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MAP GQ-849

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
U.S. ATOMIC ENERGY COMMISSION

GEOLOGIC QUADRANGLE MAPS OF THE UNITED STATES

GEOLOGIC MAP OF THE TOPOPAH SPRING QUADRANGLE, NYE COUNTY, NEVADA

By
Paul P. Orkild and J. T. O'Connor

QUADRANGLE LOCATION

PUBLISHED BY THE U. S. GEOLOGICAL SURVEY
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1970

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TOPOPAH SPRING QUADRANGLE, NEVADA
GQ-849

DESCRIPTION OF MAP UNITS

Qa ALLUVIUM (0–50 ft)—modern sand and gravel composed of pebble- to boulder-sized subangular to rounded fragments of tuff, rhyolite, and basalt.

Qc COLLUVIUM AND TALUS (0–150 ft)—unsorted talus and scree of local derivation. Gravels are composed of poorly sorted angular to well-rounded boulders, cobbles, pebbles, and sand derived from rocks in the adjacent highlands; locally cemented with caliche. In Fortymile Canyon are unconsolidated partly dissected fan gravels.

RHYOLITE OF SHOSHONE MOUNTAIN:

Tsp Plug and dikes—light- to purplish-gray devitrified flow-banded to vesicular vitric rhyolite that contains sparse phenocrysts of feldspar. Intrusive into bedded tuff and rhyolites of Shoshone Mountain. Plug probably is in the vent for the rhyolitic lavas.

Tsrd Unit D (0–350 ft)—lava flows of gray to purple devitrified rhyolite; black vitrophyre at base; sparse phenocrysts of feldspar. Flow underlain by related tuff breccia and reworked ash-fall and ash-flow tuff.

Tsrc Unit C (0–650 ft)—lava flows of light-gray to purple devitrified coarsely to finely flow-banded rhyolite; brown to black vitrophyre at base; sparse phenocrysts of feldspar. Flows underlain by related-reddish brown flow breccia and white vitric ash-fall and ash-flow tuff that contains large pumice and abundant lithic fragments.

Tsrb Unit B (0–650 ft)—lava flows of light-gray to brownish-purple devitrified coarsely to finely flow-banded rhyolite; dark-gray vitrophyre as much as 50 ft thick at base; sparse phenocrysts of feldspar. Flow underlain by related tuff breccia and white to light-gray bedded ash-fall and ash-flow tuffs.

Tsra Unit A (0–600 ft)—lava flows of light-brown to medium-gray devitrified finely to coarsely flow-banded rhyolite; dark-gray lenticular vitrophyre at base; sparse phenocrysts of feldspar. Flow underlain by related white to pink vitric ash-fall and ash-flow tuff that contains sparse inclusions of scoriaceous gray and red basalt cobbles and minor amounts of flow breccia.

Tdm MAFIC LAVA FLOWS OF DOME MOUNTAIN (0–750 ft)—light-brown to black alkali basalt that contains zones of red to black scoria—mainly at top and locally at bottom of flows; phenocrysts of plagioclase, olivine, and clinopyroxene.

Tbd BASALT DIKES (0–50 ft)—dark-gray fine-grained potassic basalt that contains phenocrysts of olivine; locally intrudes rhyolite of Delirium Canyon (Tfd).

Tgs CONGLOMERATE AND TUFFACEOUS GRAVEL AND SANDSTONE (0–100 ft)—unconsolidated poorly sorted conglomerate grading down into tuffaceous gravel and sandstone composed of fragments of rhyolite, basalt, and welded tuff. Locally, unit consists of light-gray reworked pumiceous ash-fall tuff interbedded with thin light-brown to pink pumiceous ash-flow tuffs. Intertongues with mafic lava flows of Dome Mountain (Tdm).

RHYOLITE OF FORTYMILE CANYON:

Tfc Rhyolite of Comb Peak (0–1,050 ft)—lava flows of light- to dark- to purplish-gray devitrified generally coarsely flow-banded rhyolite, with a thick (0–45 ft) black vitrophyre at base, which is locally underlain by a thick flow breccia; abundant phenocrysts of alkali feldspar, plagioclase, and quartz, and some of biotite and amphibole; zones of opaline spherulites occur throughout the unit; flows underlain by related white to orange-pink reworked locally zeolitized ash-fall and ash-flow tuff and flow breccia 0–350 ft thick.

Tff Flow breccia (0–150 ft)—light-gray devitrified to greenish-gray vitrophyric rhyolite; phenocrysts of plagioclase, alkali feldspar, quartz, and biotite; clasts generally less than 2 ft, but as large as 4 ft, in diameter.

Tfw Rhyolite of Water Pipe Butte (575 ft)—lava flows of light- to dark-gray devitrified and vitric coarsely and irregularly flow-banded rhyolite with greenish-gray vitrophyre at base; abundant (30 percent) phenocrysts of alkali feldspar, plagioclase, and quartz as large as 6 mm; biotite and amphibole common. Flows underlain locally by related greenish-gray flow breccia and thin- to thick-bedded reworked pumiceous crystal-rich ash-fall tuff as much as 200 ft thick.

Tfb Rhyolite of Buried Canyon (385 ft)—lava flows of gray to brownish-gray devitrified indistinctly flow-banded rhyolite with thin black vitrophyre at base; 6–10 percent phenocrysts of plagioclase, alkali feldspar, and biotite, less than 2 mm in diameter. Flows underlain by related tuff breccia and white and light-gray pumiceous vitric ash-fall and ash-flow tuff 60–125 ft thick; locally reworked.

Tfd Rhyolite of Delirium Canyon (1,000 ft)—lava flow of light-gray to purplish-gray devitrified finely to coarsely flow-banded rhyolite; dark-gray to dark-brown vitrophyre as much as 100 ft thick at base; phenocrysts of alkali feldspar, plagioclase, sphene, and amphibole. Flow underlain by related fused ash-fall and ash-flow tuff, densely welded tuff, and zeolitized bedded tuff; 0–500 ft thick.

Tfv Rhyolite of Vent Pass (0–630 ft)—lava flows of gray to purplish-gray devitrified to glassy strongly flow-banded rhyolite that contains 5–10 percent phenocrysts of alkali feldspar and plagioclase and a minor amount of mafic minerals; some flow layers have well-developed trachytic texture; vertical layers of vitrophyre and breccia common; inclusions of basalt numerous. Flows underlain by related zeolitized bedded crystal-rich ash-fall and ash-flow tuff as much as 150 ft thick; locally reworked.

Tbo OLDER BASALT (0–75 ft)—lava flow of red scoriaceous basalt, vent agglomerates, and volcanic bombs; probably an old spatter cone.

TIMBER MOUNTAIN TUFF:

Tma Ammonia Tanks Member (90–130 ft)—compound cooling unit of rhyolitic to quartz-latitic ash-flow tuff; reddish-brown to brown partly welded vitric tuff grading downward to brown to purplish-gray eutaxitic devitrified densely welded tuff that grades downward to white to brown nonwelded vitric tuff; 5–40 ft of white to brown ash-fall and reworked tuff at base. Abundant phenocrysts of alkali feldspar, quartz, plagioclase, and biotite.

Tmr Rainier Mesa Member (210–475 ft)—compound cooling unit of rhyolitic to quartz-latitic ash-flow tuff; gray to purple densely to partially welded vapor-phase zone that grades downward to a white and pink nonwelded vitric base that contains abundant white pumice. Abundant phenocrysts of quartz, alkali feldspar, and plagioclase, and sparse biotite. Well-developed columnar joints and eutaxitic structures occur in densely welded parts.

Tmb Bedded tuff (0–40 ft)—white to pink vitric ash-fall tuff.

Tbu UPPER BASALT FLOW (0–15 ft)—red to reddish-brown fine-grained lava.

PAINTBRUSH TUFF:

Tpc Tiva Canyon Member (100–285 ft)—compound cooling unit of ash-flow tuff that contains abundant phenocrysts of alkali feldspar, plagioclase, biotite, and clinopyroxene; upper part, gray to purple, densely welded tuff that contains abundant phenocrysts and pumice; middle part, gray to reddish-orange densely welded tuff that contains sparse phenocrysts and pumice; lower part, brown to gray nonwelded to partly welded vitric shard tuff that contains common phenocrysts and pumice; local zones of lithophysae in upper and middle parts; 0–10 ft of white ash-fall tuff at base.

Tpy Yucca Mountain Member (0–125 ft)—simple cooling unit of ash-flow tuff; gray nonwelded to partly welded vitric shard tuff that contains sparse white pumice and phenocrysts of alkali feldspar and plagioclase.

Tpp Pah Canyon Member (40–250 ft)—simple cooling unit of ash-flow tuff that contains abundant small pumice and lithic inclusions, phenocrysts of biotite, alkali feldspar, plagioclase, and sparse quartz and pyroxene; upper part is light orange brown, nonwelded, vitric, grades downward to a light-brown moderately welded, devitrified middle part, locally vitrophyric at base; lower part is white to brown, partly welded to nonwelded, vitric.

Tpt Topopah Spring Member (20–815 ft)—compound cooling unit of ash-flow tuff that contains phenocrysts of plagioclase, alkali feldspar, biotite, and clinopyroxene. Upper part is gray nonwelded vapor-phase zone grading down into reddish-brown partly welded devitrified tuff; tuff grades downward into black eutaxitic vitrophyre, which grades downward into densely welded devitrified tuff with large (to 1 ft) eutaxites, large lithic inclusions, and abundant phenocrysts; locally, bedded tuff partings occur at base. Middle part is purple to reddish-brown devitrified densely welded tuff that contains sparse pumice, abundant zones of lithophysae, and a few phenocrysts. Lower part is black vitrophyre that grades down into brown and gray nonwelded vitric tuff which contains sparse phenocrysts and common pumice.

Tpb Bedded tuff (0–200 ft)—white to light-brown vitric to zeolitized ash-fall and reworked tuff and a minor amount of nonwelded ash-flow tuff.

Tbl LOWER BASALT FLOWS (0–20 ft)—fine-grained red to reddish-brown lava flows lying between Yucca Flat (Tpy) and Pah Canyon (Tpp) Members.

Tfx RHYOLITE FLOW BRECCIA (0–150 ft)—light-greenish-gray, mainly devitrified, rhyolitic; lying between Tiva Canyon (Tpc) and Pah Canyon (Tpp) Members; clasts generally less than 2 ft, but as large as 5 ft, in diameter.

RHYOLITE OF CALICO HILLS:

Tcf Rhyolite lava flows (0–1,300 ft)—flows of light-grayish-green and reddish-brown vitrophyric to devitrified lava and flow-banded abundantly spherulitic rhyolite; sparse phenocrysts of quartz, alkali feldspar, plagioclase, and biotite.

Tct Bedded tuffs, tuff breccia, and nonwelded ash-flow tuff (0–1,300 ft)—white to light-brown poorly sorted to well-sorted zeolitized crossbedded tuff that contains abundant lithic inclusions; purple tuffaceous sandstone is locally conspicuous near base; large blocks (as much as 2½ ft) of vesiculated glass in a matrix of shards and pumice; abundant inclusions of rhyolite and welded tuff.

Ta ANDESITE DIKES (3–50 ft)—light- to reddish-brown, fine-grained, trachytic flow-banded; common pyroxene phenocrysts; intrusive into tuff of Crater Flat (Ttc) and rhyolite of Calico Hills (Tcf).

Tw WAHMONIE FORMATION (50 ft)—dark-gray to black, red, and light-green devitrified dacitic lava flows and flow breccias; base not exposed.

Ttc TUFF OF CRATER FLAT (200 ft)—simple cooling unit of ash-flow tuff with pinkish-gray vapor-phase top that grades downward to purple to pinkish-gray densely welded tuff, tuff contains phenocrysts of plagioclase, alkali feldspar, quartz, biotite, and hornblende; abundant white pumice throughout and common lithic inclusions of argillite(?).

ELEANA FORMATION:

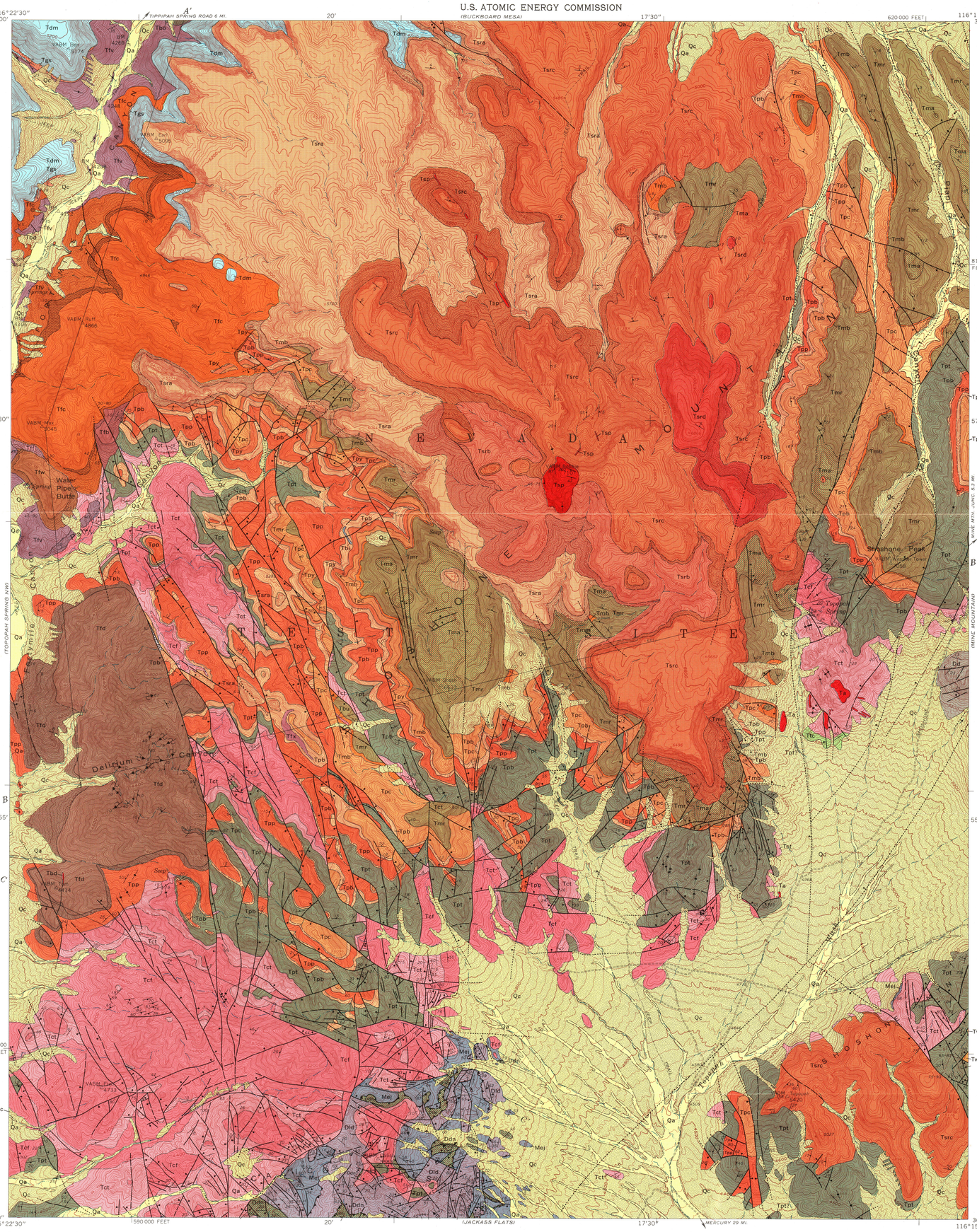
Mej Unit J(?) (350+ ft)—light- to olive- and dark-gray sandy to silty thinly laminated to very thin bedded argillite; medium- to dark-gray and brown coarsely crystalline limestone; sandy and silty stringers 3–4 in. thick that contain nodules of aphanitic to finely crystalline limestone; very thin bedded conglomerate of rounded pebbles of black chert, red argillite, and gray limestone.

Dld LIMESTONE AND DOLOMITE (100–250 ft)—upper 100 ft is dark-gray to black finely to coarsely crystalline thin- to thick-bedded crinoidal limestone with abundant pelmatozoan debris and some corals, including *Aseolites*, *Thamnopora*, and *Breviphyllum*[1]. Lower 150 ft is olive- to dark-gray finely crystalline laminated to thin-bedded limestone that locally is sandy and contains cherty lenses; abundant remains of small chonetid-like brachiopods, fragments of unidentifiable true chonetids, spiriferoid brachiopods, and tentaculitids.

Ddn DEVILS GATE LIMESTONE AND NEVADA FORMATION (400± ft)—light- to dark-gray fine- to coarse-grained thin- to thick-bedded brecciated limestone and dolomite.

Dd DEVILS GATE LIMESTONE (400± ft)—dark-gray dolomite and light- to medium-gray limestone, interbedded with minor amounts of quartzite in upper part. Dolomite is light to dark gray, weathering to shades of medium gray; aphanitic to coarsely crystalline; sparse chert blebs; laminated to thin bedded. Limestone is light to dark gray with subordinate amounts of light-brownish-gray laminae; coarsely crystalline and subordinate amounts of finely crystalline to aphanitic; locally aphanitic limestones contain sparse to abundant very fine to coarse subrounded to well-rounded quartz grains; laminated to thick bedded. Quartzite is white to medium gray, fine to coarse grained; composed of subrounded to well-rounded quartz grains; thin to thick bedded.

[1] Fossils identified by W. A. Oliver, Jr.



Base by U.S. Geological Survey, 1961
10,000-foot grid based on Nevada coordinate system, central zone

TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1970

SCALE 1:24 000
1 ½ 0 1 MILE
1 .5 0 1 KILOMETER
CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

NEVADA
QUADRANGLE LOCATION

Geology mapped in 1962–63

EXPLANATION

Stipple within Tertiary units indicates pyroclastic rocks associated with lava flows

QUATERNARY

Qa Alluvium
Qc Colluvium and talus

UNCONFORMITY

TERTIARY

Rhyolite of Shoshone Mountain
Tsp, *plug and dikes*
Tsrd, *unit D*
Tsrc, *unit C*
Tsrb, *unit B*
Tsra, *unit A*

UNCONFORMITY

Tdm Mafic lava flows of Dome Mountain
Tbd Basalt dikes — *Age relation with mafic lava flows of Dome Mountain unknown*
Tgs Conglomerate and tuffaceous gravel and sandstone

UNCONFORMITY

Pliocene — Rhyolite of Fortymile Canyon
Tfc Rhyolite of Comb Peak — *Line pattern, flow breccia*
Tff Flow breccia
Tfw Rhyolite of Water Pipe Butte
Tfb Rhyolite of Buried Canyon
Tfd Rhyolite of Delirium Canyon
Tfv Rhyolite of Vent Pass

UNCONFORMITY

Tbo Older basalt

UNCONFORMITY

Timber Mountain Tuff
Tma, *Ammonia Tanks Member*
Tmr, *Rainier Mesa Member*
Tmb, *bedded tuff*
Tbu Upper basalt flow — *Interlayered with bedded tuff of Timber Mountain Tuff*

UNCONFORMITY

Miocene — Paintbrush Tuff
Tpc Tiva Canyon Member
Tpy Yucca Mountain Member
Tpb Bedded tuff
Tpp Pah Canyon Member
Tbl Lower basalt flows
Tfx Rhyolite flow breccia
Tpt Topopah Spring Member

UNCONFORMITY

Rhyolite of Calico Hills
Tcf, *rhyolite lava flows*
Tct, *bedded tuffs, tuff breccia, and nonwelded ash-flow tuff*
Ta Andesite dikes
Tw Wahmonie Formation

UNCONFORMITY

Ttc Tuff of Crater Flat

UNCONFORMITY

MISSISSIPPIAN
Mej Unit J(?) of Eleana Formation

UNCONFORMITY

CARBONIFEROUS
DEVONIAN
Upper Devonian
Dld Limestone and dolomite
Middle Devonian
Lower Devonian
Ddn Devils Gate Limestone and Nevada Formation
Dd Devils Gate Limestone

Contact
Dashed where approximately located; dotted where concealed

Fault, showing dip, plunge of slickensides, and displacement in feet
Dashed where approximately located; dotted where concealed. Bar and ball on downthrown side

Breccia zone

Thrust fault
Dotted where concealed. Sawteeth on upper plate

Minor anticline, showing direction of plunge

Small fold, showing sense of movement and plunge of axis

PLANAR AND LINEAR FEATURES
Planar and linear symbols may be combined

Inclined
Overturned
Inclined and plunge of slickensides

Vertical
Horizontal
Strike and dip of beds

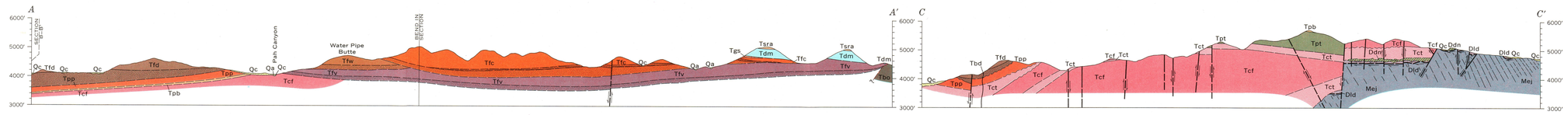
Inclined
Vertical
Strike and dip of flow layering

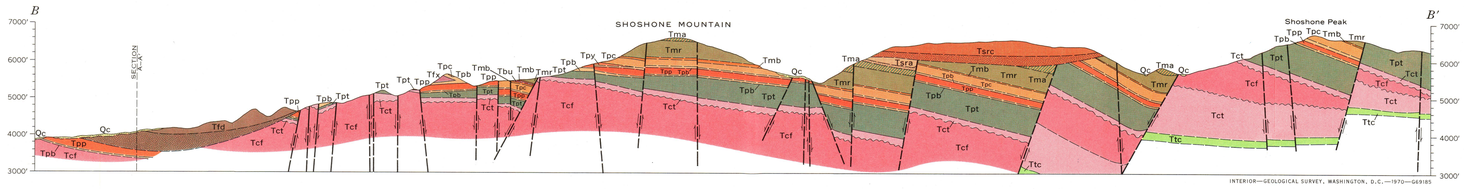
Inclined
Horizontal
Bearing and plunge of lineation

Inclined
Vertical
Strike and dip of joints

Shaft

Prospect pit





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