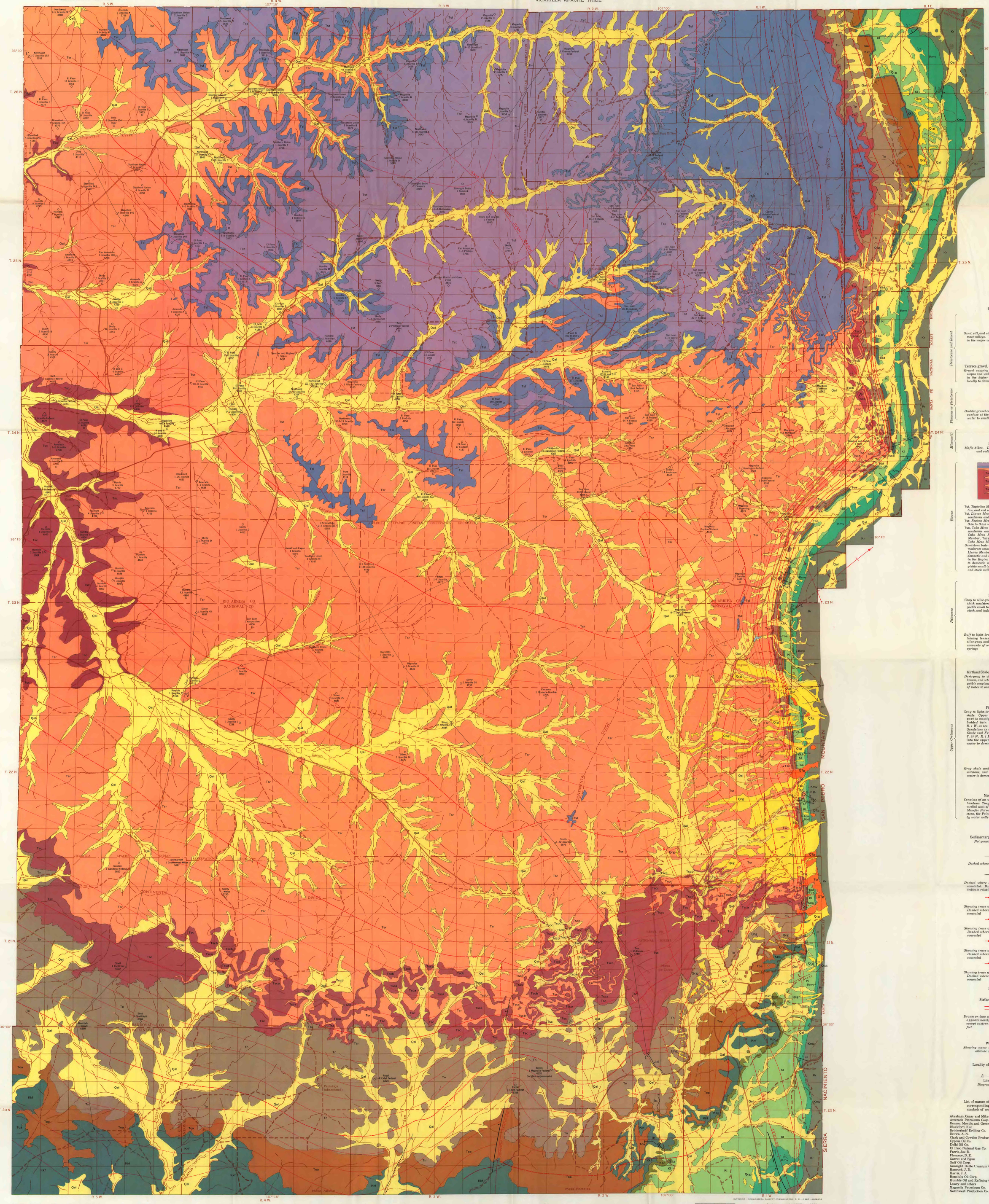
PREPARED IN COOPERATION WITH THE
JICARILLA APACHE TRIBE



EXPLANATION

Qal — Alluvium
Sand, silt, and clay containing some gravel. Present in most valleys. Yields water to domestic and stock wells in the major valleys

UNCONFORMITY

Qcg — Terrace gravel, colluvium, and stream-channel gravel
Gravel capping terraces; local colluvial deposits on slopes and walls of valleys; sand, silt, clay, and gravel in the higher parts of some valleys. Yield water locally to domestic and stock wells and to springs

Pleistocene and Recent — QUATERNARY

UNCONFORMITY

QTg — High-terrace gravel
Boulder gravel capping remnants of the highest erosional surface at the foot of San Pedro Mountain. Yields water to small seeps at one locality

Pliocene or Pleistocene — TERTIARY OR QUATERNARY

UNCONFORMITY

Ti — Intrusive igneous rocks
Mafic dikes. Locally contain agglomerate of igneous and sedimentary rocks. Yield no water

Miocene(?)

UNCONFORMITY

Tst, Tsl, Tsr, Tsc, Tscb, Tsca — San Jose Formation
Tst, *Tapicitos Member, red shale and interbedded white, tan, and red sandstone*
Tsl, *Llaves Member, massive red to buff conglomeratic sandstone and interbedded sandy shale*
Tsr, *Regina Member, variegated shale and interbedded thin to thick white to tan sandstone*
Tsc, *Cuba Mesa Member, thick buff to tan conglomeratic sandstone and some interbedded shale. Where the Cuba Mesa Member intertongues with the Regina Member, Tsca, Tscb, and Tscc are tongues of the Cuba Mesa Member*
Sandstone beds in the Tapicitos Member yield small to moderate amounts of water to domestic and stock wells. Llaves Member yields moderate amounts of water to domestic and stock wells and springs. Sandstone beds in the Regina Member yield small amounts of water to domestic and stock wells. Cuba Mesa Member yields small to moderate amounts of water to domestic and stock wells and springs

Eocene — TERTIARY

UNCONFORMITY

Tn — Nacimiento Formation
Gray to olive-gray shale containing interbedded thin to thick sandstone and conglomeratic sandstone. Locally yields small to moderate amounts of water to domestic, stock, and industrial wells

Toa — Ojo Alamo Sandstone
Buff to light-brown thick crossbedded sandstone containing lenses of conglomerate and thin lenses of olive-gray and gray shale. Yields moderate to large amounts of water to domestic and stock wells and springs

Paleocene

UNCONFORMITY

Kkf — Kirtland Shale and Fruitland Formation undivided
Dark-gray to olive-gray shale and interbedded buff, brown, and white sandstone. Contains local lenses of pebble conglomerate and coal. Yields a small amount of water to one well

Kpc — Pictured Cliffs Sandstone
Gray to light-brown sandstone and interbedded gray shale. Upper part is mostly soft sandstone. Lower part is mostly sandy silty shale containing interbedded thin sandstone. From sec. 33, T. 21 N., R. 1 W., to sec. 4, T. 20 N., R. 1 E., the Pictured Cliffs Sandstone is mapped with the undivided Kirtland Shale and Fruitland Formation. North of sec. 4, T. 23 N., R. 1 E., the Pictured Cliffs grades laterally into the upper part of the Lewis Shale. Yields no water to domestic or stock wells in this area

Kl — Lewis Shale
Gray shale containing a few thin beds of sandstone, siltstone, and concretionary limestone. Yields no water to domestic or stock wells in this area

Kmv — Mesaverde Group undivided
Consists of an upper unit of thick sandstone, the La Ventana Tongue of the Cliff House Sandstone; a medial unit of coal-bearing shale and sandstone, the Menefee Formation; and a lower unit of thick sandstone, the Point Lookout Sandstone. Not penetrated by water wells in this area

Upper Cretaceous — CRETACEOUS

Kr — Sedimentary, igneous, and metamorphic rocks
Not penetrated by water wells in this area

CRETACEOUS AND OLDER

Contact
Dashed where approximately located; dotted where inferred

Fault
Dashed where approximately located; dotted where concealed. Bar and ball on downthrown side; arrows indicate relative horizontal displacement

Anticline
Showing trace of axial plane and direction of plunge. Dashed where approximately located; dotted where concealed

Syncline
Showing trace of axial plane and direction of plunge. Dashed where approximately located; dotted where concealed

Anticlinal bend
Showing trace of axial plane and direction of plunge. Dashed where approximately located; dotted where concealed

Synclinal bend
Showing trace of axial plane and direction of plunge. Dashed where approximately located; dotted where concealed

Strike and dip of beds

Strike and dip of overturned beds

Structure contours
Drawn on base of Ojo Alamo Sandstone. Dashed where approximately located. Contour interval 100 feet except eastern margin of area where interval is 500 feet

Well drilled for oil or gas
Showing name of company, number and lease, and altitude at base of Ojo Alamo Sandstone

Locality of measured stratigraphic section
Shown on plate 4

Line of correlation diagram
Diagrams shown on plates 2, 3, and 4

List of names of companies and independent drillers corresponding to abbreviated names shown with symbols of wells drilled for oil or gas

Abraham, Oscar and Mike
Amerada Petroleum Corp.
Benson, Montin, and Greer
Blackford, Ken
Brinkerhoff Drilling Co.
Brown, A. N.
Clark and Cowden Production Co.
Cyprus Oil Co.
Delhi Oil Co.
El Paso Natural Gas Co.
Farris, Joe D.
Florance, D. E.
Garret and Egan
Gulf Oil Corp.
Gunsight Butte Uranium Corp.
Hancock, J. D.
Harris, J. J.
Honolulu Oil Corp.
Humble Oil and Refining Co.
Lowry and others
Magnolia Petroleum Co.
Northwest Production Co.
Ohio Oil Co.
Pan American Petroleum Corp.
Pure Oil Co.
R. and G. Drilling Co.
Reading and Bates, Inc.
Reynolds Mining Corp.
Royal Development, Inc.
San Juan Gas Corp.
Shell Oil Co.
Silver, Caswell
Sinclair Oil and Gas Co.
Skelly Oil Co.
Smith, Lloyd, Inc.
Southern Union Gas Co.
Spurrier and Bigbee
Stanolind Oil and Gas Co.
Sun Oil Co.
Superior Oil Co.
Turner, Fred, Jr.
U.S. Smelting, Refining, and Mining Co.

Base map adapted from U.S. Geological Survey topographic quadrangles, New Mexico State Highway Commission Planning Survey quadrangles, and Resources Map of the Jicarilla Indian Reservation (1957)

APPROXIMATE MEAN DECLINATION, 1967

GEOLOGIC MAP OF THE SOUTHERN PART OF THE JICARILLA APACHE INDIAN RESERVATION AND ADJACENT AREAS, NEW MEXICO

SCALE 1:63 360

1 ½ 0 1 2 3 4 5 MILES

1 .5 0 1 2 3 4 5 KILOMETERS

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

SECTIONIZED TOWNSHIP

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1967—W66138

Geology mapped in 1959 and 1960 by
E. H. Baltz assisted by S. R. Ash