Preliminary geologic map of the Albuquerque 1^{o} x 2^{o} quadrangle northwestern New Mexico

Compiled by

D. J. Wyant and Annabelle Olson

Open-File Report

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SURFICIAL DEPOSITS

Qal ALLUVIAL DEPOSITS (QUATERNARY)--Locally includes some terrace gravels, eolian sand, and colluvium

Qc COLLUVIUM (QUATERNARY)--Includes talus, rockfall, and landslide debris

Qes EOLIAN SAND (QUATERNARY)

Ql LAKE DEPOSITS (QUATERNARY)--Even-bedded clay, silt, and sand

Qps PIEDMONT SLOPE DEPOSITS (QUATERNARY)--Alluvial fan and pediment deposits; locally includes some eolian sand and tributary alluvium

Qtg TERRACE GRAVELS (QUATERNARY)--Inset stream deposits adjacent to major flood plains, some colluvium, and some small outcrops of undivided Sante Fe Group

GENERAL VOLCANIC SEQUENCE

Qb BASALT (QUATERNARY)--Includes associated mafic rocks; age less than 1.8 m.y. (million years)

Qrv VALLES RHYOLITE OF TEWA GROUP (PLEISTOCENE)--Flows, pyroclastics, and resurgent volcanic domes within Valles caldera. Includes the Banco Bonito (top), El Cajete, Battleship Rock, Valle Grande, Redondo Creek and Deer Canyon (base) Members

Qrc CERRO TOLEDO RHYOLITE OF TEWA GROUP (PLEISTOCENE)--Volcanic domes, tuffs, and associated sediments

Qbt BANDELIER TUFF OF TEWA GROUP (PLEISTOCENE)--Includes the Tshirege and Otowi Members; rhyolite ash-flow tuffs and some air-fall pumice

Tts TSCHICOMA FORMATION OF POLVADERA GROUP (PLIOCENE)--Light-gray to gray latite and quartz latite flows and volcanic domes

Tb BASALT (PLIOCENE AND MIOCENE)--Includes associated mafic rocks; generally of 1.8-26 m.y. old

Ti INTRUSIVES (PLIOCENE AND MIOCENE)--Stocks, dikes, and plutons

Tk KERES GROUP (PLIOCENE)--Basaltic, andesitic, dacitic, and rhyolitic volcanic rocks in the southern Jemez Mountains that interfinger with volcanic gravels of the upper part of the Cochiti Formation. The Keres Group includes the Bearhead Rhyolite, Paliza Canyon Formation, Canovas Canyon Rhyolite, and basalt of Chamisa Mesa. Aggregate thickness about 1,800 m. Map unit also includes some older Tertiary volcanic and intrusive rocks in Bland Canyon area

Tp PORPHYRITIC ANDESITE OF MOUNT TAYLOR STRATO-VOLCANO (PLIOCENE AND MIOCENE)--Thick, jointed flows

Trl RHYOLITE, TRACHYTE AND LATITE OF MOUNT TAYLOR STRATO-VOLCANO (PLIOCENE AND MIOCENE)--Light-gray tuffs as thick as 150 m; plugs and domes; gray flows aggregating as much as 300 m thick. Rhyolite at East Grants Ridge has been K-Ar dated 3.3±0.3 m.y. (Bassett and others, 1963)

Tm MONZONITE PORPHYRY (OLIGOCENE? AND EOCENE?)--Stocks, laccoliths, sills, dikes, and plutons of the igneous centers of

San Pedro Mountain, South Mountain, and the Ortiz Mountains

Te ESPINASO VOLCANICS OF STEARNS, 1953 (OLIGOCENE)--Light-gray volcanic ash containing latite flows and breccias. Thickness 120-450 m

SEDIMENTARY ROCKS

QTsf SANTA FE GROUP UNDIVIDED (PLEISTOCENE, PLIOCENE, AND MIOCENE)--Pale-red, gray, and brown poorly consolidated clay, siltstone, sandstone, and conglomerate. Deposited generally in basins along the Rio Grande depression; may include some inset deposits of ancestral Rio Grande. Map unit includes Zia Sand north of Jemez Creek. In the Albuquerque area the youngest beds of the Santa Fe Group form the Llano de Albuquerque, a constructional geomorphic surface. This surface is shown by a stipple pattern and is characterized by a thick relict calcic soil (caliche) of about 0.5 m.y. age (Hawley and others, 1976). Where QTsf deposits are overlain, the unit is shown in parenthesis

Ta Ancha Formation (Pliocene)--Pale-red to pale-yellow poorly consolidated silt, arkosic sand, and gravel. Locally contains some acidic volcanic ash. Thickness 0-100 m

Tp Puye Formation (Pliocene)--Interbedded conglomerate, lahar breccia, well-sorted river gravel, and some lake beds. Breccia is largely volcanic detritus derived from Pliocene Tschicoma Formation. Thickness 70-220 m

Tt Tesuque Formation (Pliocene and Miocene)--Pink, orange, and reddish-brown siltstone, crossbedded arkosic sandstone, and gravel. Clasts angular, generally derived from Precambrian crystalline rocks. Maximum thickness more than 1,200 m

Tc COCHITI FORMATION (PLIOCENE AND MIOCENE)--Volcanic to arkosic sand and gravel. Composed largely of volcanic debris near Santo Domingo and Cochiti Pueblos. Southward, near Santa Ana Pueblo, the formation is reddish colored and dominantly arkosic. Interfingers with volcanic flows of the Pliocene Keres Group. Maximum thickness at least 450 m

Tab ABIQUIU TUFF OF SMITH, 1938 (TERTIARY)--Thin-bedded, light-gray tuffaceous sand and conglomerate. Includes some white to light-gray beds of chert; locally contains conglomerate derived from Precambrian crystalline rocks. Maximum thickness about 430 m

Tz ZIA SAND (MIOCENE)--Light-gray to pinkish-colored, poorly consolidated, well-sorted sand. Well exposed along Jemez Creek. Maximum thickness about 600 m

Tg GALISTEO FORMATION (OLIGOCENE? AND EOCENE)--Gray, yellowish-brown, moderate reddish-brown and pink shale, arkosic sandstone, and conglomerate. Thickness more than 1,000 m near Cerillos

Tsj SAN JOSE FORMATION (EOCENE)--Upper part is variegated gray and pale reddish-brown shale and friable pale-brown sandstone (Regina Member); lower part is yellowish-brown crossbedded conglomeratic sandstone (Cuba Mesa Member). Thickness 90 m in map area

Tn NACIMENTO FORMATION (PALEOCENE)--Thin-bedded light- and dark-gray claystone and siltstone; in places variegated or mottled dusky red, olive gray, brown, and light gray. Some yellowish-gray lenticular beds of clayey sandstone. Thickness about 250 m

Toa OJO ALAMO SANDSTONE (PALEOCENE)--Brown to pale yellowish-gray fine- to coarse-grained conglomeratic sandstone. Silicified wood abundant. Interfingers with overlying Nacimiento Formation. Thickness 15 to about 50 m

Kk KIRTLAND SHALE (UPPER CRETACEOUS)--Gray to olive carbonaceous shale; thin interbeds of brown to olive sandstone. Contains white to gray silicified wood. Thickness about 35-150 m

Kf FRUITLAND FORMATION (UPPER CRETACEOUS)--Pale-gray silty sandstone, gray to brown carbonaceous shale, and coal. Thickness less than 60 m

Kpc PICTURED CLIFFS SANDSTONE (UPPER CRETACEOUS)--Yellowish-brown to yellowish-gray crossbedded marine sandstone containing brown-weathering lenses and concretions and gray shale. Thickness about 15-70 m

Kl LEWIS SHALE (UPPER CRETACEOUS)--Light- to dark-gray shale containing local yellowish-brown sandstone lenses. Calcareous siltstone concretions abundant; marine fossils sparse. Thickness 25-460 m

Kch CLIFF HOUSE SANDSTONE OF MESAVERDE GROUP (UPPER CRETACEOUS)--Gray and light-brown fine- to medium-grained marine sandstone containing interbeds of gray to brown shale, carbonaceous shale, and coal. Thickness 0-185 m

Kcl La Ventana Tongue of Cliff House Sandstone--Sandstone, carbonaceous shale, and coal in upper part; light-gray to light-brown thick-bedded cliff-forming marine sandstone in lower part. Grades laterally southwestward into Menefee Formation; lenses northeastward into Lewis Shale. Thickness 0-275 m

Kmf MENEFEE FORMATION OF MESAVERDE GROUP (UPPER CRETACEOUS)--Dark-gray to brown claystone, white to dark-brown sandstone, and subbituminous coal. Includes the Allison Member and the Cleary Coal Member at base. The Allison interfingers with the La Ventana Tongue of the Cliff House Sandstone toward the east. Thickness 125-770 m

Kph HOSTA TONGUE OF POINT LOOKOUT SANDSTONE OF MESAVERDE GROUP (UPPER CRETACEOUS)--Very pale orange to light-gray cliff-forming sandstone. Separated from main body of Point Lookout Sandstone by Satan Tongue of Mancos Shale. Thickness 15-30 m

Kms SATAN TONGUE OF MANCOS SHALE (UPPER CRETACEOUS)--Dark-gray shale containing interbeds of brownish-gray siltstone and pale yellowish-brown sandstone. The Satan Tongue separates the Hosta Tongue of the Point Lookout Sandstone from the main body of the Point Lookout. Thickness 0-215 m

Kp POINT LOOKOUT SANDSTONE OF MESAVERDE GROUP (UPPER CRETACEOUS)--Pale-orange to light-gray cliff-forming sandstone. Thickness 15-65 m

Kcc CREVASSE CANYON FORMATION OF MESAVERDE GROUP (UPPER CRETACEOUS)--Includes the Gibson Coal, Bartlett Barren, Dalton Sandstone, and Dilco Coal Members. The Mulatto Tongue of the Mancos Shale interfingers between the Dalton and Dilco Members. Thickness about 425 m

Kmm MULATTO TONGUE OF MANCOS SHALE (UPPER CRETACEOUS)--Yellowish-gray to yellowish-brown sandy marine shale. Thickness a wedge edge to about 180 m

Kg GALLUP SANDSTONE OF MESAVERDE GROUP (UPPER CRETACEOUS)--Reddish-brown, very pale orange, and dark yellowish-orange to light-gray crossbedded to even-bedded sandstone. Thickness about 8-50 m

Kmv MESAVERDE GROUP, UNDIVIDED (UPPER CRETACEOUS)

Km MANCOS SHALE, MAIN PART (UPPER CRETACEOUS)--Pale yellowish-brown shale and silty clay. Thin bentonitic beds common near base. In the southern part of the map area two tongues of the upper part of the Mancos Shale (the Satan and Mulatto Tongues) interfinger with the Mesaverde Group. The basal part of the main body includes sandy shales and in the southern part of the map area persistent beds of sandstone that may be tongues of the underlying Dakota Sandstone. Thickness as much as 700 m in the northern part of the map area

Kd DAKOTA SANDSTONE (UPPER CRETACEOUS)--Pale yellowish-brown, grayish-orange, or light-gray ledge-forming sandstone. Locally includes beds of dark-gray carbonaceous shale or coaly shale. Local conglomeratic lenses common. Thickness about 1-30 m

Ku SEDIMENTARY ROCKS, UNDIVIDED (UPPER CRETACEOUS)

Jm MORRISON FORMATION, UNDIVIDED (UPPER JURASSIC)--Variegated greenish-gray, gray, and pale reddish-brown mudstone, claystone, and sandstone. Includes Brushy Basin, Westwater Canyon, and Recapture Members. Thickness about 150 m over much of area; thins towards south and is absent in the southwestern part of the map area

Jmj Jackpile sandstone, an economic unit--White, yellowish-gray, or pale-orange ledge-forming sandstone. Shown only west of San Ysidro. Equivalent to Brushy Basin Member. Contains large uranium deposits near Laguna. Thickness 0-60 m

Jb BLUFF SANDSTONE (MIDDLE JURASSIC)--Yellowish-gray strongly crossbedded fine- to medium-grained well-sorted sandstone.

Thickens to more than 100 m at the south end of the map area and grades into the Zuni Sandstone to the south

Jbs BLUFF SANDSTONE AND SUMMERVILLE FORMATION, UNDIVIDED (MIDDLE JURASSIC)--Bluff Sandstone (Jb) described above

Summerville Formation--Brown and grayish-red to white fine-grained calcreous sandstone interbedded with dusky-red to brown or gray sandy siltstone and claystone. Medium bedded; weathers to notched ledges and cliffs. Thickness about 60 m at south edge of map area; thins towards the north and generally absent east of the Rio Grande

Jste SUMMERVILLE FORMATION, TODILTO FORMATION, ENTRADA SANDSTONE, UNDIVIDED (MIDDLE JURASSIC)

Jte TODILTO FORMATION AND ENTRADA SANDSTONE, UNDIVIDED (MIDDLE JURASSIC)

Todilto Formation--Gray, platy to massive, limestone having overlying or interbedded white gypsum. Thickness a wedge edge to about 50 m

Entrada Sandstone--Pale- or yellowish-gray to moderate reddish-orange sandstone. Locally includes some reddish-brown siltstone. Forms prominent crossbedded ledge or cliff. Thickness about 15-45 m

Ju SEDIMENTARY ROCKS, UNDIVIDED (UPPER AND MIDDLE JURASSIC)

Trc CHINLE FORMATION (UPPER TRIASSIC)--Varicolored red beds, dominantly shale in upper part and sandstone in lower part. Thickness averages about 300-520 m; thins to about 180 m in Sierra Nacimiento

Psg SAN ANDRES LIMESTONE AND GLORIETA SANDSTONE, UNDIVIDED (LOWER PERMIAN)

Psa SAN ANDRES LIMESTONE (LOWER PERMIAN)--Medium-gray fine-grained limestone. Map unit locally includes overlying yellowish-gray to reddish-brown siltstone and shale probably equivalent to Permian Bernal Formation. Thickness of San Andres 0 to about 90 m, thickening toward the south and southeast

Pg GLORIETA SANDSTONE (LOWER PERMIAN)--White, gray, and yellowish-brown well-sorted quartz sandstone. Forms prominent ledges and cliffs. Thickness about 45 m thick over most of map area; absent in northern part of Sierra Nacimiento

Py YESO FORMATION (LOWER PERMIAN)--Medium- to thick-bedded moderate orange-pink, yellow, and white sandstone, siltstone, and platy dense dolomitic limestone. Locally includes some beds of gypsum in upper part. Thickness about 30 to more than 370 m

Pa ABO SANDSTONE (LOWER PERMIAN)--Moderate reddish-brown shale, siltstone, sandstone, and conglomerate containing local greenish-gray lenses. Thickness about 75-300 m

Pu SEDIMENTARY ROCKS, UNDIVIDED (UPPER AND LOWER PERMIAN)

IPmu MADERA GROUP, UPPER PART (UPPER PENNSYLVANIAN)--Dense gray limestone interbedded with gray to reddish-brown shale, arkose, and sandstone. Is the Wild Cow Formation in Sandia and Manzanita Mountains. Thickness a wedge edge to about 250 m

Pml MADERA GROUP, LOWER PART (UPPER AND MIDDLE PENNSYLVANIAN)--Gray massive to thick-bedded cliff-forming cherty limestone containing some thin interbeds of calcareous shale. Is the Middle and Upper Pennsylvanian Los Moyos Limestone in Sandia and Manzanita Mountains. Thickness a wedge edge to about 120 m

Ps SANDIA FORMATION (MIDDLE AND LOWER PENNSYLVANIAN)--Interbedded gray to brown shale, sandstone, and sandy limestone. Locally, in the Sierra Nacimiento and Sandia Mountains, map unit includes the Arroyo Penasco Group of Mississippian age. Thickness a wedge edge to about 60 m

Pm SEDIMENTARY ROCKS, UNDIVIDED (UPPER, MIDDLE AND LOWER PENNSYLVANIAN)

p€ ROCKS OF PRECAMBRIAN AGE, UNDIVIDED--Mostly coarse grained gray to pink granite and granitic gneiss. Precambrian Y, in part, on basis of Rb-Sr dates of about 1,400 m.y. (Wasserberg and others, 1965)

p€m METAMORPHIC ROCKS OF PRECAMBRIAN AGE--Mostly schist, amphibolite, phyllite, and quartzite; minor pegmatities

CONTACT

FAULT--Bar and ball on downthrown side; dotted where concealed

INTRUSIVE DIKE

VOLCANIC VENT

References cited

Bassett, W. A. and others, 1963, Potassium-argon ages of volcanic rocks north of Grants, in Geology and technology of the Grants uranium region: New Mexico Bur. Mines and Mineral Resources Mem. 15, p. 215-216.

Hawley, J. W., Bachman, G. O., and Manley, Kim, 1976, Quaternary stratigraphy in the Basin and Range and Great Plains provinces, New Mexico and western Texas, in Mahaney, W. C., ed., Quaternary stratigraphy of North America: Stroudsburg, Pa., Dowden, Hutchinson, and Ross, Inc., p. 235-274.

Smith, H. T. U., 1938, Tertiary geology of the Abiquiu quadrangle, New Mexico: Jour. Geol., v. 46, no. 7, p. 933-965.

Stearns, C. E., 1953, Tertiary geology of the Galisteo-Tongue area, New Mexico: Geol. Soc. America Bull., v. 64, p. 459-508.

Wasserburg, G. J., Towell, D., and Steiger, R. H., 1964, A study of Rb-Sr systematics in some Precambrian granites of New Mexico: Amer. Geophys. Unim. Trans., v. 46, no. 1, Abs., p. 173-174.