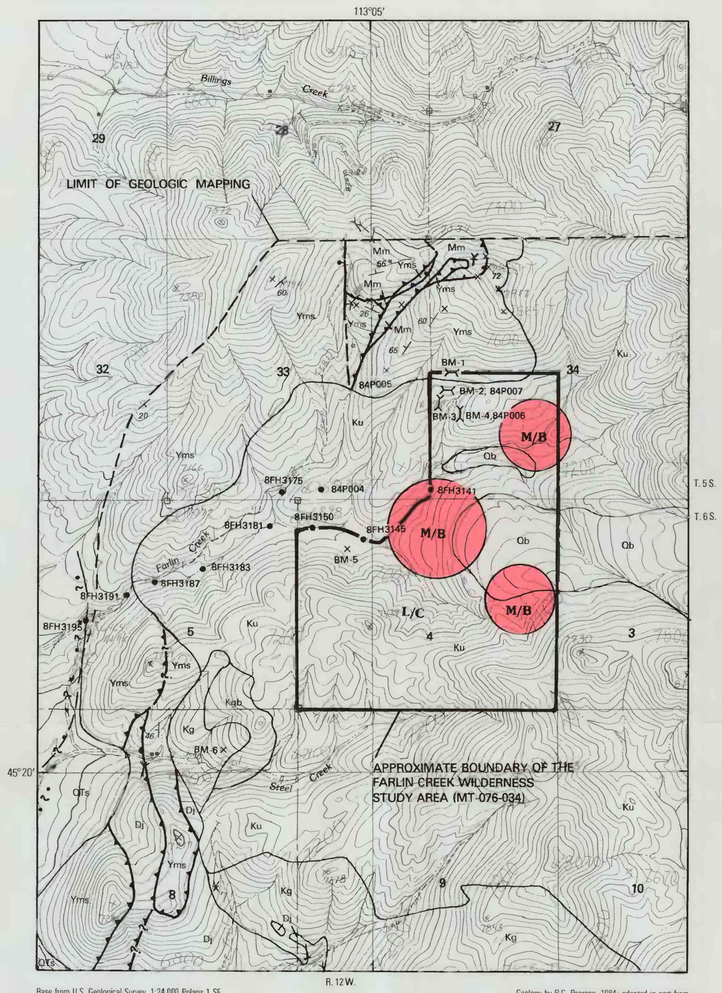
DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY

BULLETIN 1724-C
PLATE 1



Base from U.S. Geological Survey, 1:24,000 Polaris 1 SE quadrangle, unpublished, unedited map

Geology by R.C. Pearson, 1984; adapted in part from unpublished map by D.R. Zimbelman (1979-81)

DESCRIPTION OF MAP UNITS

QTs **Slope, alluvial, and valley-fill deposits (Quaternary and Tertiary)**—Slope deposits are fine, angular debris of Mount Shields(?) Formation, partly slumped, on moderately steep slopes; mapped where identity of bedrock is obscured. Alluvial deposits are mainly fine to coarse gravel along Farlin Creek and Steel Creek. Valley-fill deposits of Tertiary age are inferred along west edge of map area from Steel Creek northward to north of Farlin Creek; no exposures in map area; exposures elsewhere along east side of Grasshopper Creek valley are tuffaceous sandstone, tuff, and nonvolcanic gravel

Qb **Block stream (Quaternary)**—Consists of angular to subrounded, boulder-sized blocks of Middle Proterozoic Quartzite and minor Cretaceous granodiorite in tonguelike deposit that occupies valley of one branch of Farlin Creek. Quartzite derived from southwest flank of Baldy Mountain, about 1 mi east of the study area

Ku **Uphill Creek Granodiorite (Cretaceous)**—Light-gray, medium-grained, nonfoliated, hornblende-biotite granodiorite. Major pluton of Pioneer batholith. Contact commonly gradational; small bodies of generally fine-grained, light- to medium-gray rocks intrude the country rock—mainly Mount Shields(?) Formation—in a contact zone locally more than 300 ft wide. Biotite-pyroxene granodiorite described next is the only one of these marginal rocks mapped separately

Kgb **Biotite-pyroxene granodiorite (Cretaceous)**—Fine-grained, medium-gray, brown-weathering rock that intrudes gabbro of Polaris School and is intruded by Uphill Creek Granodiorite. One thin section contains (in percent) andesine, 43.2; quartz, 15.5; orthoclase, 8.4; biotite, 15.6; orthopyroxene and clinopyroxene, 15.7; opaques, 1.4

Kg **Hornblende gabbro of Polaris School (Cretaceous)**—Medium-grained, dark-gray to dark-greenish-gray, inhomogeneous rock that consists dominantly of hornblende and bytownite. Near carbonate sedimentary rocks, gabbro contains inclusions of marble and skarn and is more inhomogeneous than elsewhere; it appears to be contaminated by reaction of the magma with carbonate rocks

Mm **Mission Canyon Limestone and Big Snowy(?) Group (Upper Mississippian)**—Mostly white to light-gray, fine- to coarse-grained, massive to thin-bedded calcitic and locally dolomitic marble. Unit also contains a few beds of light-green to white calc-silicate granofels, white calc-silicate-bearing quartzite, and black, biotitic calc-silicate hornfels

Dj **Jefferson Dolomite (Upper Devonian)**—Generally white, yellowish-brown-weathering, medium-grained dolomitic marble; local small masses are medium gray and slightly fetid. Within 1 mi south of map area, unit has become mostly dark gray and generally fetid. Near thrust faults, rock is commonly brecciated. Dolomite has been silicated to form skarn locally adjacent to gabbro of Polaris School and Uphill Creek Granodiorite

Yms **Mount Shields(?) Formation (Middle Proterozoic)**—Coarse- to medium-grained, gray, white, tan, and locally pink quartzite and minor gray quartzose phyllite. Quartzite variety feldspathic and micaceous; dark micaceous laminae are common. Bedding attitudes and characteristics in many outcrops obscured by closely spaced joints that are coated with micas, chlorite, and iron oxides. Near granodiorite, unit is cut by white to medium-gray dikes

Contact

Normal fault—Dashed where approximately located; bar and ball on downthrown side

Thrust fault—Dashed where approximately located, queried where doubtful; sawteeth on upper plate

Strike and dip

BM-4 × **Prospect pit, showing sample number**

BM-1 **Bulldozer cut, showing sample number**

Adit

Open

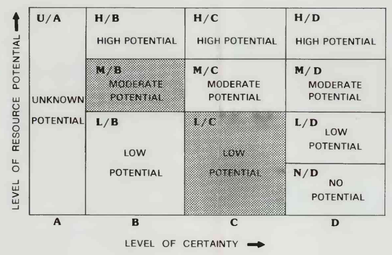
Inaccessible

8FH3191 **Stream-sediment sample locality, showing sample number**

EXPLANATION OF MINERAL RESOURCE POTENTIAL SHOWN ON MAP A

M/B **Geologic terrane having moderate resource potential for molybdenum, with certainty level B, and low resource potential for other metals, nonmetals, oil and gas, and geothermal energy, with certainty level C**

L/C **Geologic terrane having low resource potential for all metals, nonmetals, oil and gas, and geothermal energy, with certainty level C**



LEVELS OF RESOURCE POTENTIAL

- **H** High mineral resource potential
- **M** Moderate mineral resource potential
- **L** Low mineral resource potential
- **U** Unknown mineral resource potential
- **N** No known mineral resource potential

LEVELS OF CERTAINTY

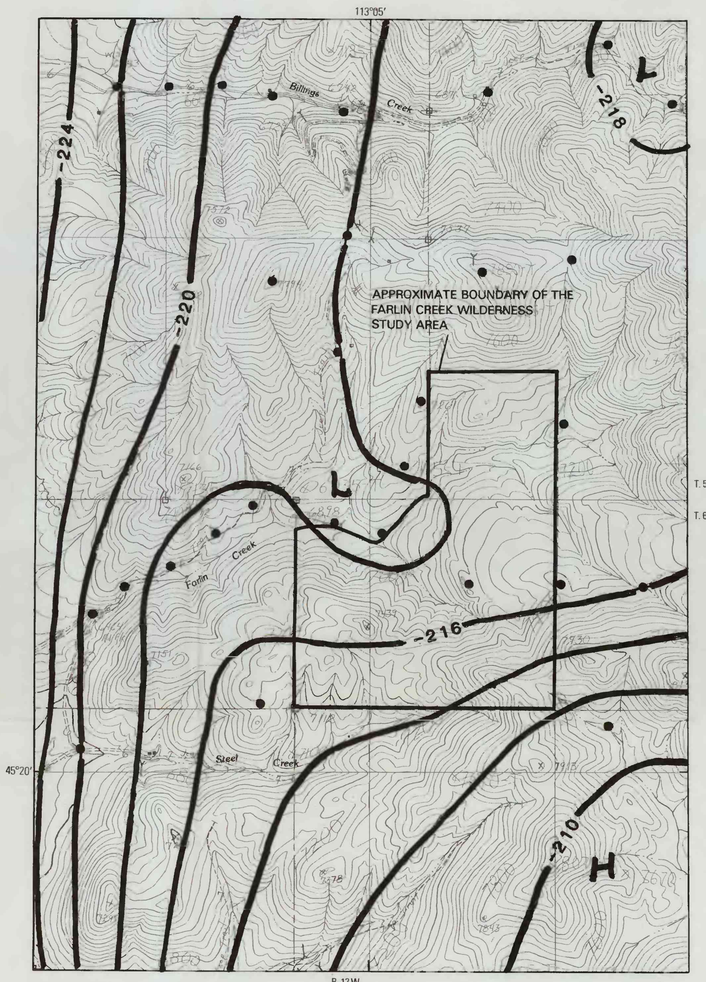
- **A** Available data not adequate
- **B** Data indicate geologic environment and suggest level of resource potential
- **C** Data indicate geologic environment, give good indication of level of resource potential, but do not establish activity of resource-forming processes
- **D** Data clearly define geologic environment and level of resource potential and indicate activity of resource-forming processes in all or part of the area

Diagram showing relationships between levels of mineral resource potential and levels of certainty. Shading shows levels that apply to this study area

CORRELATION OF MAP UNITS

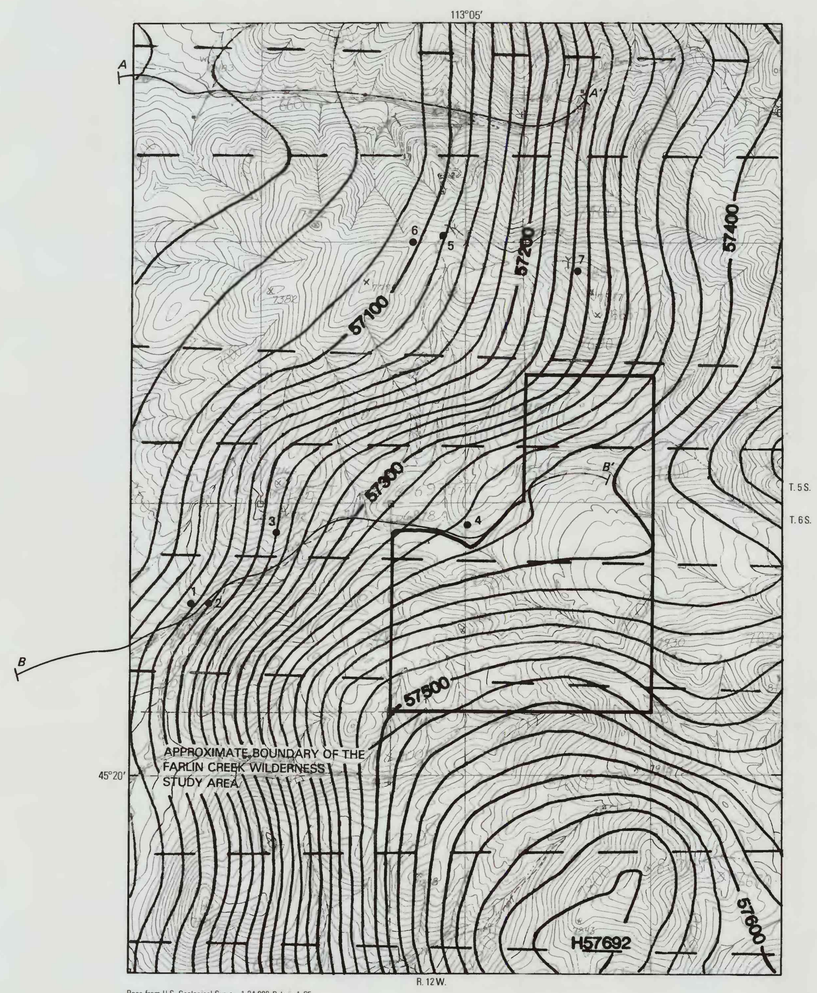
QTs, Qb	QUATERNARY AND TERTIARY
Ku	CRETACEOUS
Kgb	
Kg	
Mm	MISSISSIPPIAN
Dj	DEVONIAN
Yms	MIDDLE PROTEROZOIC

Map A. Map showing mineral resource potential, geology, and sample localities.



Base from U.S. Geological Survey, 1:24,000 Polaris 1 SE quadrangle, unpublished, unedited map

Map B. Complete Bouguer gravity anomaly map. Contour interval is 2 milligals; reduction density is 2.67 grams per cubic centimeter. Dots represent gravity stations. H, high; L, low.



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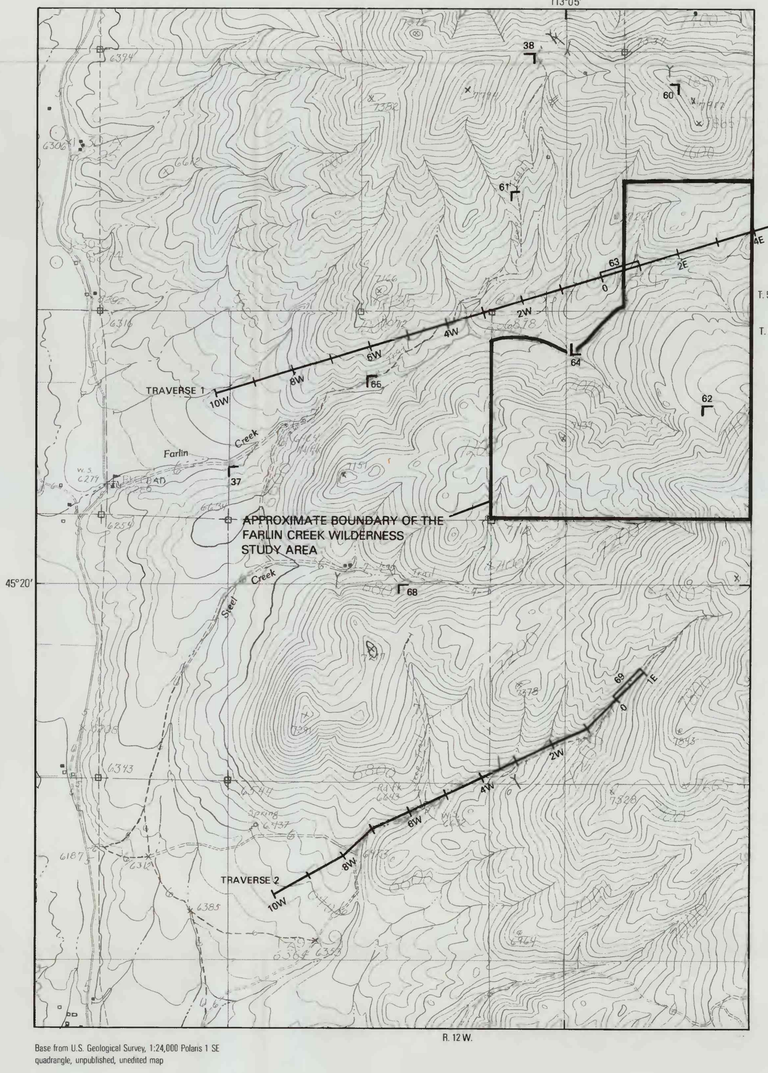
Map C. Aeromagnetic anomaly map. A-A′ and B-B′ are traces of ground total-intensity magnetic traverses. Rock-sample localities (dots) correspond to entries in table 3. Ground and aeromagnetic profiles are shown on figure 3. Contour interval is 20 gammas (nanoteslas). Dashed lines are traces of flight lines. "H57692" indicates a high, in gammas.



Base from U.S. Geological Survey, 1:24,000 Polaris 1 SE quadrangle, unpublished, unedited map

EXPLANATION FOR MAP D

Telluric traverse showing dipole sites (hachures)—Dipole spacing 250 m

AMT soundings, showing station number and dipole configuration—Dipole spacing 25 m

AMT sounding on telluric traverse, showing station number—Dipole spacing 250 m

Map D. Map showing location of telluric profiles and AMT (audio-magnetotelluric) soundings.

SCALE 1:24 000

1 ½ 0 1 MILE

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

MAPS SHOWING MINERAL RESOURCE POTENTIAL, GEOLOGY, GEOCHEMICAL SAMPLE LOCALITIES, AND GEOPHYSICAL DATA FOR THE FARLIN CREEK WILDERNESS STUDY AREA, BEAVERHEAD COUNTY, MONTANA