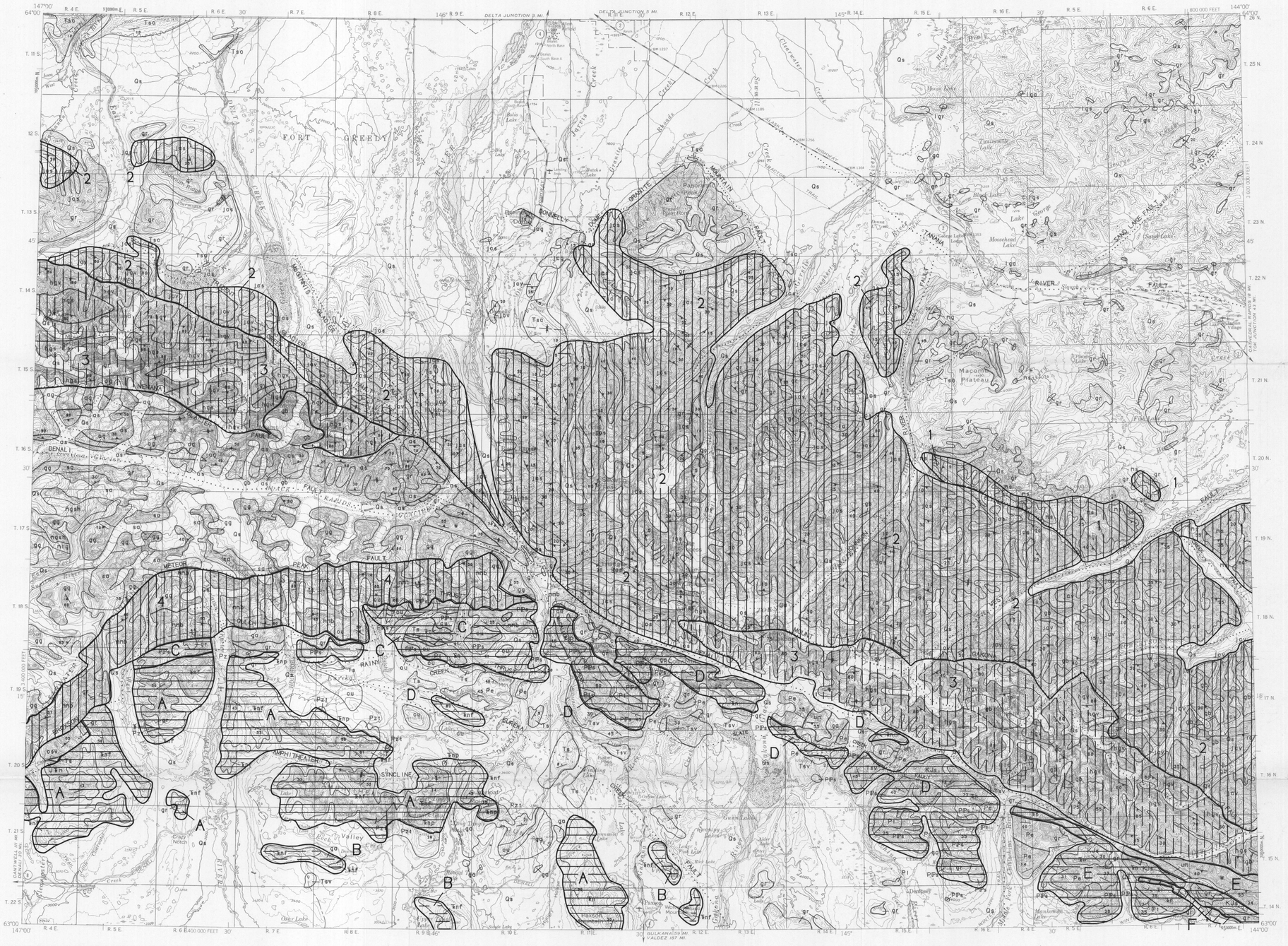
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

FOLIO OF THE MOUNT HAYES QUADRANGLE
MISCELLANEOUS FIELD STUDIES
MAP MF-1996-A
SHEET 3 OF 4
Explanatory pamphlet accompanies map



Base from U.S. Geological Survey, 1955
Universal Transverse Mercator projection

Generalized bedrock geologic map compiled by Warren J. Nokleberg from mapping by Warren J. Nokleberg, Ian M. Lange, John N. Aleinikoff, Ronny T. Miyaoka, and Richard E. Zehner, 1977-85

SCALE 1:250 000

5 0 5 10 15 20 25 MILES

5 0 5 10 15 20 25 KILOMETERS

CONTOUR INTERVAL 200 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

GOLD QUARTZ VEIN DEPOSITS, Cu-Ag QUARTZ VEIN DEPOSITS, AND KENNECOTT Cu-Ag DEPOSITS

METALLIFEROUS MINERAL RESOURCE ASSESSMENT MAPS OF THE MOUNT HAYES QUADRANGLE, EASTERN ALASKA RANGE, ALASKA

By
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1990

GOLD QUARTZ VEIN DEPOSITS, Cu-Ag QUARTZ VEIN DEPOSITS, AND KENNECOTT Cu-Ag DEPOSITS

EXPLANATION

Gold quartz vein deposits--Area of potential for undiscovered deposits. Numbers refer to table 5

Moderate

Low

Cu-Ag quartz vein deposits--Area of potential for undiscovered deposits. Letters refer to table 6

Moderate

Low

Kennecott Cu-Ag deposits--Area of potential for undiscovered deposits. Letter refers to table 7

NOTE: See sheet 1 for explanation of geologic symbols.

Table 5.--Potential and recognition criteria for gold quartz vein deposits, Mount Hayes quadrangle, eastern Alaska Range, Alaska

(+, letter, element, or mineral indicates criterion present; 0 indicates criterion not observed)

Potential	Recognition criteria present in each area							
	Diagnostic				Secondary			
	Area 1	2	3	4	1	2	3-5	6
Moderate	1	0	+	+	+	+	+	gold, py, ar
Moderate	2	+	+	+	+	+	+	gold, py, ar
Low	3	0	+	+	+	+	+	ar
Moderate	4	0	+	+	+	+	+	gold, cin, py, ar

Description of recognition criteria

Diagnostic

1. Geologically favorable environment of regionally metamorphosed and penetratively deformed graywacke, shale, or chert intruded by granitic plutons.
2. Known deposit, prospect, or occurrence.
3. Greenschist facies regional metamorphism.
4. Quartz veins, with or without with Fe-carbonate, pyrite, arsenopyrite, and base-metal sulfides.

Secondary

1. Intrusion of calc-alkaline plutons during or just after regional metamorphism and penetrative deformation.
2. Quartz-vein emplacement along major faults, shear zones, axial planes, and fold axes.
3. Anomalous values of As, Sb, Cu, Mo, W, Au, Ag, or Hg in rock samples.
4. Anomalous values of As, Sb, Cu, Mo, W, Au, Ag, or Hg in stream-sediment samples.
5. Anomalous values of As, Sb, Cu, Mo, W, Au, Ag, or Hg in heavy-mineral-concentrate samples.
6. Occurrence of gold, pyrite, or arsenopyrite in heavy-mineral-concentrates samples.

Table 6.--Potential and recognition criteria for Cu-Ag quartz vein deposits, Mount Hayes quadrangle, eastern Alaska Range, Alaska

(+, letter, element, or mineral indicates criterion present; 0 indicates criterion not observed)

Potential	Recognition criteria present in each area									
	Diagnostic					Secondary				
	Area 1	2	3	4	5	1	2	3	4	5
Moderate	A	+	+	+	+	+	Cu, Ag, Au	Cu, Ag	Cu, Ag	gold, py cp
Low	B	0	+	+	+	+	0	0	0	0
Moderate	C	+	+	+	+	+	Cu, Ag Au	Cu	Cu, Ag	cp, py
Moderate	D	+	+	+	+	+	Cu, Ag Au	Cu, Ag	Cu	gold, py, cp
Moderate	E	+	+	+	+	+	0	Cu	Cu, Ag	gold, py, cp

Description of recognition criteria

Diagnostic

1. Geologically favorable environment of regionally metamorphosed and penetratively deformed mafic or intermediate igneous rocks.
2. Known deposit, prospect, or occurrence.
3. Prehnite-pumpellyite to lower greenschist facies metamorphism.
4. Quartz veins.
5. Areas of pervasively altered greenstone with chlorite, epidote, actinolite, or carbonate.

Secondary

1. Quartz vein occurrence controlled by faults and shear zones.
2. Anomalous values of Cu, Ag, or Au in rock samples.
3. Anomalous values of Cu, Ag, or Au in stream-sediment samples.
4. Anomalous values of Cu, Ag, or Au in heavy-mineral-concentrate samples.
5. Occurrence of chalcopyrite, bornite, chalcocite, pyrite, native copper, or gold in heavy-mineral-concentrate samples.

Table 7.--Potential and recognition criteria for Kennecott Cu-Ag deposits, Mount Hayes quadrangle, eastern Alaska Range, Alaska

(+, letter, element, or mineral indicates criterion present; 0 indicates criterion not observed)

Potential	Recognition criteria present in area									
	Diagnostic					Secondary				
	Area 1	2	3	4	5	1	2	3	4	5
Moderate	F	0	+	0	+	+	0	0	Zn, Ag	cp, py

Description of recognition criteria

Diagnostic

1. Geologically favorable environment of metabasalt, disconformably overlain by limestone or dolomite.
2. Known deposit, prospect, or occurrence.
3. Prehnite-pumpellyite to lower greenschist-facies regional metamorphism.
4. Weathered sabhka facies in carbonate rock overlying metabasalt.
5. Quartz-epidote-sulfide-copper-carbonate veins in metabasalt.

Secondary

1. Amydgules in metabasalt with chlorite, chalcedony, quartz, epidote, zeolites, calcite, Cu-sulfides, and rare native copper.
2. Anomalous values of Cu, Pb, Zn, or Ag in rock samples.
3. Anomalous values of Cu, Pb, or Ag in stream-sediment samples.
4. Anomalous values of Cu, Pb, Zn, or Ag in heavy-mineral-concentrate samples.
5. Occurrence of chalcocite, bornite, covellite, galena, sphalerite, or pyrite in heavy-mineral-concentrate samples.