DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

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

GEOLOGIC QUADRANGLE MAP
TOPOPAH SPRING SW QUADRANGLE, NEVADA
GQ-439

DESCRIPTION OF MAP UNITS

Qac ALLUVIUM AND COLLUVIUM (0–515 ft)—stream, fan, and terrace gravels; locally caliche cemented.

RHYOLITES OF FORTYMILE CANYON:

Tfcr Lava flow of Comb Peak (50+ ft)—gray devitrified locally lithophysal flow-banded rhyolite. Only lower part exposed.

Tfcp Pyroclastic rock of Comb Peak (50–75 ft)—white to pink vitric bedded tuff and massive tuff breccia that grade upward into flow breccia at base of overlying flow rhyolite.

TIMBER MOUNTAIN TUFF:

Tmr Rainier Mesa Member (150+ ft)—simple(?) cooling unit of pumiceous ash-flow tuff. Top is eroded. Light-gray partly welded devitrified tuff of interior of unit grades downward into white to pink nonwelded glassy tuff at base. Phenocrysts (10–25 percent) are mainly quartz and alkali feldspar, with some plagioclase and rare biotite.

PAINTBRUSH TUFF:

Tpc Tiva Canyon Member (400± ft)—multiple-flow compound cooling unit of ash-flow tuff. Top is gray pumiceous, vitric or vapor-phase crystallized, nonwelded to partly welded tuff less than 10 ft thick that grades down to densely welded red and black vitrophyre about 5 ft thick. The vitrophyre is underlain by red- or purple-brown eutaxitic devitrified welded tuff 50–100 ft thick that grades downward into a zone of purple-gray lithophysal welded tuff 100–200 ft thick. The lithophysal tuff grades downward into densely welded purple-gray devitrified tuff 75–150 ft thick that is characterized by closely spaced conchoidal fractures subparallel to foliation. Underlying the devitrified tuff is commonly a gray moderately welded crudely columnar-jointed unit 15–30 ft thick showing vapor-phase crystallization. Underlying this is 10–20 ft of brown or orange-brown partly welded vitric shards that grade down to gray or white nonwelded poorly bedded vitric tuff 15–30 ft thick at base of cooling unit. Phenocrysts, mainly alkali feldspar and some biotite, and pumice decrease downward in the cooling unit. Top contains about 15 percent pumice and about 10 percent phenocrysts; base 2–5 percent pumice and 1–3 percent phenocrysts. A lithologically distinctive bedded tuff, 5–10 ft thick and too thin to map, everywhere separates the Tiva Canyon and Yucca Mountain Members.

Tpy Yucca Mountain Member (0–175 ft)—simple cooling unit of ash-flow tuff. Where less than 50 ft thick, entire cooling unit is nonwelded to partly welded pink or gray vitric shard tuff. Where thicker, the center of the cooling unit is purple-brown welded devitrified tuff, and partly welded tuff in the upper part of the unit shows vapor-phase crystallization. The tuff contains 3–10 percent pumice lapilli, rare small lithic inclusions of angular red-brown aphanitic volcanic rock, and 1–3 percent phenocrysts of alkali feldspar with some oligoclase and rare biotite and quartz. The member is thickest in the northwestern part of quadrangle; the wedge-out to the southeast is depositional.

Tpp Pah Canyon Member (0–150 ft)—multiple-flow cooling unit of ash-flow tuff. Periphery of cooling unit is pink or white nonwelded vitric tuff; in thick sections the center is pale orange-brown partly welded devitrified tuff. Contains 4–8 percent phenocrysts, mainly alkali feldspar and biotite with some oligoclase and rare quartz; 1–2 percent small (0.1–0.3 in.) but distinctive angular red-brown lithic inclusions of volcanic rock; about 5 percent pumice lapilli. Unit is thickest in northwest part of quadrangle; wedges out depositionally to southeast where it contains abundant large (4–10 in.) blocks of pumice.

Tpt Topopah Spring Member (700± ft)—multiple-flow compound cooling unit of ash-flow tuff. At top is gray to brown poorly bedded nonwelded to partly welded pumiceous tuff 3–25 ft thick, commonly partly silicified or otherwise altered. The partly welded tuff is underlain by red and black densely welded vitrophyre 3–10 ft thick. Below the vitrophyre is red-brown devitrified welded tuff 75–150 ft thick characterized by distinctive gray-white eutaxitic pumice; underlying this tuff is purple-gray lithophysal welded tuff 100–250 ft thick with distinctive angular lithic inclusions of red-brown porphyritic volcanic rock near top; next lower zone of brown devitrified densely welded tuff 150–250 ft thick grades to black vitrophyre 60–90 ft thick. The vitrophyre grades downward, showing decreasing welding, to basal olive-brown vitric poorly bedded nonwelded tuff about 30 ft thick. At top, member contains about 15 percent pumice lapilli and 10–15 percent phenocrysts, mainly alkali feldspar and plagioclase with some biotite; these percentages decrease downward to about 5 percent pumice lapilli and 1–3 percent phenocrysts at base.

TIMBER MOUNTAIN AND PAINTBRUSH TUFFS:

Tmp Bedded tuffs interlayered with ash-flow tuffs (0–40 ft)—vitric white to buff ash fall, thin ash flow, and reworked tuffs. Ash-fall and ash-flow tuffs typically poorly to moderately bedded; reworked tuff well bedded, locally crossbedded. Contain 5–30 percent fine to coarse pumice, 1–10 percent phenocrysts, and less than 3 percent lithic fragments of dark aphanitic volcanic rock.

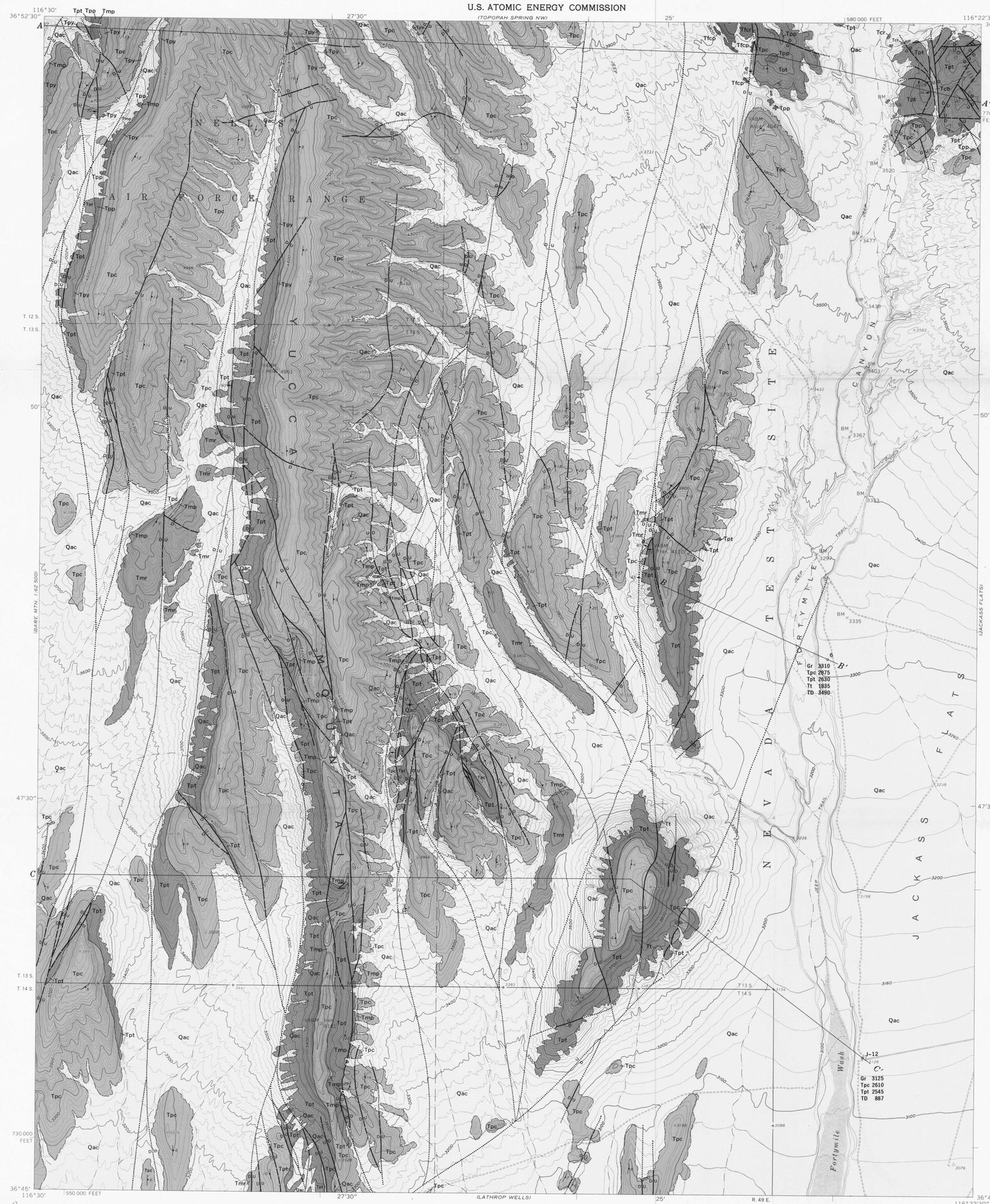
RHYOLITE OF CALICO HILLS:

Tcr Lava flow (20+ ft)—gray to red-brown, glassy to devitrified rhyolite. Flow layering is well developed and commonly has been locus of spherulitic crystallization. Phenocrysts (5–10 percent) are mainly feldspar and biotite. Only upper part exposed.

Tcb Tuff breccia (30+ ft)—white to yellow tuff, containing large (4–15 in.) blocks of glassy flow rhyolite. Both tuff and rhyolite blocks are extensively zeolitized. Only upper part exposed.

Tt UNDIVIDED TUFFS (1,655 ft)—white, buff, and pink vitric and zeolitic(?) tuff that is massive to well bedded. Bedding and local crossbedding best developed in upper part. Contains 10–30 percent pumice lapilli, 5–10 percent phenocrysts; abundant biotite in some beds. Only upper 50 ft exposed.

[1] Terminology for pyroclastic rocks from C. S. Ross and R. L. Smith (1961, Ash-flow tuffs; their origin, geologic relations, and identification: U.S. Geol. Survey Prof. Paper 366, p. 3–8) and R. L. Smith (1960, Zones and zonal variations in welded ash flows: U.S. Geol. Survey Prof. Paper 354–F, p. 149–159.



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

SCALE 1:24 000

1 ½ 0 1 MILE

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

Geology mapped in 1962

EXPLANATION

QUATERNARY
- Qac — Alluvium and colluvium

UNCONFORMITY

TERTIARY
- Pliocene
  - Tfcr, Tfcp — Rhyolites of Fortymile Canyon
    - Tfcr, *lava flow of Comb Peak*
    - Tfcp, *pyroclastic rock of Comb Peak*
- UNCONFORMITY
- Miocene(?) and Pliocene
  - Tmr — Rainier Mesa Member of Timber Mountain Tuff
- UNCONFORMITY
- Miocene(?) and Pliocene
  - Paintbrush Tuff
    - Tpc — Tiva Canyon Member
    - Tpy — Yucca Mountain Member
    - Tpp — Pah Canyon Member
    - Tpt — Topopah Spring Member
  - Tmp — Timber Mountain and Paintbrush Tuffs, *Bedded tuffs interlayered with ash-flow tuffs*
- UNCONFORMITY
- Miocene and Pliocene(?)
  - Tcr, Tcb — Rhyolite of Calico Hills (Tcr, *lava flow*; Tcb, *tuff breccia*)
  - Tt — Undivided tuffs

Contact
Dashed where approximately located

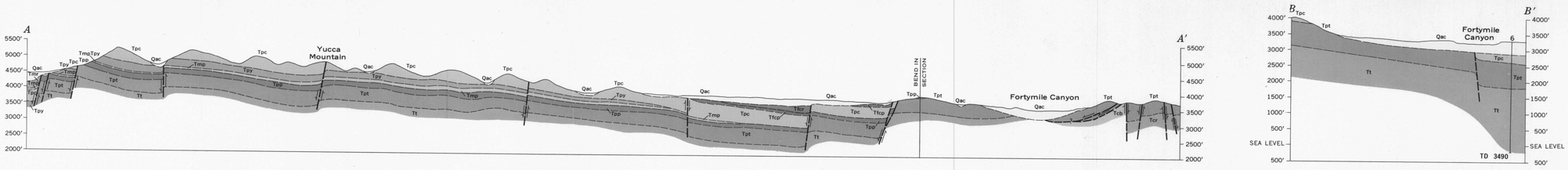
Fault, showing dip
Dashed where approximately located; dotted where concealed; queried where doubtful. U, upthrown side; D, downthrown side

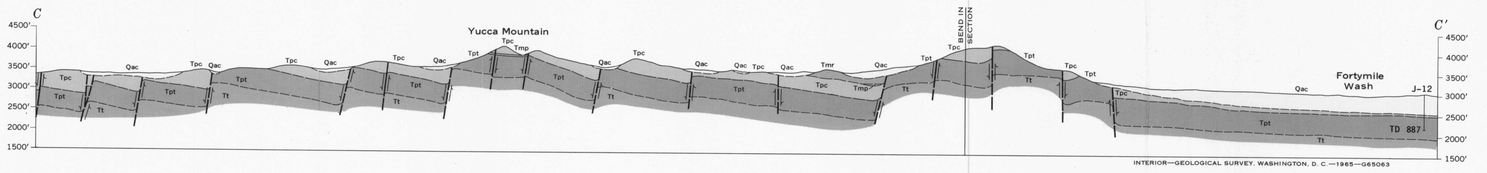
Strike and dip of beds

Strike and dip of foliation in welded tuffs

Horizontal foliation in welded tuffs

Test drill hole
Showing ground elevation (Gr), elevation of erosional top of Tiva Canyon Member and tops of other rock units shown on map (Tpc, Tpt), in feet. TD, total depth, in feet





INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1965—G65063

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

By
Peter W. Lipman and Edward J. McKay

1965

For sale by U.S. Geological Survey, price $1.00

D-01