fluvial and marine sandstone and shale as much as 1,000ft (305m) thick; shown only in cross sections.

Mancos Shale and Tres Hermanos Formation—Only lower few feet (few meters) of Mancos shale exposed in Alivio quadrangle. In the subsurface, **Km** probably consists of marine shale and siltstone with interbedded-fluvial, beach, and near-shore sandstone bodies. May be approximately 740ft (225m) thick.

Dakota Sandstone—Upper, massive, crossbedded marine sandstone overlies lower, crossbedded fluvial sandstone, approximately 95ft (29m) thick.

Permian

Upper Yeso Formation—Upper sandstone-limestone member consists of 330ft (100m) of interbedded, gray limestone, yellow dolomite, and red to yellow sandstone with local gypsum lenses, lower limestone member is 80ft (24m) of medium bedded, fossiliferous, gray limestone.

Lower Yeso Formation—Upper red siltstone-dolomite member consists of 640ft (195m) of interbedded limestone, dolomite, red beds, and massive gypsum, basal Meseta Blanca Member consists of 250ft (76m) of thin-bedded, orange to brick-red sandstone and siltstone.

Abo Formation—Red fluvial sandstone and siltstone interbedded with grayish-red to red overbank shale and claystone, approximately 1,150ft (350m) thick.

Pennsylvanian

Magdalena Group—Upper Bar B Formation, approximately 1,345ft (410m) thick is 65-70% shale but also includes thin limestone beds as well as limestone-pebble conglomerate and red beds in upper 330ft (100m), medial Nakaye Formation includes at least 765ft (233m) of thick-bedded, burrowed, fossiliferous, cherty limestone and interbedded shale, basal Red House Formation consists of interbedded shale, sandstone, and thin- to medium-bedded marine limestone approximately 109ft (33m) thick, white to gray chert breccia is locally present at the base.

Mississippian

Lake Valley Formation—Upper Tierra Blanca Member is medium-bedded limestone and white chert as much as 25ft (8m) thick, but thickness varies because of pre-Magdalena erosion, Nunn Member is 28ft (8.5m) of soft, fossiliferous limestone and calcareous shale, followed downward by 30ft (9m) of cliff-forming, cherty limestone of the Alamogordo Member; basal Andrecito Member is thin-bedded limestone and interbedded shale, approximately 3ft (1m) thick.

Devonian

Percha Shale—Greenish-gray to black micaceous shale in the lower part grading upward to 30ft (9m) of brown siltstone at top, a single bed of crossbedded oolitic limestone also is present in upper half of the formation, approximately 236ft (72m) thick.

Silurian

Fusselman Dolomite—Brown, cherty dolomite in thick to medium beds, approximately 100ft (30m) thick.

Ordovician

Montoya Formation—Only upper 50ft (15m) of upper Cutter Member exposed, which consists of light-gray, medium-bedded dolomite, formation is probably approximately 400ft (122m) thick, mostly dolomite.

El Paso Formation—Not exposed in Alivio quadrangle, probably is near 500ft (152m) thick in subsurface and consists of limestone and dolomite; shown only in cross sections.

Cambrian and Ordovician

Bliss Formation—Not exposed in Alivio quadrangle, probably is near 115ft (35m) thick in subsurface and consists of black to dark-brown, hematitic sandstone and shale and gray quartzite, shown only in cross sections.

Precambrian

Granite—Not exposed in Alivio quadrangle, probably red, coarse-grained granite as in adjacent McLeod Tank quadrangle; shown only in cross sections.