Arizona Geological Survey
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# Geologic Map of the Picacho Mine Area, Southeastern California

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## SYMBOLS

### FOLIATION

All foliations-strike line types:

planar irregular approximate

**Primary foliation**

upright vertical BEDDING

FLOW FOLIATION eutaxitic foliation in welded tuff

**Tectonic foliations**

TECTONITE FABRIC

COMPOSITIONAL BANDING

GENERIC FOLIATION

### CONTACTS

Solid lines indicate precise location, dashed lines approximate location, dashed with queries very approximate, and dotted inferred beneath younger blanketing or intrusive units.

intrusive or depositional contact; dots indicate well exposed depositional contact

### FAULTS

HIGH ANGLE (ball on down-thrown side, arrow indicates dip, box arrow indicates orientation of slickenside striations)

LOW ANGLE (barbs on hanging wall)

low-angle, nature uncertain

low-angle normal fault

### MISCELLANEOUS

Tie line joining regions underlain by same map unit

## EXPLANATION OF MAP UNITS

d **Disturbed areas**. Dumps, leach heaps, and graded areas around mines. Includes unmapped outcrop in the Picacho Mine.

Qs **Undivided surficial deposits**. Non-indurated sandy alluvium in washes to moderately indurated gravel blanketing pediments. Also includes talus and colluvium. May include some late Tertiary deposits

**Picacho Dacite**

Ta Andesite. Very fine-grained light gray groundmass with sparse crystals of dark green pyroxene and clear to white plagioclase. Disseminated opaque specks are ubiquitous. Rock is massive and relatively homogeneous. Locally has strongly developed platy jointing. Rock is andesite or dacite. Interpreted to be same unit as Pebble Mountain andesite of Crowe [1978].

Tax Breccia. Angular clasts of Ta in a matrix of comminuted Ta, interpreted to be autobreccia at base of Ta. Contact into Ta is gradational.

**Tuffs of Ferguson Wash Group**

All tuffs are buff to very light gray colored when poorly to moderately welded, and pinkish gray when strongly welded. Crystals are typically 1-2 mm in diameter.

Ttf Ferguson Wash tuff. Crystal poor tuff. Contains phenocrysts of feldspar, quartz, biotite and hornblende, generally moderately to strongly welded.

Trt Sanidine-biotite tuff. Poorly to moderately welded, indurated tuff with sparse crystals of sanidine and biotite. Locally interbedded with hornblende-biotite tuff. $^{40}Ar/^{39}Ar$ date on sanidine is 23.6±0.1 Ma (W. McIntosh, written comm., 1996).

Tsw Senator Wash tuff. Crystal rich tuff with abundant crystals of biotite, hornblende and feldspar. Lithic fragments common, mostly volcanic rocks.

Block tuff zones. Blocks of Tpp and Tba in tuffaceous matrix. Locally present at base of Trt and Tsw.

Tts Tuff and tuffaceous sediments. White to buff well-bedded tuffaceous sandstone and bedded non-welded tuff.

Tpt Pyroxene-bearing tuff. Poorly welded, crystal-poor tuff with sparse but prominent crystals of green pyroxene(?).

Txv **Sedimentary(?) Breccia**. Composed of volcanic clasts; rock avalanche deposits related to Tba?

Tu **Fault rocks and hydrothermally altered rock**. Medium gray, very fine-grained to aphanitic, massive and highly fractured rock probably consisting of quartz, feldspar, chlorite and epidote. Uncertain protolith, apparently derived from Jag, JXgn, or Js

**Older Conglomerate**

Tc Conglomerate, undivided

Tcw Winterhaven-clast conglomerate. Winterhaven Formation-clasts predominant; outcrops have a reddish- to purplish-brown color.

Tcv Volcanic-clast conglomerate. Tba-type clasts predominant.

Tcg Granitic conglomerate to sedimentary breccia. Boulders of equigranular, medium-grained biotite granitoid predominant, in a grussy, poorly indurated matrix.

Tcm Mixed-clast conglomerate. Mixed Tertiary volcanic rocks, and pre-Tertiary granite and gneiss are predominant clast types.

Tx **Sedimentary(?) Breccia**. Composed of shattered fine to medium-fine grained leucogranite and gneiss. Leucogranite is generally unfoliated, aplitic quartz-feldspar rock. Unit is variably silicified, locally recemented to dense rock. Clasts have rotated relative to each other, indicated by variability of foliation between gneissic clasts

**Quechan Volcanics**

Tba Olivine basalt lavas. Dark gray very fine grained groundmass containing 1-2 mm crystals of olivine altered to iddingsite, dark green pyroxene and plagioclase in variable amounts. Vesicular zones, autobreccia zones and red oxidized flow boundaries are common. Generally non-resistant, forming low hills and pediment.

Tpp Plagioclase-pyroxene andesite or dacite. 2-4 mm plagioclase crystals make 10-25% of rock. Greenish to purple gray dense very fine grained to aphanitic groundmass. Sparse chloritized mafic (biotite, hornblende?) minerals. Rock generally massive and not clearly intrusive or extrusive.

Brecciated zone. Monolithologic volcanic autobreccia or pyroclastic breccia composed of clasts of Tpp.

Andesitic dikes. Very fine-grained, equigranular light gray felsite dikes, intrude Tpp.

**Winterhaven Formation** (see descriptions in Haxel et al, 1985)

Js Sandstone and shale

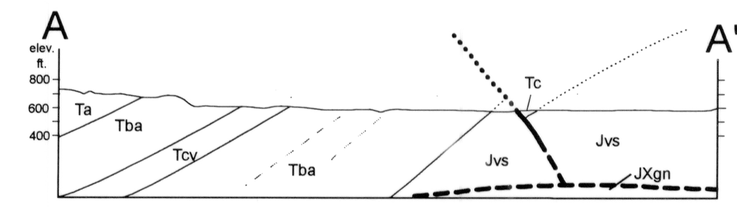
Jv Volcanic rocks

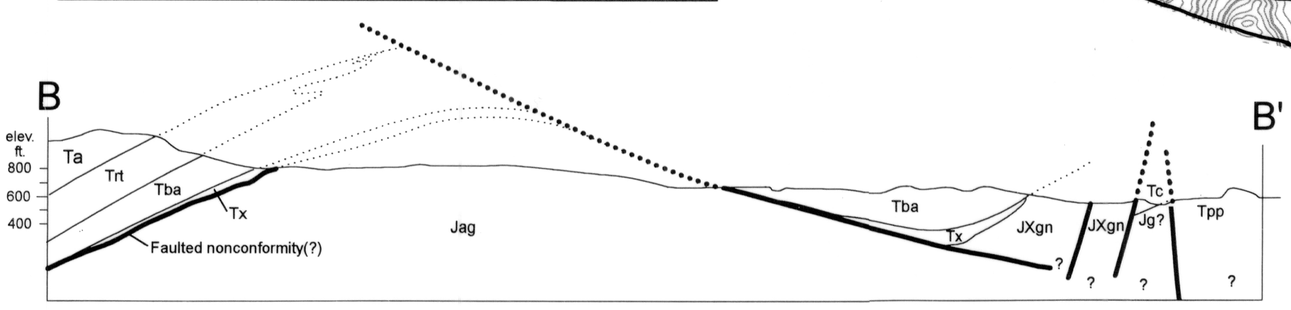
**Basement complex**: Granitic and metamorphic rocks

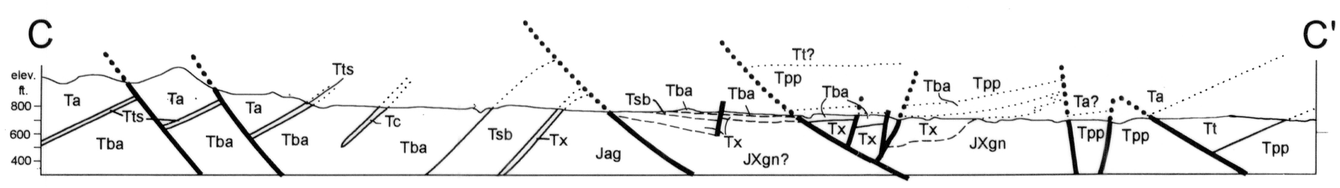
JXgr Fine-grained granitoid. Fine-grained, equigranular biotite granitoid. Underlies conglomerate in small fault block east of mine. Contact with conglomerate not exposed.

JXgn Biotite quartz-feldspar gneiss and leucogranite. Compositionally layered gneiss with 1-20 m thick, concordant to discordant leucogranite granitic layers and irregular masses. Gneissic banding typically alternates biotite poor and biotite rich on a cm scale. Gneiss generally fine-grained and equigranular. Leucogranite fine to medium grained nearly devoid of mica, and generally unfoliated to weakly foliated.

Jag Augen gneiss. Moderately foliated to gneissic, medium- to coarse-grained porphyritic biotite granite. Rock is relatively homogeneous with variations on texture on a meter scale apparently mostly due to strain variations. K-feldspar porphyroclasts 2-4 cm in diameter are common and distinctive.

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