Geologic Map of the Mount Taylor Quadrangle, Valencia County, New Mexico.

By

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Scale 1:24,000

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GEOLOCIC MAP OF THE MOUNT TAYLOR QUADRANGLE, VALENCIA COUNTY, NEW MEXICO

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Description of Units

These are mainly the field descriptions used during mapping with a few descriptions from Lipman et al. (1979). Cretaceous descriptions and a few volcanic descriptions are from the Lobos Springs Quad Goff et al, (2008)

Quaternary

Qal **Alluvium—**Deposits of sand, gravel and silt in main valley bottoms; locally includes stream terraces, alluvial fans, and canyon wall colluvium; Late Holocene in age; maximum thickness of various alluvium deposits is uncertain but may exceed 10 m. Alluvium in canyon bottoms and along major drainages is typically coarse-grained, cobble to boulder size sandy gravel of mixed volcanic lithologies and subordinate sandstone clasts. Alluvium in embayments adjacent to main drainages is typically finer-grained, silt and sand dominated deposits with pebble-gravel lenses and minor interbedded gravel beds. Valley floor alluvium and low terrace deposits are characterized by weakly-developed soils with 10YR-2.5Ycolor, none to minimal carbonate accumulation, and lack of Bt horizon development. Locally includes small areas of colluvium, terrace and fan deposits to small to map separately.

Qa **Alluvium--** flat areas of upland alluvium not associated with any obvious valley or piedmont slopes. Usually fine grained and perhaps of eolian origin.

Qt4 **Alluvium underlying Qt4 terrace surfaces—**Deposits of sandy pebble to boulder size gravel underlying terrace surfaces located approximately 3 to 5 m above local base level. Deposit thickness ranges from 2 to greater than 6 m. Soils developed in deposits underlying Qt4 surfaces are weakly developed, with 10YR color, minimal horizon development, none to minimal carbonate accumulation, and lack of Bt horizon development (Table 1). Late Holocene in age.

Qt3 **Alluvium underlying Qt3 terrace surfaces—**Deposits of sandy pebble to boulder size gravel underlying terrace surfaces located approximately 7 m above local base level. Typically forms fill terraces with deposit thickness of 7 m or more. Poorly preserved; soil properties not described.

Qt2 **Alluvium underlying Qt2 terrace surfaces—**Deposits of sandy pebble to boulder size gravel underlying terrace surfaces located 12 to 18 m above local base level. Deposit thickness ranges from 4 to 10 m or more. Where preserved, soils are well developed, exhibit Stage II to III carbonate morphology, Bt horizon .with 5YR color. Likely middle to late Pleistocene in age.

Qt1 **Alluvium underlying Qt1 terrace surfaces—**Deposits of sandy cobble to boulder size gravel underlying terrace surfaces located approximately 35 to 40 m above local base level. Forms fill terraces with deposit thickness ranging from 6 to 8 m or more. Soils are stripped (eroded). Early Pleistocene?

Qfy **Young Alluvial fans—**Typically fan-shaped deposits of coarse bouldery gravel and sand, silt, and clay that emanate from tributary drainages along axis of major drainages. Grades into alluvial deposits along main channels; probable late Holocene age; maximum exposed thickness about 10 m.

Qf4 **Deposits underlying Qf4 fan surfaces—**Part of fan complex at the mouth of Water, Timber, and Castillo Canyons; Qf4 surfaces form part of the modern piedmont. Deposits of fine sand to coarse gravel; typically interbedded fine to medium sand and imbricated cobble-to-boulder-size gravel with individual gravel beds 1-3m thick. Qf4 deposits often bury Qf3 deposits and include buried soils (Figure 1). Total thickness 3 to 10 m or more. Where present, Qf3 buried soils are 1 to 5 m below the Qf4 surface. Qf4 soils are characterized by A-Bw-C or A-Bk-C profiles with maximum Stage I carbonate morphology (Table 1), locally include buried A horizons. Middle to late Holocene.

Qf3 **Deposits underlying Qf3 fan surfaces—**Part of fan complex at the mouth of Water, Timber, and Castillo Canyons; Qf3 surfaces form part of the modern piedmont. Deposits of sandy pebble to boulder gravel of mixed volcanic lithologies and subordinate sandstone clasts greater than 3 m thick; base of deposit poorly exposed. Soils are partially eroded, but exhibit Stage II to III carbonate morphology, Bt horizon with 5YR to 7.5YR color (Figure 2, Table 1). Likely middle Pleistocene.

Qf2 **Qf2 Deposits underlying Qf2 fan surfaces—**Deposits of subrounded to subangular sandy pebble to boulder gravel underlying remnant fan surfaces at mouth of Timber and Castillo canyons. Deposit is 10 to 15 m or more thick. Qt2 fan surfaces are 10 to 12 m above local base level. Soils are stripped; however, clasts eroding from deposit exhibit continuous carbonate coatings. Early to middle Pleistocene?

Qf1 **Deposits underlying Qf1 fan surfaces—**Deposits of subrounded to subangular sandy pebble to boulder gravel underlying remnant fan surfaces at mouth of Castillo canyon. Deposit is 5 to 10 m thick, with upper 2 m comprising basalt boulder gravel. Qf1 fan surfaces are 15 to 20 m above local base level. Soils are stripped; however, clasts eroding from deposit exhibit continuous carbonate coatings. Early Pleistocene?

Qc **Colluvium—**Poorly sorted slope wash and mass wasting deposits from local sources; mapped only where extensive or where covering critical relations; thickness can locally exceed 15 m. Locally buries terrace surfaces and underlying alluvium along the sides of narrow canyons, including Water, Timber, and Seco canyons.

Qls **Landslides—**Poorly sorted debris that has moved chaotically down steep slopes; slumps or block slides (toreva blocks) partially to completely intact, that have moved down slope; slumps and block slides usually display some rotation relative to their failure plane; thickness varies considerably depending on the size and nature of the landslide.

Qtc **Talus/Colluvium**--Slope wash, talus, coarse colluvium, and landslide material where morphology not obvious**.**

Basaltic Rocks

Tub **Upper Basalt (Lipman)--**Fine grained dense alkalic basalt and basaltic scoria **(Tubc**). Sometimes has scattered pyroxene phenocrysts to 1 cm. Several local vent areas, marked by scoria cones, occur around the southern lower flank of Mt Taylor present in this map area. One scoria cone contains intrusive areas **(Tubi)** Locally contains interlayers of similar lithology to TPb. These have been observed in a few areas to be gradational in contact and not interleaved flows.

Tptb **Pyroxene trachybasalt—**Gray, fine-grained flow containing conspicuous, large (≤1.5 cm), resorbed, very dark green clinopyroxene megacrysts (Lipman et al., 1979). Phenocrysts consist of plagioclase, olivine, clinopyroxene, and orthopyroxene in an intersertal groundmass containing plagioclase, olivine, clinopyroxene, opaque oxides, and glass. Many specimens contain quartz xenocrysts. Part of flow is uplifted by San Fidel dome and has resulting steep dip slope to north suggesting that doming post-dates eruption of the lava (Lipman et al., 1979). Lava underlies Tvs but overlies Totb, Tpb, Tgrt, Upper Cretaceous Dalton Sandstone (Kcd) and the Mulatto Member of the Mancos Shale (Kmm). Unit has two $Ar^{40/39}$ dates of 2.78 ± 0.03 and 2.79 ± 0.06 Ma, respectively. Maximum exposed thickness is about 80 m.

Totb **Older trachybasalt —** Black to dark gray, fine-grained basalt and red to black cinder deposits
Totc (**Totc**) having sparse olivine and plagioclase phenocrysts in intersertal groundmass containing

microphenocrysts of plagioclase, augite, olivine, opaque oxides and glass. Some flows have rare orthopyroxene microphenocrysts. Some flows have tiny (<1 mm) ovoid patches very rich in glass and opaque oxides. All flows may have rare quartz xenocrysts. Eroded cone on east side of Rinconada Basin has NNE-trending dike and fissure. Eroded cone on SE side of Horace Mesa contains NE-trending feeder dike.

Tbta **Pyroxene basaltic trachyandesite—**Gray, fine-grained flow and red to black cinder deposits (**Tbtc**) containing conspicuous, large (≤1.5 cm), resorbed, very dark green clinopyroxene megacrysts (Lipman et al., 1979). Phenocrysts consist of plagioclase, olivine, clinopyroxene, and orthopyroxene in an intersertal groundmass containing plagioclase, olivine, clinopyroxene, opaque oxides, and glass. Many specimens contain quartz xenocrysts. Eroded cinder cone is located west Mt Taylor quadrangle and contains rare blocks of fine- to medium-grained olivine-pyroxene gabbro. Underlies Tvs but overlies Totb, Topta, Upper Cretaceous Dalton Sandstone (Kcd) and the Mulatto Member of the Mancos Shale (Kmm). Unit is not dated. Maximum exposed thickness is about 80 m.

Tvs **Volcaniclastic sedimentary rocks—Gray** to tan to white debris flows, fluvial deposits and interbedded tuffs shed from the Mount Taylor stratovolcano during growth. Boulders form a lag deposit on surface of debris flows to the extent that the true mix of facies is usually unknown. Fluvial component contains rounded to subrounded cobbles including a higher proportion of basaltic clasts, especially to SW. Tuffs consist mostly of thin beds and lenses of fall deposits with vesiculated pumice having phenocrysts of plagioclase, clinopyroxene ± hornblende ± biotite. Unit is interbedded with practically all lavas on southwest side of Mount Taylor and Horace Mesa. Overlies pyroxene basaltic trachyandesite (Tbta) east of Rinconada Basin and basanite (Tbb). Maximum exposed thickness is >200 m.

Tpb **Plagioclase basalt--**Distinctive flows of coarsely porphyritic basalt , containing 10-20 percent phenocrysts of plagioclase in tablets as much as 2 cm in diameter and sparse smaller phenocysts of olivine and pyroxene. Usually interbedded in Tvs. Probably erupted from one or more vent areas near the top of Mount Taylor.

Tvt **Tuffs and tuffaceous sediments—**Tan to white ash flow tuffs, tephra, pumice falls, sandstones, conglomerates located below Tpb or stratigraphic equivalent. Where well exposed along Water Canyon ash flow and tephra deposits are common, perhaps dominant in this interval.

Tbi **Basaltic intrusions-- Dark** gray to black fine grained intrusive equivalents of **Tub** or other extrusive lavas.

Porphyritic Intermediate Lavas

Tplu **Porphyritic Intrusive Rocks—**subdivided based on phenocryst mineralogy, in particular presence of hornblende and biotite. Mapped as Tplu where exposure or time prevented separation.

Tta **Trachyandesite, undivided—** Multiple flows of gray to blue-gray, porphyritic lavas that originate from near the summit of Mount Taylor. Phenocrysts consist of resorbed plagioclase, potassium feldspar, oxidized clinopyroxene, hypersthene, sparse biotite, sparse oxidized hornblende, and magnetite in a pilotaxitic groundmass containing microphenocrysts of plagioclase, clinopyroxene, apatite, opaque oxides, and devitrified glass. May contain rare, small (≤5 mm) hornblende megacrysts. Some specimens show minor Fe-oxide alteration. Overlies small flow of Tytb and flows of hornblende trachyandesite (That). Interbedded with

volcaniclastic sedimentary deposits (Tvs). Underlies flow of Tytb on upper north side of Rinconada Canyon. Flow near summit of Mount Taylor is dated at 2.60 ± 0.05 Ma (Perry et al., 1990). Exposed thickness is >215 m.

Tptd **Trachydacite to Trachyandesite lavas –**Gray to tan moderately porthyritic rocks with phenocryst assembledge coarse phenocrysts dominated by plagioclase with no obvious biotite or hornblende and little visible pyroxene**.**

Tbhtd **Biotite bearing Trachydacite—**Tan to gray rocks with abundant plagioclase phenocrysts and visible biotite. Often also contain hornblende Usually more porphyritic and lighter colored than Tta or Tptd.

Tphtd **Porphyritic hornblende trachydacite—**Pale gray to tan, massive to sheeted porphyritic lava, dikes and intrusion with conspicuous large (≤1 cm) phenocrysts of plagioclase, some with apparent rapakivi texture. Additional phenocrysts are hornblende and clinopyroxene. Equivalent to porphyry of San Jose Canyon (Lipman et al., 1979). Intrudes Tptb and Tpb on SW edge of Mount Taylor quadrangle; has $Ar^{40/39}$ date of 2.63 ± 0.10 Ma; thickness ≥100 m.

Trt **Bedded tuff deposites.** Underlie Tphtd at one locality along western edge of quadrangle. Mostly light colored medium to fine pumice fall deposits in this exposure.

Tcptd **Tql of Lobo Springs-- Coarse porphyritic trachydacite—**Pale pink to tan, very coarse porphyritic lava containing large (≤ 3 cm) phenocrysts of potassium feldspar. Unit superficially looks like granite and makes a distinctive fine gravelly soil. Smaller phenocrysts consist of magnetite, potassium feldspar, plagioclase, oxidized clinopyroxene, and apatite in a hyalopilitic groundmass of tiny felted plagioclase, potassium feldspar, clinopyroxene, opaque oxides and devitrified glass. Unit shows minor Fe-oxide alteration. Unit underlies Tta and probably That in extreme NE corner of quadrangle. Relations with other units in Mount Taylor stratovolcano are unclear. Unit is not dated. Maximum observed thickness is about 80 m.

Tel **Enclave rich trachydacite to trachyandesite –**gray to brown rocks containing plagioclase, and hornblende phenocrysts but also containing abundant (nearly every hand sample) enclaves of more mafic rocks or magmas.

Tpetd **Porphyritic enclave-bearing trachydacite—**Thick, multiple flows of dark gray to tan porphyritic lavas having conspicuous enclaves up to 50 cm in diameter, especially in the lower flows. Lava contains phenocrysts of large potassium feldspar, plagioclase, clinopyroxene, orthopyroxene and biotite in an intergranular to hyalopilitic groundmass of plagioclase, potassium feldspar, clinopyroxene and devitrified glass. Groundmass contains sparse phenocrysts (?) of quartz. Enclaves consist of potassium feldspar, plagioclase, clinopyroxene, orthopyroxene, magnetite, and vesiculated glass. Overlies Tcptd, Ttha, and Tbhtd; intruded by dike of Thi. Flow just west of quadrangle boundary has $^{40}Ar/^{39}Ar$ date of 2.68 ± 0.09 Ma. Maximum exposed thickness about 250 m.

Tptba **Porphyritic basaltic trachyandesite—**Gray to tan, massive, porphyritic basaltic trachyandesite lavas containing phenocrysts of clinopyroxene, plagioclase and rare olivine; overlies and intrudes Tbtd and Tpta; unit not dated; maximum observed thickness about 110 m.

Tbtd **Slightly porphyritic biotite trachydacite—**Multiple, often platy flows of pale gray slightly porphyritic lavas occurring along the north margin of the amphitheater; contains 2-4% phenocrysts of small, blocky plagioclase, biotite, and clinopyroxene. Underlies Tpbtd; overlies Tpta and Tpcta; intruded by Tbi; overlies Tvs and Tpbta. Unit is not dated. Maximum observed thickness is about 215 m.

Ttdl **Lower trachydactite—**Multiple, often platy flows of pale gray slightly porphyritic lavas occurring along the north margin of the amphitheater; contains 2-4% phenocrysts of small, blocky plagioclase, biotite, clinopyroxene, and conspicuous enclaves of dark, fine-grained trachyandesite; underlies Tvs, Ttd, Tta, and Ttdc; overlies Tub and Tob; intruded by Thli; unit not dated; maximum exposed thickness about 150 m.

Tpcta **Porphyritic clinopyroxene trachyandesite—**Flows of tan to gray, massive trachyandesite with conspicuous phenocrysts of clinopyroxene in groundmass of plagioclase, clinopyroxene and devitrified glass; underlies Tbtd; unit not dated; maximum observed thickness about 60 m.

Tder **porphyritic mixed lava** --Distinctive bulbous flow or intrusion on southwest side of Mt Taylor cone. Dark gray to black rock which contains abundant porphyritic enclaves of more mafic rock or magmas Similar to Tel but enclaves are very abundant in every sample.

Tdo **Older Dacite**-- light gray to white moderately porphyritic rock containing feldspar, hornblende and biotite. Often has a distinctive blocky textured plagioclase. May be more mafic component of Tr dome or a separate dome or intrusion.

Tr **Rhyolite flow or dome.** Light gray to white rocks containing 10 to 20 percent quartz, potassium feldspar and biotite phenocrysts. Sugary texture near margins and in western exposure but more altered and denser to east.. Center of exposures are coarser grained, lack quartz and have a distinctively porphyritic texture (Tod). Exposures are very poor in general. Occurs in core of Mount Taylor cone and forms the first volcanic unit that can be observed in the volcanic sequence

Tt **trachyte**—fine grained dark lava. Few recognizable phenocrysts.

Tbo **basaltic lavas**—Dark gray to black basalts, usually altered. These flows occur in the center of the Mt Taylor crater area and are some of the earliest rocks from this vent area.

Tbb **Basanite lava**. Single flow of dark gray to black basaltic lavas. Contains a few obvious phenocrysts of olivine. Underlies Tpb and overlies Tbh in Southeastern portion of the quadrangle. Flow decreases in elevation northward and may have been erupted to the south flowing north before Mt Taylor became an edifice.

Tbh **Hawaiite lava**.—medium gray mafic lavas. Sheen on weathered broken surface. Occur beneath the basanite lavas in southeastern portion of quadrangle.

Intrusions

Thbi **Trachydacite intrusions—**Gray to pink rocks containing 15 to 20 phenocrysts of plagioclase, hornblende and biotite. Most common around the center of Mt Taylor.

Thi **Trachydacite to Trachyandesite intrusions—**Gray rocks containing obvious plagioclase and hornblende phenocrysts but not biotite

Cretaceous

Crevasse Canyon Formation

Kcg **(Kgi) Gibson Coal Member—**Interbedded black to brown siltstone, thin to medium bedded tan, golden-yellow, brown, and greenish gray sandstone, and black coal. The sandstones are composed of well to moderately sorted, very fine- to medium-grained angular to subrounded quartz grains with < 10% mafic minerals and <1% clay (litharenite). The sandstone beds are cross-bedded, ranging from trough cross-beds to large-scale, low amplitude planar cross-beds. Ripple marks are locally preserved. Mud clast conglomerates frequently occur at the base of the sandy intervals. Bioturbation is rare. Elliptical to spherical fractured siderite to goethite concretions with calcite (or more rarely, barite) fill fractures and are present throughout the unit (Figure 10). Petrified wood fragments are common; logs up to 10 cm in diameter and 0.5 m long are locally preserved (Figure 11). The coal beds are generally < 0.5 m thick. A volcanic ash bed that is 2 to 4 cm thick is interbedded with coal at UTM coordinates 254819 3901134 (NAD27)(Figure 12). The lower contact is gradational with the underlying Dalton Sandstone Member; the top is not exposed. Maximum exposed thickness is roughly 350 m.

Kcd **(Kd) Dalton Sandstone Member—**Forms two prominent cliffs, a lower yellowishorange cliff and an upper white cliff with an intervening short slope (doublet). The basal sandstone near the contact with the underlying Mulatto Tongue of the Mancos Shale often has thin beds containing abundant pelecypods casts and molds. The carbonate-cemented basal sandstone is composed of well-sorted, very fine-grained angular quartz grains with < 5% mafic minerals and <1% clay. The weakly cemented upper sandstone consists of well sorted, fine-grained, angular to subrounded quartz grains with <1% lithics and 7 to 10% feldspar. The upper and lower contacts are gradational with the overlying Gibson Coal Member of the Crevasse Canyon Formation and the underlying Mulatto Tongue of the Mancos Shale. Maximum exposed thickness is ≤25 m.

Kcs **(Ks, Kst) Stray Sandstone Member—**Forms two prominent reddish-orange cliffs with an intervening short slope (doublet). On a fresh surface, this medium-bedded, planar cross- bedded sandstone is white to yellowish gray. This sandstone is composed of well to moderately sorted, very fine- to medium-grained angular quartz grains with < 1% mafic minerals and <1% clay. The top of the Stray Sandstone is a thin (<1 m) conglomerate with pebbles to cobbles of quartzite, chert, and quartz. The upper and lower contacts are gradational with the overlying Mulatto Tongue of the Mancos Shale and the underlying Dilco Coal Member of the Crevasse Canyon Formation. Maximum exposed thickness is ≤40 m.

Kcdc **(Kdi) Dilco Coal Member—**Interbedded black to brown siltstone, thin to medium bedded tan, brown, and olive-green sandstone, and black coal. The sandstones are composed of well to moderately sorted, very fine- to fine-grained angular quartz grains with < 5% mafic minerals, 1 to 5% muscovite, and 1-5 % potassium feldspar altered to clay. The sandstones are cross-bedded to ripple laminated. Elliptical to spherical fractured siderite to goethite concretions, with calcite (or more rarely, barite) filling the fractures are present throughout the unit. The coal beds are < 0.5 m thick and are usually in the lower part of the unit. The upper and lower contacts are gradational with the overlying Stray Sandstone of the Crevasse Canyon Formation and the underlying main body of the Gallup Sandstone. Maximum exposed thickness is ≤150 m.

Gallup Sandstone

Kgm Main body—Yellowish gray, white, or golden yellow, medium to thick-bedded,

cross-bedded sandstone. The sandstone consists of moderately sorted, fine to very fine-grained angular to subrounded quartz grains with < 5% mafic minerals, 1 to 2% muscovite, plant debris, and potassium feldspar altered to clay (10 to 30%). Often the sandstone beds are bioturbated with ~1.0 cm diameter cylindrical, vertically oriented burrows. Carbonaceous shale is intercalated with the sandstone. Locally contains fossiliferous (*Innocermid*) beds near the top. Faint, very low angle trough cross beds occur locally in sets less than 0.25 m thick, with azimuth of 010° (northerly flow). Beds are primarily planar-tabular or laminated. The lower contact is gradational with Mancos Shale and the upper contact is gradational with the Dilco Coal Member of the Crevasse Canyon

Kgu **Upper tongue—**White medium-bedded, cross-bedded to tabular sandstone that is locally capped by well-cemented, fractured, brown-weathering, planar crossbedded sandstone. The brown sandstone is carbonate cemented; the weakly cemented white sandstone does not react to hydrochloric acid. The sandstone consists of well-sorted, fine-grained angular quartz grains with < 5% mafic minerals and potassium feldspar altered to clay (15 to 25%). The white arkosic sandstone has no muscovite, but the brown capping sandstone has trace amounts of muscovite and biotite. Trough cross beds occur in sets less than 0.5 m thick and have azimuths of 025° (northeastern flow direction). Cross beds are moderately steeper than those in unit Kgi (described below). Local internal scour surfaces are present. Hematitic concretions and stained surfaces occur throughout unit. The upper and lower contacts are gradational with Mancos Shale. Maximum exposed thickness is ≤30 m.

Kgl **Lower tongue—**White medium-bedded, cross-bedded to tabular sandstone that is locally capped by well-cemented, fractured, brown-weathering, planar crossbedded sandstone. Brown sandstone is carbonate cemented; the weakly cemented white sandstone does not react to hydrochloric acid. The sandstone is composed of well to moderately sorted, fine to very fine-grained angular quartz grains with < 5% mafic minerals and potassium feldspar altered to clay (10 to 15%). The white subarkosic sandstone has no muscovite, but the brown capping sandstone has trace amounts of muscovite. Cross bed sets are 0.5 meters thick, low angle trough cross beds, with azimuths of 150° (southeastern flow direction). The top of unit is locally conglomeratic with sandstone clasts and sharks teeth. The upper and lower contacts are gradational with Mancos Shale. Maximum exposed thickness is ≤15 m.

Mancos Shale

Kmm **Mulatto Tongue—**Golden yellow, thin-bedded, tabular to ripple-laminated sandstone and black shale. Burrows and scattered pelecypod molds are common in the sandstone beds. Moderately to well sorted, very fine-grained angular to very well-rounded quartz grains with < 1% mafic minerals, ~1% muscovite, and abundant clay (~30%). Coarse to very coarse sandstone beds near the basal contact with the Stray Sandstone and lenses of conglomerate with well-rounded pebbles of black and white chert and black quartzite are locally present. Upper and lower contacts are gradational with the Dalton and Stray Sandstone members of the Crevasse Canyon Formation. Maximum exposed thickness is ≤50 m.

Km **Main body—**Black to dark brown shale and silty shale intercalated with finely laminated to cross-bedded thinly bedded sandstone. The sandstones are wellsorted,

fine-grained quartz arenites. Upper and lower contacts are gradational. Small tongues of Main Mancos are interbedded within the Gallup Sandstone units. Maximum exposed thickness of Main Mancos beneath Gallup Sandstone is ≤50 m. Maximum drilled thickness including Bridge Creek Limestone (described below) is roughly 145 m (Table 2).

Kmb **Bridge Creek Limestone—**Finely laminated, fossiliferous, light gray limestone interbedded with thin black shale below the Main body of the Mancos Shale. Identified only in narrow horst on east side of exposed core of San Fidel dome where it overlies Twowells Sandstone; in fault contact with other units. Correlative with the Greenhorn Limestone. Contains abundant invertebrate fossils including *Pycnodonte* aff. *P. kellumi*, *Exogyra levis*, *Plicatula* cf. *P.hydrotheca, cf. Caryocorbula and Turritella sp. (Barry Kues, University of New* Mexico, personal communication). Unit is moderately hornfelsed from subjacent magmatic intrusions and displays minor hydrothermal alteration, particularly along fractures and planer zones of permeability. Maximum exposed thickness is ≤25 m.

K **Ku** Cretaceous Rocks Undivided or uncategorized**. (Kus—** unidentified sandstone**), (Kuh—** hornfelsed siltstone and shales**)--**