

EXPLANATION

METAMORPHIC ROCKS

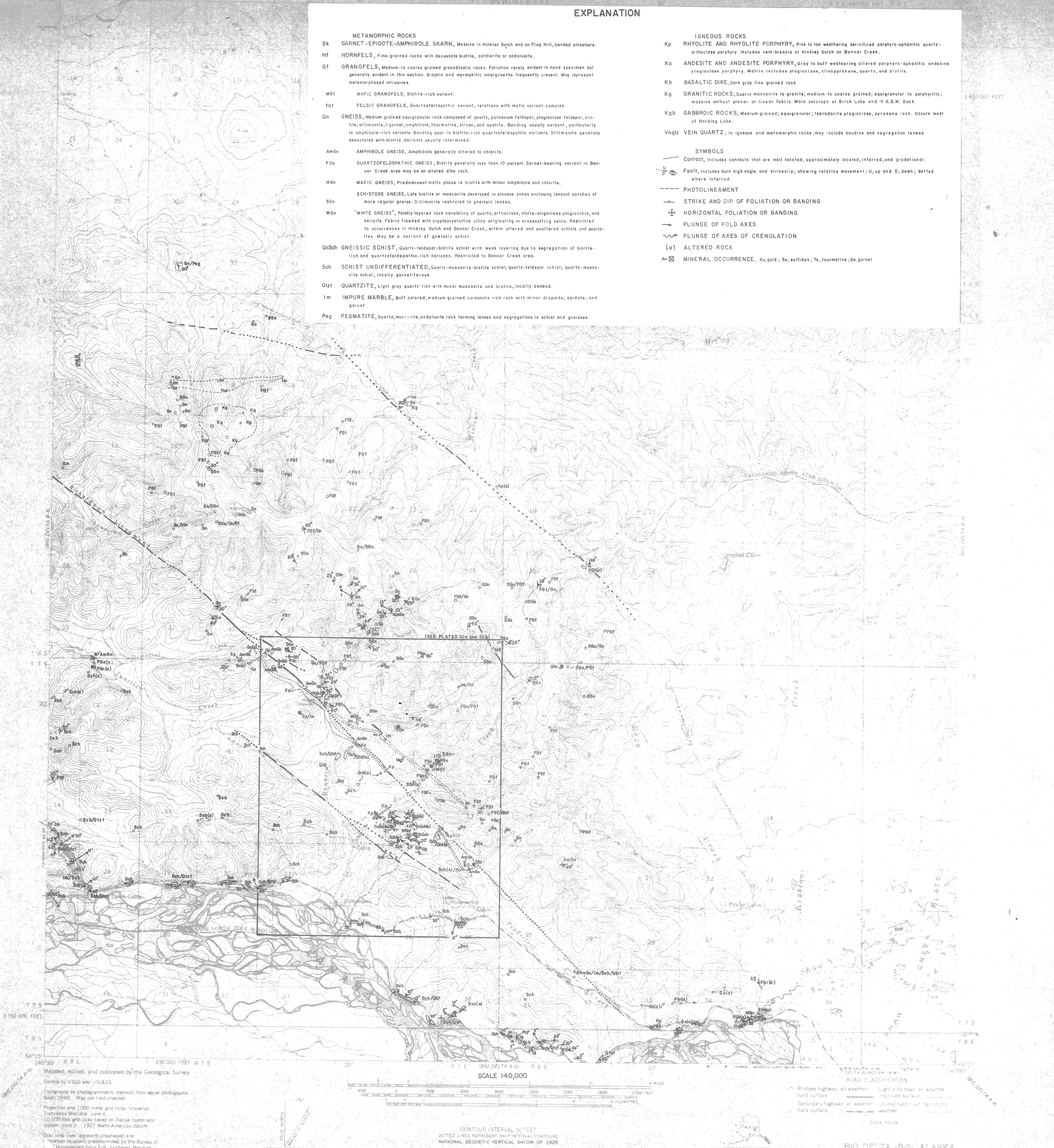
- Sk GARNET-EPIDOTE-AMPHIBOLE SKARN, Massive in Hinkley Gulch and on Flag Hill, banded elsewhere.
- Hf HORNFELS, Fine-grained rocks with decussate biotite, cordierite or andalusite.
- Gf GRANOFELS, Medium-to coarse grained granoblastic rocks. Foliation rarely evident in hand specimens but generally evident in thin section. Graphic and mylonitic intergrowths frequently present. May represent metamorphosed intrusives.
- Mgf MAFIC GRANOFELS, Biotite-rich variant.
- Fgf FELSIC GRANOFELS, Quartzofeldspathic variant, relations with mafic variant complex.
- Gn GNEISS, Medium grained equigranular rock composed of quartz, potassium feldspar, plagioclase feldspar, biotite, sillimanite, garnet, amphibole, tourmaline, zircon, and apatite. Banding usually evident, particularly in amphibole-rich variants. Banding poor in biotite-rich quartzofeldspathic variants. Sillimanite generally associated with biotite. Variants usually intermixed.
- AmGn AMPHIBOLE GNEISS, Amphibole generally altered to chlorite.
- Fgn QUARTZFELDSPATHIC GNEISS, Biotite generally less than 10 percent. Garnet-bearing variant in Banner Creek area may be an altered dike rock.
- Mgn MAFIC GNEISS, Predominant mafic phase is biotite with minor amphibole and chlorite.
- Sgn SCHISTOSE GNEISS, Late biotite or muscovite developed in sinuous zones enclosing lensoid patches of more regular gneiss. Sillimanite restricted to gneissic lenses.
- Wgn "WHITE GNEISS", Faintly layered rock consisting of quartz, orthoclase, albite-oligoclase plagioclase, and sericite. Fabric flooded with cryptocrystalline silica originating in crosscutting veins. Restricted to occurrences in Hinkley Gulch and Banner Creek, within altered and unaltered schists and quartzites. May be a variant of gneissic schist.
- GnSch GNEISSIC SCHIST, Quartz-feldspar-biotite schist with weak layering due to segregation of biotite-rich and quartzofeldspathic-rich horizons. Restricted to Banner Creek area.
- Sch SCHIST UNDIFFERENTIATED, Quartz-muscovite-biotite schist; quartz-feldspar schist; quartz-muscovite schist, locally garnetiferous.
- QtzI QUARTZITE, Light gray quartz rich with minor muscovite and biotite, locally banded.
- Im IMPURE MARBLE, Buff colored, medium grained carbonate rich rock with minor diopside, epidote, and garnet.
- Peg PEGMATITE, Quartz, muscovite, andalusite rock forming lenses and segregations in schist and gneisses.

IGNEOUS ROCKS

- Kp RHYOLITE AND RHYOLITE PORPHYRY, Pink to tan weathering sericitized porphyro-aphanitic quartz-orthoclase porphyry. Includes vent-breccia at Hinkley Gulch on Banner Creek.
- Ka ANDESITE AND ANDESITE PORPHYRY, Gray to buff weathering altered porphyro-aphanitic andesine plagioclase porphyry. Matrix includes plagioclase, clinopyroxene, quartz, and biotite.
- Kb BASALTIC DIKE, Dark gray fine grained rock
- Kg GRANITIC ROCKS, Quartz monzonite to granite; medium to coarse grained, equigranular to porphyritic; massive without planar or linear fabric. Main outcrops at Birch Lake and V.A.B.M. Back.
- Kgb GABBROIC ROCKS, Medium grained; equigranular; labradorite plagioclase, pyroxene rock. Occurs west of Harding Lake.
- Vnqtz VEIN QUARTZ, In igneous and metamorphic rocks, may include boudins and segregation lenses

SYMBOLS

- Contact, includes contacts that are well located, approximately located, inferred, and gradational.
- Fault, includes both high angle and strikeslip; showing relative movement; U, up and D, down; dotted where inferred.
- PHOTOLINEAMENT
- STRIKE AND DIP OF FOLIATION OR BANDING
- HORIZONTAL FOLIATION OR BANDING
- PLUNGE OF FOLD AXES
- PLUNGE OF AXES OF CRENULATION
- (a) ALTERED ROCK
- MINERAL OCCURRENCE, Au, gold; Su, sulfides; To, tourmaline; Gg, garnet



Mapped, edited, and published by the Geological Survey  
Control by USGS and USCGS  
Topography by photogrammetric methods from aerial photographs taken 1949. Map not field checked.  
Projection and 1000 meter grid ticks: Universal Transverse Mercator, zone 6.  
10,000-foot grid ticks based on Alaska coordinate system, zone 3, 1927 North American datum.  
Gray lined lines represent unsurveyed and marked locations predetermined by the Bureau of Management, Fairbanks, Alaska.  
as portrayed, indicate only the wetter areas, if low relief, as interpreted from aerial photographs.

**GEOLOGY OF THE RICHARDSON MINING DISTRICT, ALASKA**  
BY  
R.C. Swainbank, P.J. Burton, and P.A. Metz  
Mineral Industry Research Laboratory  
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BIG DELTA (B-5) ALASKA  
14415-A145007-1-A30  
1949  
PHOTOREVISED 1975