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OIL AND GAS INVESTIGATIONS
MAP OM 190

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PRELIMINARY GEOLOGIC MAP OF WESTERN SAN JUAN BASIN, SAN JUAN AND McKINLEY COUNTIES, NEW MEXICO

By
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Scale 1:125 000
1 0 1 2 3 4 5 6 7 8 9 10 Miles

1957

Base compiled from aerial photographs and mosaics and from existing maps.

APPROXIMATE MEAN DECLINATION, 1957

EXPLANATION

SEDIMENTARY ROCKS

Qal — Alluvium
Unconsolidated deposits of valley fill.

Qls — Landslide debris
Unconsolidated surficial deposits consisting mainly of Chuska sandstone.

Qtg — Terrace gravel
Veneer of unconsolidated gravel and sand deposited on stream-cut terrace surfaces.

Qpg — Pediment gravel
Veneer of unconsolidated gravel and boulder debris deposited on pediment surfaces.

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Tc — Chuska sandstone
Gray to grayish-white, massive, and crossbedded sandstone with some interbedded siltstone and shale.

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Tn — Nacimiento formation
Gray and brown shale and tan medium-grained sandstone.

Koa — Ojo Alamo sandstone
Tan, fine- to coarse-grained, conglomeratic sandstone.

Kku, Kkf, Kkl — Kirtland shale
Consists of upper greenish-gray shale member (Kku), tan fine- to medium-grained Farmington sandstone member (Kkf), and a lower greenish-gray shale member (Kkl). The McDermott member of the Animas formation, which consists of purple and greenish shale, moderate yellow sandstone, and conglomerate, is mapped with the Kirtland shale in the Pifion Mesa area.

Kf — Fruitland formation*
Gray, brown, and black shale; yellowish-brown and tan crossbedded sandstone; and coal.

Kpc — Pictured Cliffs sandstone*
Tan, crossbedded, medium- to massive-bedded fine- to medium-grained sandstone. In small area approximately 8 miles east of Newcomb this unit and the Cliff House sandstone are mapped as a unit owing to the absence of the Lewis shale.

Kl — Lewis shale*
Light- to dark-gray shale, beds of concretionary limestone, and interbedded thin platy sandstone. Sandstone is commoner in the upper and lower transitional zones.

Kch — Cliff House sandstone*
Tan and gray crossbedded fine- to medium-grained sandstone with varying amounts of interbedded gray shale.

Kmf, Kmc — Menefee formation*
Alternating beds of tan and brown sandstone; gray and brown claystone and shale; coal; and scattered layers of ironstone and limestone concretions. Includes in the lower part the Cleary coal member (Kmc) formerly included by the U. S. Geological Survey as the upper part of the Gibson coal member. In the Chuska Mountains from Toadlena southward the Menefee formation includes equivalents of rocks probably as young as Kirtland shale. In the vicinity of Tohatchi the Tohatchi formation is mapped with the Menefee.

Kpl, Kh — Point Lookout sandstone*
Tan and brown sandstone with lesser amounts of gray shale. Includes the Hosta sandstone and upper tongue of Hosta sandstone of former U. S. Geological Survey usage. In the southern part of the area the Hosta tongue (Kh), formerly lower Hosta tongue, is separated from the main body of the Point Lookout by the Satan tongue (Kms) of the Mancos shale.

Kmcg, Kcg, Kcb, Kcda, Kcbd, Kcd — Crevasse Canyon formation*
Alternating beds of tan irregularly bedded and lenticular sandstone, drab shale and claystone, and coal. Where the Crevasse Canyon is present it underlies the Point Lookout sandstone or the Hosta tongue of the Point Lookout sandstone and overlies the Gallup sandstone. The Crevasse Canyon includes at the top the Gibson coal member (Kcg), which is equivalent to the lower part of the Gibson coal member of former U. S. Geological Survey usage, the Bartlett barren member (Kcb), the Dalton sandstone member (Kcda), and the Dilco coal member (Kcd). South of the termination of the Point Lookout sandstone the Gibson coal member of the Crevasse Canyon formation and the Cleary coal member (Kmc) of the Menefee formation merge to form an undifferentiated unit (Kmcg) which is mapped for convenience with the Crevasse Canyon formation. Along the Arizona State line in the Manuelito-Window Rock coal-mine area the Bartlett barren member and the Dilco coal member are mapped together as an undifferentiated unit (Kcbd).

Kg — Gallup sandstone*
Tan, brown, and pinkish-gray thin- to massive-bedded sandstone with lesser amounts of brown carbonaceous shale; gray shale; and lenses of coal. The Gallup underlies the Crevasse Canyon formation in the southern part of the area and separates the upper and lower parts of the Mancos shale in the northern part. Along the southern part of Mesa de los Lobos the Dilco coal member of the Crevasse Canyon formation is mapped with the Gallup sandstone.

Kms, Kmm, Kmu, Kml — Mancos shale*
Predominantly light- to dark-gray shale with lesser amounts of tan fine-grained sandstone and siltstone, bedded limestone, and concretionary limestone. South of the San Juan River the Mancos shale (Km) is divided into upper (Kmu) and lower (Kml) parts by the Gallup sandstone of the Mesaverde group. The upper part intertongues southward with other units of the Mesaverde to form the Satan tongue (Kms) and the Mulatto tongue (Kmm). In the southern part of the area only the lower part of the Mancos is present.

Kd — Dakota sandstone
Tan, brown, and gray sandstone; conglomeratic sandstone; and conglomerate; frequently contains partings of brown carbonaceous shale and lenses of coal.

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Jmb, Jmw, Jmu, Jmr, Jms — Morrison formation
Consists of the Brushy Basin member (Jmb)—green, purple, and gray shale and siltstone; gray and tan sandstone and conglomeratic sandstone (may locally contain equivalents of the Burro Canyon formation); the Westwater Canyon member (Jmw)—yellowish-gray sandstone with conglomeratic lenses, and dark reddish-brown siltstone and shale; the Recapture member (Jmr)—white and brown fine- to medium-grained sandstone, siltstone, and conglomerate; and the Salt Wash member (Jms)—white and moderate orange very fine grained to medium-grained sandstone, grayish-red shale, and gray limestone. In some areas the Morrison formation (Jm) is undifferentiated; in other areas it is divided into an upper part (Jmu) and a lower part mapped with the Cow Springs sandstone (Jcs).

Jcs, Jz — Cow Springs and Zuni sandstones
Greenish-gray to light yellowish-gray, fine- to medium-grained crossbedded sandstone, which intertongues with members of the Morrison formation and grades into upper units of the San Rafael group. Cow Springs sandstone (Jcs) in the Defiance Uplift; Zuni sandstone (Jz) in the Zuni Uplift.

Js — Summerville formation
Moderate reddish-brown, fine- to medium-grained sandstone and argillaceous siltstone. Northwest of Beautiful Mountain includes the Bluff sandstone, a gray to brown medium- to coarse-grained sandstone.

Jt — Todilto formation
Gray thin-bedded limestone and reddish-brown sandy shale and siltstone.

Jeu, Jel — Entrada sandstone
Reddish-brown fine-grained sandstone and siltstone; upper sandy member (Jeu) and lower silty member (Jel). In some areas the Entrada sandstone (Je) is not differentiated.

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Twl, Twr — Wingate sandstone
Divided into the Lukachukai member (Twl) which is a reddish-brown fine-grained crossbedded sandstone, and the Rock Point member (Twr) which is a reddish-brown siltstone that grades southward into mudstone.

Tco, Tcpu, Tcp, Tcpl, Tcl, Tcs — Chinle formation
Divided into the Owl Rock member (Tco) which consists of interbedded limestone and shale, the Petrified Forest member (Tcp) which consists of claystone and minor amounts of siltstone and sandstone and which is split to the east into upper (Tcpu) and lower (Tcpl) parts by the Sonsela sandstone bed (Tcps), a lower member (Tcl) which consists of siltstone, sandstone, and lime-pellet conglomerate, and the Shinarump member (Tcs) which consists of moderate orange and yellowish-gray sandstone, siltstone, conglomerate, and shale.

UNCONFORMITY

ZUNI MOUNTAINS AREA — CHUSKA MOUNTAINS AREA

Trm — Moenkopi formation
Reddish-brown sandy shale and siltstone.

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Psal — Upper limestone member of the San Andres formation
Grayish orange pink to light-brown limestone.

Pcd — De Chelly sandstone member of the Cutler formation
Reddish-orange and pale-orange sandstone.

IGNEOUS ROCKS

Ti — Intrusive rocks
Dikes consisting mainly of minette or monchiquite; and necks of tuff-breccia, minette, or monchiquite with fragments of sedimentary and plutonic rocks.

WASHINGTON PASS VOLCANIC FIELD

Tb — Basalt

Tb2 — Late basalt

Twt — Welded tuff

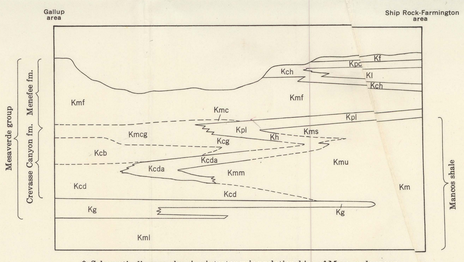
Tb1 — Early basalt

Tv — Stratified tuffaceous conglomerate and lithic tuff

Te — Extrusive rocks
Flows consisting mainly of trachybasalt, and ejecta consisting mainly of lapilli tuff.

Tbr — Brecciated sedimentary rocks related to volcanic rocks

Gallup area — Ship Rock-Farmington area



* Schematic diagram showing intertonguing relationships of Mesaverde group equivalent formations, and the Mancos shale.

MAP SYMBOLS

Contact
Dashed where gradational or arbitrary; dotted where concealed.

Fault
Dashed where inferred; dotted where concealed. U, upthrown side; D, downthrown side.

Anticlinal axis, showing plunge
Dashed where inferred; dotted where concealed.

Synclinal axis, showing plunge
Dashed where inferred; dotted where concealed.

Monoclinal axis
Dashed where inferred; dotted where concealed.

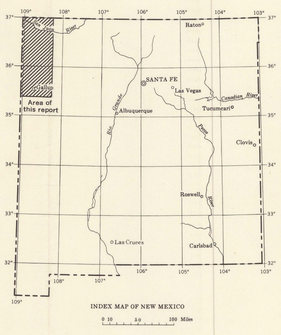
Strike and dip of beds

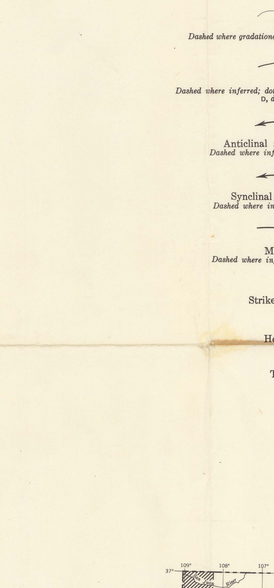
Horizontal beds

TP — Trading post

DS — Day school

LO — Fire lookout





INDEX MAP OF WESTERN SAN JUAN BASIN SHOWING SOURCES OF GEOLOGIC DATA

5 0 5 10 15 Miles

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