GEOLOGIC MAP OF PAHUTE MESA, NEVADA TEST SITE AND VICINITY, NYE COUNTY, NEVADA

By

Paul P. Orkild, K. A. Sargent, and R. P. Snyder

MISCELLANEOUS GEOLOGIC INVESTIGATIONS
MAP I-567

PUBLISHED BY THE U. S. GEOLOGICAL SURVEY
WASHINGTON, D. C.
1969
GEOLOGIC MAP OF PAHUTE MESA, NEVADA TEST SITE AND VICINITY, NYE COUNTY, NEVADA

By Paul P. Orkild, K. A. Sargent, and R. P. Snyder

DESCRIPTION OF MAP UNITS

Qac   ALLUVIUM AND COLLUVIUM (0-800+ ft)—Unconsolidated bouldery to sandy stream (channel) deposits, fans, talus, and slope-wash deposits.

QI    LANDSLIDE BLOCKS—Large blocks of Grouse Canyon Member of Belted Range Tuff have slipped down the west slope of Saucer Mesa.

QTac  ALLUVIUM AND COLLUVIUM (0-400+ ft)—Two undivided units; upper is Quaternary alluvium and colluvium; lower is sandy to bouldery colluvium interlayered with Labyrinth Canyon Member of Thirsty Canyon Tuff.

QTb   BASALT OF BASALT RIDGE AND OF BUCKBOARD MESA (0-200 ft)—Dense black porphyritic basalt containing phenocrysts of labradorite and clinopyroxene as much as 30 mm long; at Buckboard Mesa, flows are nonporphyritic olivine basalt. Includes cinder beds beneath some basalt flows and agglomeratic spatter cone at Scrugham Peak.

QTbd  FEEDER DKES—Discontinuous thin dikes of scoriaceous porphyritic and nonporphyritic basalt.

THIRSTY CANYON TUFF:

Ttl   LABYRINTH CANYON MEMBER (0-50 ft)—Simple cooling unit of comenditic ash-flow tuff underlain by ash-fall tuff; pale-pink to light-gray partially welded devitrified and vapor-phase altered tuff underlain by light-gray to buff nonwelded to partially welded and glassy ash-flow tuff at base; contains 5 percent phenocrysts (0.5-2 mm); mainly sodic sanidine, with less abundant iron-rich clinopyroxene, fayalite, amphibole, sodic plagioclase, accessory oxides, and zircon.

Ttg   GOLD FLAT MEMBER (0-200 ft)—Simple cooling unit of pantelleritic ash-flow tuff, yellowish to reddish-brown, locally green to black at base, densely to partially welded, devitrified except for thin local basal vitrophyre; locally underlain by very thin ash-fall tuff; contains 15-25 percent of generally fractured phenocrysts, mainly alkali feldspar, chiefly sanidine but including numerous large (1-2+ cm) conspicuous euhedral crystals of calcic anorthoclase, with less abundant quartz, sodic plagioclase, fayalite, iron-rich clinopyroxene, opaque oxides, and accessory biotite, zircon, apatite, and chevkinite; uncommon to abundant lithic inclusions; youngest ash flows contain many phenocryst-rich cognate inclusions.

Ttt   TRAIL RIDGE MEMBER (0-280 ft)—Simple cooling unit of metaluminous to subaluminous silicic ash-flow tuff with conspicuous white to buff pumice-rich ash-fall tuff at base; ash-flow tuff reddish brown, purplish brown, and pale pink, densely to partially welded, mainly devitrified but locally with glassy vitrophyric base; contains 2-30 percent phenocrysts (1-4 mm), mainly sanidine, with less abundant iron-rich clinopyroxene, fayalitic olivine, opaque oxides, and accessory biotite, zircon, and apatite; older ash flows generally contain abundant lithic inclusions.

Ttsr  SPEARHEAD AND ROCKETWASH MEMBERS (0-435 ft)—Compound cooling unit of comenditic to trachytic sodic rhyolitic ash-flow tuff with thin buff pumice-rich ash-fall tuff locally at base; ash-flow tuff dark gray to reddish brown, partially to densely welded, devitrified and in part vapor-phase altered except for a thin glassy zone at base; individual ash flows contain 3-25 percent phenocrysts (1-5 mm), mainly sodic sanidine in upper part and mainly sanidine-anorthoclase and sodic plagioclase in lower part, with less abundant quartz, iron-rich clinopyroxene and olivine, amphibole, opaque oxides, and accessory biotite, apatite, and zircon. Some ash flows are characterized by abundant dark-gray to brown scoriaceous pumice fragments as much as 2 feet in diameter.

Tat   ASH-FALL AND REWORKED TUFF (0-175 ft)—Thick- to thick-bedded white, yellowish-gray, pinkish-gray, and light-brown vitric ash-fall tuff; locally lower part is zeolitic and cemented with calcium carbonate.

Tgs   GRAVEL AND TUFFACEOUS SEDIMENTS (0-500+ ft)—Yellowish-gray to yellowish-brown bouldery volcanic gravel; poorly sorted and stratified; locally cemented by caliche near surface. May include gravel of Quaternary age.

Tih   LAVAS OF HIDDEN CLIFF (0-100+ ft)—Medium- to dark-gray massive to vesicular trachyte and mafic trachytic lava flows; contains 5-20 percent phenocrysts, mainly plagioclase,
with less abundant olivine, clinopyroxene, opaque oxides, and apatite in an intergranular seriate texture of trachytic groundmass of alkali feldspar, plagioclase, iron-rich clinopyroxene, opaque oxides, and, locally, sodic amphibole.

Tly ROCKS OF YELLOW CLEFT—Tuffs, lavas, and minor syenite. Trachyte, trachytic sodic rhyolite, and comendite lava flows, breccias, tuff-breccias, and welded tuffs, generally dark-gray to reddish-brown; and light-gray to grayish-brown (weathering yellow orange) strongly jointed porphyritic to locally medium-grained hypidiomorphic-granular quartz syenite locally grading to trachyte; syenite contains abundant phenocrysts of anorthoclase and sodic plagioclase, and less abundant clino­pyroxene, altered olivine, opaque oxides, and apatite set in a groundmass of alkali feldspar with minor quartz, biotite, and opaque oxides.

Tlr LAVAS OF RIBBON CLIFF (0-700+ ft)—Medium-gray to brown massive to flow-layered dense to vesicular trachytic soda rhyolite, quartz trachyte, and trachyte lavas; generally crystallized except for locally glassy tops and bases; contains 15-30 percent phenocrysts, mainly large (as much as 2 cm) anorthoclase, with less abundant clinopyroxene, iron-rich olivine, and opaque oxides; flows locally are underlain by thin units of gray to buff ash-fall tuff.

Tlf MAFIC LAVAS (0-60 ft)—Dark-brown to black massive to scoriaceous olivine-bearing basalt.

TIMBER MOUNTAIN TUFF:

Tma AMMONIA TANKS MEMBER (0-300+ ft)—Compound cooling unit of ash-flow tuff consisting of partially to densely welded gray and buff glassy and devitrified quartz latitic tuff containing dark mafic scoria and pumice grading to flattened black glass as much as 2 feet long, which overlies partially to densely welded gray devitrified and glassy rhyolitic and quartz latitic tuff, which in turn overlies a thin basal zone of partially to densely welded pink, gray, and black glassy rhyolitic tuff. Tuff contains 10-35 percent phenocrysts (1-3 mm) of sanidine, quartz, and plagioclase, with less abundant biotite, clinopyroxene, hornblende, and accessory opaque iron oxides, spinel, zircon, and apatite. Xenoliths common, including rhyolite and fragments of Rainier Mesa Member.

Tpb TUFF OF BLACK TOP BUTTES (0-640 ft)—Simple cooling unit of pale-gray nonwelded to partially welded ash-flow tuff; contains 5-10 percent phenocrysts (1-2 mm), mainly alkali feldspar, with less abundant plagioclase, biotite, clinopyroxene, opaque oxides, and apatite. This ash flow is lenticular within bedded tuff 200 feet stratigraphically below the base of the Tiva Canyon Member on the south face of Pahute Mesa and is similar to Stockade Wash Member but lacks hornblende, is lower in biotite content and richer in lithic fragments than the ash-flow sequence mapped as Stockade Wash east of Split Ridge.
Tpt  TOP OH SPRING MEMBER (0-450 ft)—Compound cooling unit of reddish-brown densely welded ash-flow tuff, mainly rhyolite but commonly grades into quartz-latite at its top; mainly devitrified but glassy at top and base; contains 10-20 percent phenocrysts (1-3 mm) in quartz latitic upper part and 1-3 percent phenocrysts (1 mm) in rhyolitic lower part, mainly alkali feldspar and plagioclase, with less abundant biotite, magnetite, and clinopyroxene.

Tpw  STOCKADE WASH MEMBER (0-500 ft)—Simple cooling unit of pale-gray and brown nonwelded to partially welded rhyolite ash-flow tuff characterized by small (1 cm) orange-brown poricite fragments, rhyolitic lithic fragments, and by common large (1-2 mm) biotite flakes; contains 5-10 percent phenocrysts of alkali feldspar and plagioclase, with minor biotite, hornblende, and opaque oxides; numerous windmade cavities; columnar joints in thicker partially welded sections.

LAVAS OF SCRUGHAM PEAK QUADRANGLE:

Trpr QUARTZ-RICH RHYOLITE LAVAS (0-565 ft)—Light- to brownish-gray devitrified and gray to green vitrophyric lava flows; contains 25-30 percent (1-3 mm) phenocrysts of alkali feldspar, plagioclase, and quartz, with less abundant biotite, hornblende, and sphene.

Trpq QUARTZ-BEARING RHYOLITE LAVAS (0-1,140 ft)—Light- to dark-gray devitrified to vitrophyric lava flow; contains 10-11 percent phenocrysts (1-2 mm) of alkali feldspar and plagioclase, with less abundant quartz, biotite, sphene, opaque oxides, and hornblende.

Trpb BIOTITE RHYOLITE LAVAS (0-1,000+ ft)—Light- to dark-gray devitrified to vitrophyric lava flow; 10-12 percent phenocrysts (1-2 mm), mainly alkali feldspar and plagioclase in subequal amounts, with less abundant biotite, minor sphene, opaque oxides, clinopyroxene, and hornblende.

Trph HORNBLENDE RHYOLITE LAVAS (0-400+ ft)—Light- to greenish-gray devitrified to vitrophyric lava flow; 4-5 percent phenocrysts (1-2 mm), mainly alkali feldspar, with minor plagioclase, hornblende, opaque oxides, sphene, and biotite.

Trpp PYROXENE-BEARING RHYOLITE LAVAS (0-980+ ft)—Light- to dark-gray devitrified and vitrophyric lava flow; contains 8-10 percent phenocrysts (1-3 mm), mainly alkali feldspar and plagioclase, with less abundant biotite, opaque oxides, sphene, and clinopyroxene (augite).

Ti LATITE LAVAS OF SOUTH KAWICH VALLEY (0-80 ft)—Fine-grained dark-gray to black phenocryst-poor olivine latite lava; not distinguishable from basalt in outcrop.

Tb BEDDED TUFF (0-1,080+ ft)—White to brown glassy to zeolitized ash-fall, reworked, and nonwelded ash-flow tuff; sparse to abundant crystals of quartz, feldspar, and biotite. TUFFS AND RHYOLITES OF AREA 20—Phenocrysts, principally of quartz and feldspar, range from a few percent to about 25 percent of the rock. Quartz ranges from about 10 percent of the phenocrysts in the phenocryst-rich rhyolites to as much as 40 percent in the phenocryst-poor rhyolites. With increase in phenocrysts, the feldspars become larger, as much as 7 mm, and the plagioclase ratio increases from a few percent to about 50 percent of the feldspar. The accessory-mineral suite is characterized by allanite and pyroxene in upper part (Trael) and allanite and abundant hornblende in lower part (Tral).

Trau UPPER RHYOLITE LAVAS (0-2,040 ft)—Gray to light-greenish-gray massive to conspicuously flow-layered devitrified to vitrophyric lava flows with conspicuous biotite phenocrysts; contains 10-25 percent phenocrysts (1-4 mm), mainly quartz, alkali feldspar, plagioclase, and biotite, with less abundant allanite, zircon, apatite, clinopyroxene, hypersthene, and rare hornblende; flows locally are underlain by thin blocky flow breccias.

Tral LOWER RHYOLITE LAVAS (0-1,700 ft)—Gray to light-reddish-brown massive to flow-layered devitrified to vitrophyric lava flows with conspicuous biotite phenocrysts; contains 10-25 percent phenocrysts (1-6 mm), mainly alkali feldspar, plagioclase, quartz, and biotite, with less abundant allanite, hornblende, apatite, and clinopyroxene.

Trab BEDDED AND ASH-FLOW TUFFS (0-2,457+ ft)—Light-gray to yellow to orange-pink lithic-riche zeolitized bedded tuff and nonwelded commonly zeolitized and argillized ash-flow tuff; intercalated with upper and lower rhyolite flows of Area 20. Contains 5-20 percent phenocrysts of quartz, alkali feldspar, plagioclase, sparse biotite, and rare allanite, pyroxene, and hornblende.

Trat LITHIC-RICHE ASH-FLOW TUFF (0-2,100+ ft)—Gray to light-brown, zeolitized, nonwelded to partially welded; contains as much as 50 percent lithic fragments of gray to reddish-brown welded tuff and rhyolite as large as 4 inches; mineralogy of upper part similar to bedded and ash-flow tuff (Trab); lower part of tuff commonly contains zircon in excess of allanite.

LAVA AND TUFF OF DEAD HORSE FLAT:

Tdhb BEDDED TUFF (0-500+ ft)—Ash-fall and reworked tuff, and volcanic sandstone and tuffaceous conglomerate locally interlayering with lavas and welded tuffs of Dead Horse Flat; rocks are yellow, greenish gray, and reddish brown and commonly zeolitized.

Tdha ASH-FLOW TUFF (0-1,450+ ft)—Reddish-brown, brown, and green nonwelded to densely welded devitrified comenditic ash-flow and ash-fall tuff; sparse to common
phenocrysts of sodic sanidine, quartz, and 
spars clinopyroxene. Some ash flows are 
similar to Tub Spring Member of Belted 
Range Tuff but phenocrysts lack the 
euhedralism of those of Tub Spring, and 
Tub Spring crystals have smaller average grain 
size and generally smaller pumice and lithic 
fragments.

**Tdp** TRACHYCTIC SODIC RHYOLITE LAVA OF DEAD 
HORSE FLAT (0-615 ft)—Dark-greenish-gray 
and grayish-purple, flow-laminated; 20 
percent phenocrysts, mainly sodic sanidine, 
plagioclase, and clinopyroxene, with rare to 
sparsite in, a trachytic groundmass 
of alkali feldspar, quartz, and sodic amphibole.

**RHYOLITE OF SAUCER MESA AND TUFF OF 
BASKET VALLEY:**

**Trsu** UPPER LAVA FLOWS OF SAUCER MESA 
(0-500+ ft)—Several flows and dikes of 
green-gray and purplish-gray mainly devitrified 
flow-laminated and massive comenditic lavas and 
trachytic sodic rhyolite lavas; sparse phenocrysts of sodic 
sanidine, sparse to rare clinopyroxene, and fayalite. Unit locally includes thin lenses of 
ash-fall tuff.

**Trsf** FEEDER DIKE.

**Trsl** LOWER LAVA FLOWS OF SAUCER MESA 
(0-500+ ft)—Several flows and dikes of 
crystal-poor and crystal-rich lavas. Rocks in 
western part are mostly crystal-poor and 
lithologically identical to upper flows (Trsu); in eastern part unit includes red 
and reddish-gray trachytic rhyolite with 
abundant large phenocrysts of sodic sanidine, 
sparse clinopyroxene, and fayalite.

**Tbv** TUFF OF BASKET VALLEY (0-300 ft)— 
Densely welded to nonwelded black, brown, 
red, and green vitric and devitrified trachytic 
sodic rhyolite ash-fall 
tuff; well-developed eutaxitic structure; 
common phenocrysts of sodic sanidine, 
sparse clinopyroxene, and fayalite.

**Trt** TRACHYCTIC SODIC RHYOLITE LAVA OF 
SAUCER MESA (0-300 ft)—Dark-gray, 
flow-laminated and layered; 10 percent small 
phenocrysts of sodic sanidine, clinopyroxene, 
and fayalite in a trachytic groundmass of 
alkali feldspar, sodic amphibole, and iron 
ore; gas cavities contain vapor-phase crys-
tals of sodic amphibole.

**BELTED RANGE TUFF:**

**Tbg** GROUSE CANYON MEMBER (0-1,760 
ft)—Compound cooling unit of densely welded 
comenditic ash-flow tuff, greenish-gray to 
pale-brownish-gray and red; devitrified 
except for thin vitrophyre locally present at 
base; prominently developed compaction and 
flow foliation and flow lineation present in 
most outcrops; lenticular gas cavities con-
taining vapor-phase crystals of quartz, 
sanidine, and sodic amphibole common in 
upper and middle parts of unit; lithophysae 
locally present near base; rare to uncom-
mon phenocrysts of sodic sanidine, very 
rare to sparse quartz, clinopyroxene, and 
fayalite. Maximum exposed thickness within 
the map area is 250 feet, but the member 
is 1,760 feet thick in drill hole UE19g near 
the center of the Silent Canyon caldera.

**Tbt** TUB SPRING MEMBER (0-1,705 ft)—Com-
pound cooling unit of densely welded to 
nonwelded buff to bluish-gray and brick-red 
devitrified comenditic ash-flow tuff; 20-25 
percent phenocrysts of sodic sanidine, 
quartz, and sparse clinopyroxene and fa-
yalite. Maximum exposed thickness within 
the map area is 200 feet, but the member is 
1,705 feet thick in drill hole PM1 near the 
center of the Silent Canyon caldera.

**ASH-FLOW, ASH-FALL, AND BEDDED RE-
WORKED TUFF:**

**Tba** BEDDED REWORKED AND MINOR ASH-
FLOW TUFF (0-655 ft)—Ash-flow tuff, 
volcanic sandstone, and conglomerate; 
generally rich in rhyolite fragments; rock is 
buff, yellow, red, and gray, commonly 
zoelitized.

**Tbb** ASH-FALL TUFF AND MINOR BEDDED 
REWORKED TUFF (0-1,700 ft)—Gray vitric 
and yellow zoelitized fine to lapilli tuff; gen-
erally underlie the Grouse Canyon Member 
and are intercalated between flows of rhyo-
lite of Split Ridge (Trsr).

**Trq** RHYOLITE LAVA OF QUARTET DOME 
(0-1,775+ ft)—Thick flows and endogenous 
rhyolitic domes of light-gray to grayish-
red generally devitrified coarsely flow-
layered comenditic lava; 5-30 percent 
phenocrysts of quartz, alkali feldspar, 
and sparse clinopyroxene and fayalite.

**Trsr** RHYOLITE LAVA OF SPLIT RIDGE (0-1,100+ 
ft)—Flow and dikes of devitrified greenish-
gray and brown nonporphyritic to very 
sparsely porphyritic strongly flow-
laminated lava; vitrophyric basal zones and 
dike margins occur locally; less than 
1 percent phenocrysts of alkali feldspar, 
aegirite-augite, and fayalitic olivine.

**Trsd** DIKE.

**QUARTZ LATITE WEST OF SPLIT RIDGE:**

**Tql** LAVA FLOWS (0-820 ft)—Dark-bluish-gray 
vitric and orange to reddish-brown devitrified 
massive quartz latite flows; upper flow 
contains 10 percent phenocrysts, mainly 
plagioclase, with less abundant alkali feld-
spar, biotite, hornblende, quartz, and 
opaque oxides; lower flow contains 15 per-
cent phenocrysts (as large as 5 mm), mainly 
plagioclase, with less abundant biotite, 
hornblende, and magnetite.

**Tqt** BEDDED TUFF (0-675 ft)—Pale-gray and yel-
low fine- to coarse-beded zeolitic tuff 
containing locally common to abundant 
subangular to rounded lapilli- to cobble-
sized fragments of dark welded tuff and 
silicic lava.

**Tad** TRACHYTE LAVA OF SAUCER MESA (0-300 
ft)—Reddish-gray or green (weathering to 
dark red or brown) peralkaline trachyte 
lava; 10-30 percent large phenocrysts of 
sodic sanidine, clinopyroxene, and rare 
crystals of iron-rich olivine in either a 
vitric or a trachytic groundmass of alkali 
feldspar and sodic amphibole.
Trk  RHYOLITE LAVA OF KAWICH VALLEY (0-500+ ft)—Light- to medium-gray devitrified and glassy well-flow-laminated comenditic lavas; sparse to common phenocrysts of sodium-rich sanidine, quartz, and rare clinopyroxene and fayalite; spherulitic devitrification and zeolitic alteration common.

Tca  CALC-ALKALINE ASH-FLOW TUFF IN DRILL HOLE UE20f (492 ft)—Slightly to densely welded-calc-alkaline; occurs from 9,740 to 10,232-foot depth; contains less than 5 percent phenocrysts, mainly alkali feldspar, quartz, and rare plagioclase and biotite, hornblende, clinopyroxene, orthopyroxene, and opaque oxides; abundant small lithic inclusions.

Tto  TUFF OF TOLICHA PEAK (?) (0-195 ft)—Pink to buff densely welded devitrified shard-rich tuff; 1-2 percent phenocrysts of quartz, plagioclase, and alkali feldspar; rock weathers to hard "clinkstone."

Tnwt  NONWELDED TO SLIGHTLY WELDED ASH-FLOW TUFF IN DRILL HOLE UE20f (465 ft)—Calc-alkaline; occurs from 11,082 to 11,547-foot depth; contains 10-20 percent phenocrysts (1 mm), mainly plagioclase, with less abundant quartz, alkali feldspar, biotite, and sparse plagioclase, quartz, and opaque oxides.

Tqr  QUARTZ LATTIC LAVA IN DRILL HOLE PM1 (343+ ft)—Rhyolite flow; occurs from 7,515 to 7,858-foot depth.

Tcf  TUFF OF CRATER FLAT (0-559 ft)—Simple (?) cooling unit of reddish-brown to gray densely welded devitrified ash-flow tuff; contains 10-25 percent phenocrysts (1-2 mm), mainly plagioclase, alkali feldspar, and quartz, with less abundant biotite.

Trv  TUFF OF REDROCK VALLEY (190 ft)—Orange to reddish-brown moderately to densely welded devitrified ash-flow tuff; contains 10-20 percent phenocrysts (0.5-1 mm), mainly plagioclase, with less abundant alkali feldspar and biotite, and sparse quartz, apatite, zircon, and allanite.

Tpar  PERALKALINE RHYOLITE LAVA IN DRILL HOLE UE20f (1,682 ft)—Flows; occurs from 12,004 to 13,686-foot depth; lavas are very similar to rhyolites of Split Ridge (Trsr) and Quartet Dome (Tqr).

Tri  RHYOLITE INTRUSIVE—Dominantly light-orange-brown devitrified massive calc-alkaline lava; sparse phenocrysts of quartz, alkali feldspar, and biotite.

Td  LAVAS OF INTERMEDIATE COMPOSITION (0-4,600+ ft)—Dominantly brown and brownish-gray porphyritic andesite to rhyodacite; andesite contains 20-30 percent small phenocrysts of plagioclase, clinopyroxene, and hypersthene in a plagioclasic groundmass of plagioclase and iron ore; rhyodacite contains 20 percent large (as much as 1 cm) phenocrysts of plagioclase, brown hornblende, biotite, and clinopyroxene in a hyalopilitic groundmass of plagioclase microlites and brown glass.

Twc  TUFF OF WILSONS CAMP (?) (100-200 ft)—Simple cooling unit of nonwelded to densely welded quartz latite or rhyodacite ash-flow tuff; dark gray where glassy, light gray to reddish brown where devitrified; contains 25-35 percent phenocrysts, mainly plagioclase, with less abundant alkali feldspar, quartz, biotite, hornblende, clinopyroxene, orthopyroxene, and opaque oxides; abundant small lithic inclusions.

Tbs  BASALT (25 ft)—Single dark-gray flow containing about 30 percent phenocrysts (0.25-3 mm) of plagioclase, clinopyroxene, and iddingsite after olivine in a hyalopilitic groundmass of plagioclase, olivine, glass rich in opaque oxides, and chlorophaeite.

Tab  BEDDED TUFF (0-2,000+ ft)—White to pale-brown thin- to thick-bedded tuffaceous sediments and ash-fall tuff; locally ash-fall tuffs contain abundant pumice averaging 1 cm in length; some beds are reworked and conglomeratic; locally rich in dacite lithic fragments; commonly zeolitized.

Tgi  GRANITIC INTRUSIVE—Grayish-orange-pink sericitized chloritized granodiorite porphyry with interstitial granophyric texture; contains 20 percent quartz, 60 percent sericitized albition plagioclase, 10 percent potassium-rich feldspar altered to sericite, 9 percent chlorite after biotite, 1 percent pyrite and magnetite, and trace of zircon, apatite, and calcite. Average grain size about 1 mm; plagioclase phenocrysts as large as 1 cm.

Mg  LEUCOCRANITE—Reddish-brown, equigranular to medium-grained; contains about 40 percent quartz and 60 percent perthite; plagioclase averages less than 1 percent; a few shreds of muscovite constitute the only micaceous mineral.

STIRLING QUARTZITE:

pCse  UNIT E (795 ft)—Predominantly micaceous siltstone and quartzite; small amount of sandstone, argillite, and carbonate material in lower part.

pCsd  UNIT D (270 ft)—Light- to medium-gray limestone and dolomite; silty in upper part.

pCsc  UNIT C (835 ft)—Upper part predominantly greenish-gray siltstone, which grades locally to argillite; several thin dolomite layers near top. Lower 600 feet gray to grayish-purple siltstone with abundant micaceous siltstone and quartzite; minor thin dolomite layers near base.

pCsl  LOWER PART (2,970 ft)—Upper part (1,130 ft) purple to greenish-gray sequence containing nonmicaceous to highly sericitic silty sandstone, quartzite, and siltstone; uppermost beds transitional to unit C. Lower part (1,840 ft) predominantly purplish-gray to gray and pink quartzite; minor micaceous siltstone or phyllite, which becomes less abundant downward.