DEPARTMENT OF THE INTERIOR

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SHEET 2 OF 3

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Mineral Resources - Medfra Quadrangle, Alaska

INTRODUCTION

The mineral resource assessment of the Medfra quadrangle is part of a multidisciplinary study carried out in 1978-1979 by the U.S. Geological Survey under its Alaska Mineral Resources Assessment Program (AMRAP). These investigations represent the first attempt to evaluate the mineral resource potential of the Medfra quadrangle by an integrated study of geological, geochemical, and geophysical data. It should be emphasized that our investigations were of a reconnaissance nature; bedrock sampling and observations were limited to 650 sites, and stream sediment, moss, and pan concentrate sampling to 515 sites.

Background data for this assessment are contained in a series of previously open-filed reports: a regional scale (1:250,000) geologic map (Patton and others, 1980), a mineral occurrence map (Schwab and others, 1981), a report on the chemistry, mineralogy, and K-Ar ages of igneous and metamorphic rocks (Moll and others, 1981), an interpretation of Landsat imagery of the quadrangle (Le Compte, 1981), an interpretation of aeromagnetic data (Patton and others, 1982), a summary of geochemical analyses of stream sediment, moss, and heavy mineral concentrate samples (King and others, 1980), and a series of six reports on the distribution and abundance of various chemical elements in stream sediment, heavy mineral concentrate, and moss samples (King and others, 1983). Brief reports have also been open-filed describing a contact metasomatic magnetite deposit in the upper Sulukna River (Throckmorton and Patton, 1978) and a U- and Th-rich rhyolite in the Sischu Mountains (Miller and others, 1980).

This report consists of three sheets:

Sheet 1. A generalized geologic map showing known mineral deposits and occurrences, and areas designated as favorable for the occurrence of undiscovered mineral deposits.

Sheet 2. Tables describing:
- Table 1 -- Known mines and prospects
- 2 -- Occurrences of sulfides and other indicators of mineralization
- 3 -- Geochemical data for mineral occurrences listed in Table 2
- 4 -- Bedrock samples containing geochemical anomalies but no visible mineralization

Sheet 3. Additional tables describing:
- Table 5 -- Criteria used to select areas favorable for the occurrence of undiscovered mineral deposits
- 6 -- Threshold values for stream sediment, moss, and C-2 and C-3 fractions of heavy mineral concentrates

and a text describing the mineral and mineral fuel resources of the quadrangle.

Table 1.--*Known mines and prospects in the Medfra quadrangle*

Map No.	Name[1] (if known)	Location (Township & Range)	Development category[2]	Resource(s)[3]	Deposit type	Form	Description	References[4]
1	(Wyoming Creek)	T. 22 S. R. 15 E.	P/I	Hg, Sb	Lode	Vein	Vein, 75 cm thick, consisting of quartz intergrown with cinnabar and coarse stibnite. Vein in contact zone between monzonite stock and Cretaceous sedimentary rocks.	Mertie and Harrington, 1916, p. 258-259; Berg and Cobb, 1967, p. 227-228
2	Nixon Fork Mining Co.	T. 26 S. R. 21 E.	M/I	Ag, Au, (Bi), (Cu), (FM)	Lode	Contact metamorphic, hydrothermal	Ore occurs in small, locally rich, contact metamorphic deposits in crystalline limestone within approx. 100-150 m of faulted contact with quartz monzonite intrusion. Some deposits may be later hydrothermal replacement bodies. Primary ore minerals are auriferous chalcopyrite and pyrite; most ore is oxidized and gold enriched. Copper content of 1 to 12 percent. Production from Nixon Fork and Whalen mines estimated at 40,000 to 60,000 oz gold. Production recorded between 1919 and 1960's. Includes Crystal, Garnet, High Grade, Keen, McGowan & Lind, McGowan & Mespelt, Mespelt & Co., Mespelt Bros., and Nixon claims.	Brown, 1926, p. 127-130; Mertie, 1936, p. 229-241; Berg and Cobb, 1967, p. 96-97
3	Whalen	T. 26 S. R. 21 E.	M/I	Ag, Au, (Bi), (Cu), (FM), (RE), (W)	Lode	Contact metamorphic, hydrothermal	----do----	----do----
4	(Hidden Creek)	T. 26 S. R. 22 E.	P/I	Au	Lode	Vein	Prospect on a pyroxenite dike in limestone, copper carbonates present. No recorded production.	Martin, 1922, p. 161
5	Stone	T. 27 S. R. 21 E.	M/A	Au	Lode	Contact metamorphic	Small gold mine near contact between Paleozoic limestone and a small intrusive body. Operations began in 1949.	White and Stevens, 1953, p. 10; Berg and Cobb, 1967, p. 97
6	---	T. 28 S. R. 21 E.	P/I	Mn	Lode	Sedimentary	Manganese carbonate in shale and sandstone, exposed for 150 m on riverbank. Samples contain up to 23 percent manganese.	Berg and Cobb, 1967, p. 97
7	(Boulder Creek)	T. 25 S. R. 22 E.	P/I	Au	Placer	Disseminated	Colors of gold reported; no confirmation. Map location approximate.	Brown, 1926, p. 141
8	(Cottonwood Creek)	T. 24 S. R. 21 E.	P/I	Au	Placer	Disseminated	Colors of gold reported; no confirmation. Map location approximate.	Brown, 1926, p. 141
9	(Ruby Creek)	T. 26 S. R. 21 E.	M/I	Au, (Bi), (Cu), (FM), (Sn), (W)	Placer	Disseminated	Gold derived from lodes at head of Crystal Gulch. Sluice box concentrate contained cassiterite, ilmenite, scheelite, thorianite, sphene, hematite, malachite and zircon with uranium. Known mining 1917 to 1933.	Brown, 1926, p. 127, 138; White and Stevens, 1953, p. 10, 12-13, 15-16
10	(Crystal Gulch)	T. 26 S. R. 21 E.	M/I	Au, (Bi)	Placer	Disseminated	Small amount of high-grade ground; mined out previous to 1924.	Brown, 1926, p. 138; Mertie, 1936, p. 196-197
11	(Riddle Gulch) (Encio Gulch)	T. 26 S. R. 22 E.	M/I	Au	Placer	Disseminated	Pay streak extending down Encio Gulch and 1.5 km down Hidden Creek. Mining 1929-1931, and possibly later.	Mertie, 1936, p. 194
12	(Holmes Gulch)	T. 26 S. R. 21 E.	M/I	Au, (Bi)	Placer	Disseminated	Pay streak traced upstream to Whalen Mine. Bedrock at mine is iron-stained limestone cut by porphyritic dikes. Approximately .8 km west of monzonite intrusive.	Brown, 1926, p. 137; Mertie, 1936, p. 196
13	(Birch Gulch Creek)	T. 26 S. R. 21 E.	M/I	Au, (Bi)	Placer	Disseminated	Gold found mainly on limestone bedrock heavily impregnated with iron oxides. Lode claims staked but only placer gold mined. Small-scale mining 1924 to 1933.	Brown, 1926, p. 135; Mertie, 1936, p. 195-196
14	(Hidden Creek)	T. 26 S. R. 21 & 22 E.	M/I	Au, (Bi), (W)	Placer	Disseminated	Quartz monzonite bedrock and gravel. Gold on or close to bedrock. Largest gold nugget 4-3/4 oz. Concentrates contain much native bismuth. Mining predominantly from 1920 to 1935.	Mertie, 1936, p. 193-195
15	(Crooked Creek)	T. 27 S. R. 21 E.	M/I	Au	Placer	Disseminated	Near Stone lode mine. Placer mining in 1920's, 1930's, 1949.	White and Stevens, 1953, p. 16, 18-19; Cobb, 1973, p. 53
16	(Eagle Creek)	T. 27 S. R. 21 E.	M/I	Au, (FM), (RE), (W)	Placer	Disseminated	Near Stone lode mine. Sluice box concentrate contained uraniferous thorianite, allanite, ilmenite, scheelite. Placer mining 1926-30, 1931, 1933, 1949.	Brown, 1926, p. 139; Cobb, 1973, p. 53
17	(Canyon Creek)	T. 24 S. R. 23 E.	P/I	Au	Placer	Disseminated	Colors of gold reported; no confirmation.	Brown, 1926, p. 141
18	(Whirlwind Creek)	T. 23 S. R. 24 E.	P/I	Au	Placer	Disseminated	Gold strikes reported 1910-1915. No production recorded.	Brown, 1926, p. 141
19	(Nixon Fork, Headwaters)	T. 23 S. R. 23 E.	P/I	Au	Placer	Disseminated	Gold strikes reported 1910-1915. No production recorded.	Brown, 1926, p. 141
20	(Our Creek)	T. 19 S. R. 23 E.	P/I	Au	Placer	Disseminated	Placer gold reported near head of creek; no recorded production. Map location approximate.	Eakin, 1918, p. 51; Brown, 1926, p. 141; Henning, 1973, p. 2
21	(Clearwater Creek)	T. 22 S. R. 20 E.	P/I	Au	Placer	Disseminated	Report of colors of gold; no production.	Brown, 1926, p. 141
22	(Jones Creek)	T. 25 S. R. 22 E.	P/I	Au	Placer	Disseminated	Report of colors of gold; no production. Map location approximate.	Brown, 1926, p. 141
23	(Sunshine Mountain Streams)	T. 23 S. R. 20 E.	P/I	Au	Placer	Disseminated	Report of colors of gold; no production.	Brown, 1926, p. 141
24	(Sulukna River tributaries)	T. 19 S. R. 23 & 24 E.	P/I	Au	Placer	Disseminated	Placer gold reported; no confirmation. Map location approximate.	Eakin, 1918, p. 51
25	(Butte Creek)	T. 23 S. R. 15 E.	P/I	Au	Placer	Disseminated	Placer gold reported; no production recorded.	U.S. Bureau of Mines, 1980
26	(Submarine Creek)	T. 25 & 26 S. R. 22 E.	P/I	Au	Placer	Disseminated	Placer gold reported; no production recorded.	Herreid, 1966, p. 6
27	(Mystery Creek)	T. 26 S. R. 21 & 22 E.	P/I	Au	Placer	Disseminated	Placer gold reported; no production recorded.	Herreid, 1966, p. 6
28	---	T. 27 S. R. 21 E.	P/A	Au	Placer	Disseminated	Active prospect in Eagle Creek, Crooked Creek area. Map location approximate.	U.S. Bureau of Mines, 1980
29	---	T. 26 S. R. 21 & 22 E.	P/I	Au, (Bi)	Lode	?	Various lode claims established in 1950's above Hidden Creek, in area of Holmes Gulch, Birch Gulch, and Encio Gulch	U.S. Bureau of Mines, 1980
30	---	T. 26 S. R. 22 E.	P/I	?	Lode	?	Single lode claim established near headwaters of Mystery Creek, 1954.	U.S. Bureau of Mines, 1980
31	Swifty's Club 13 Co.	T. 26 S. R. 21 E.	P/I	Au	Lode	?	Lode claims established on lower Hidden Creek, 1954.	U.S. Bureau of Mines, 1980
32	---	T. 26 S. R. 21 E.	P/I	?	Lode	?	Lode claim above Ruby Creek near Tecla Creek.	U.S. Bureau of Mines, 1980
33	---	T. 27 S. R. 21 E.	P/A	Au	Lode	?	Lode claim in area of Eagle Creek listed as active by Bureau of Mines.	U.S. Bureau of Mines 1980
34	(Alder Gulch)	T. 27 S. R. 21 E.	P/I	Au	Placer	Disseminated	Placer claim in Eagle Creek area; map location approximate.	U.S. Bureau of Mines 1980
35	Colorado Creek Mine	T. 21 & 22 S. R. 15 E.	M/A	Au	Placer	Disseminated	Mining gravels composed chiefly of granitic rocks and chert, with a graywacke and greenschist bedrock. Mining operations located primarily in Ophir quadrangle.	Mertie, 1936, p. 172-173; Cobb, 1973, p. 151

[1] If deposits do not have a proper name, but are near named geographical features, the name of that feature is shown in parentheses.

[2] Symbols used:
- P - Prospect
  - A - Active prospect, probable exploration activity after 1967.
  - I - Inactive prospect, no reported exploration activity after 1967.
- M - Mine
  - A - Active mine, development or production since 1967 on claim with previous production.
  - I - Inactive mine, no known activity since 1967.

[3] Standard chemical symbols used for metallic resource commodities. In addition, the following symbols have been used: FM - fissionable materials other than monazite; RE - mineral (other than monazite) that contains rare earth element(s). Minor constituents or potential byproducts indicated by parentheses.

[4] Most references cited were compiled in Cobb (1978). Map locations are from Cobb (1972), U.S. Bureau of Mines (1976), and U.S. Bureau of Mines (1980).

Table 2.--*Description of occurrences of sulfides and other indicators of mineralization in the Medfra quadrangle*

Map No.	Field No.	Location (Township & Range)	Identified Mineralization[1]	Description
36	77Pa 182	T. 18 S., R. 15 E.	Pyrite	Volcanic graywacke hornfels containing disseminated pyrite.
37	78Pa 14a	T. 20 S., R. 17 E.	Undetermined sulfides	Altered rhyolite tuff with minor disseminated sulfides.
38	79Ms 38, 38a, 39	T. 19 S., R. 20 E.	Hematite, cinnabar(?)	Porphyritic rhyolite, brecciated and hydrothermally altered. Hematite occurs both as fine botryoidal masses in cavities of rock, and as dark red and black veinlets. Possible black, oxidized cinnabar in veinlets.
39	78Pa 5b 5c	T. 22 S., R. 15 E.	Pyrite	Colorado Creek placer mining area; bedrock is greenstone and chlorite schist.
40	78Pa 2	T. 22 S., R. 15 E.	Pyrite	Colorado Creek placer mining area; bedrock is argillite containing pyrite.
41	79Ms 32	T. 22 S., R. 15 E.	Pyrite	Felsite dike cutting hornfels. Dike contains hematite flecks after pyrite and iron oxide stain.
42	79Ms 22	T. 23 S., R. 15 E.	Pyrite	Hornfels containing disseminated pyrite and coated with iron oxide stain.
43	79Pa 113f	T. 24 S., R. 17 E.	Tourmaline	Small tourmaline veins in volcaniclastic hornfels.
44	78Ms 21a 77Pa 204a, 204b, 204c	T. 24 S., R. 17 E.	Tourmaline	Tourmaline-bearing dikes. Ms 21a - feldspar-tourmaline dike cutting porphyritic andesite. Pa 204a, b, c - felsite dike containing abundant tourmaline.
45	78Ms 41	T. 24 S., R. 17 E.	Pyrite	Quartz vein cutting andesite contains small amounts of pyrite.
46	78Ms 42	T. 24 S., R. 17 E.	Pyrite	Plagioclase, biotite, hornblende porphyry containing disseminated pyrite.
47	75Pa 39	T. 24 S., R. 17 E.	Coal	Float of coal from sandstone bedrock.
48	78Pa 21a	T. 23 S., R. 16 E.	Pyrite	Fine-grained sandstone hornfels containing pyrite grains up to 4 mm.
49	79Ms 61	T. 23 S., R. 17 E.	Unidentified sulfides	Sulfides present in a coarse-grained graywacke containing numerous small quartz veins.
50	78Pa 20e, 20f, 20g, 20h 79Ms 66, 66a	T. 23 S., R. 17E.	Galena	Galena-bearing quartz vein in sheared argillite hornfels. Pa 20e - argillite and quartz, 20f - quartz vein with galena, 20g - quartz vein, 20h - argillite hornfels. Ms 66 - quartz vein, 66a - brecciated sandstone.
51	78Pa 61	T. 27 S., R. 19 E.	Tourmaline	Andesite porphyry containing disseminated tourmaline.
52	78Pa 102e	T. 23 S., R. 20 E.	Pyrrhotite	Calcareous, quartzite hornfels containing disseminated pyrrhotite.
53	79Pa 85eg, 85d, 85cg	T. 23 S., R. 20 E.	Pyrite	Pyrite-bearing hornfels. Pa 85eg - calc-silicate hornfels containing pyrite, 85d - noncalcareous, sandy hornfels with abundant pyrite, 85cg - quartz vein near granite-hornfels contact.
54	76Pa 82a	T. 21 S., R. 22 E.	Hematite	Quartz, muscovite schist containing abundant specular hematite.
55	78Pa 110	T. 21 S., R. 22 E.	Hematite	Quartzofeldspathic rock containing specular hematite.
56	79Pa 18	T. 21 S., R. 22 E.	Hematite	Banded, quartz-rich metavolcanic rock containing fine specular hematite grains.
57	78Ms 85	T. 21 S., R. 23 E.	Sulfides(?)	Hornfels with veins and streaks of granitic rock. Some quartz veinlets with possible sulfides.
58	79Pa 138c	T. 20 S., R. 25 E.	---	Massive limestone with limonitic stain.
59	78Pa 54a	T. 21 S., R. 25 E.	---	Narrow band of contact metamorphosed limestone with iron oxide and copper stain.
60	76Pa 50	T. 21 S., R. 25 E.	Magnetite	Magnetite body (see also Throckmorton and Patton, 1978).
61	76Pa 50a	T. 21 S., R. 25 E.	---	Sample from skarn at granite-limestone contact near magnetite deposit.
62	76Pa 51	T. 21 S., R. 25 E.	---	Granite-limestone contact. Minor copper stain.
63	75Pa 60a	T. 20 S., R. 24 E.	Tourmaline	Rhyolite dome with tourmaline in local concentrations.
64	78Pa 42a	T. 20 S., R. 23 E.	Hematite	Quartz-mica schist containing specular hematite.
65	75Pa 71a	T. 20 S., R. 23 E.	Hematite	Banded rhyolite metavolcanic with abundant specular hematite.
66	79Pa 79	T. 22 S., R. 24 E.	---	Shale with limonitic stain.
67	78Pa 119b	T. 22 S., R. 24 E.	Pyrite	Small fine-grained intrusive body containing weathered pyrite cubes.
68	77Pa 146	T. 21 S., R. 24 E.	Pyrite	Pyrite cubes in highly micaceous, dark-gray siltstone and shale.
69	78Ms 66	T. 21 S., R. 24 E.	Pyrite	Altered dacite porphyry containing iron oxide spots after pyrite.
70	78Ms 67	T. 21 S., R. 24 E.	Pyrite	Argillite hornfels containing minor pyrite.
71	78Ms 69	T. 21 S., R. 24 E.	Unidentified sulfides	Sulfide-bearing, iron oxide stained hornfels. Complex terrane of mixed sedimentary hornfels and granite.
72	78Ms 71, 71a	T. 21 S., R. 24 E.	---	Gossan zone with possible copper stain on sedimentary hornfels containing numerous small granitic dikes.
73	77Pa 138	T. 23 S., R. 23 E.	Barite	Barite concretions in shale.
74	79Pa 3	T. 23 S., R. 24 E.	---	Gossan in small rhyolite porphyry intrusive.
75	78Ms 57	T. 22 S., R. 22 E.	Pyrite	Coarse- to medium-grained sandstone with ferruginous cement. Contains fine, disseminated pyrite.
76	78Ms 58	T. 22 S., R. 22 E.	Pyrite	Hydrothermally altered, silicified sandstone containing disseminated pyrite.
77	78Ms 59	T. 22 S., R. 22 E.	Pyrite	Heavily iron oxide stained sandstone and conglomerate containing disseminated pyrite.
78	78Ms 60	T. 22 S., R. 22 E.	Pyrite	Heavily iron oxide stained fine-grained sandstone containing disseminated pyrite.
79	78Ms 61	T. 22 S., R. 22 E.	Pyrite	Heavily iron oxide stained silicified conglomerate containing disseminated pyrite.
79	78Ms 61a, 61b	T. 22 S., R. 22 E.	---	Fine-grained, laminated, cross-bedded sandstone. Contains quartz veinlets and locally is heavily stained by iron oxides.
80	78Ms 51	T. 22 S., R. 22 E.	---	Gossan in argillite hornfels at contact with heavily oxidized quartz porphyry.
81	78Ms 13	T. 23 S., R. 22 E.	Pyrite	Pyrite-bearing felsite dike cutting argillite hornfels.
82	79Ms 84, 84a, 84b	T. 23 S., R. 22 E.	Tourmaline	Heavily iron oxide stained quartz porphyry containing numerous small tourmaline veins.
83	79Ms 85	T. 23 S., R. 22 E.	Pyrite	Highly oxidized quartz porphyry with iron oxide spots after pyrite.
84	78Ms 97, 97a	T. 23 S., R. 22 E.	Tourmaline	Sandstone hornfels containing veinlets of tourmaline.
84	78Ms 98	T. 23 S., R. 22 E.	Pyrite	Small feldspar-biotite porphyry body containing abundant disseminated pyrite.
85	78Ms 99	T. 23 S., R. 22 E.	Tourmaline	Small tourmaline-rich quartz porphyry body.
86	78Ms 100	T. 23 S., R. 22 E.	Tourmaline	Argillite hornfels with veinlets of tourmaline and quartz.
86	78Ms 100a	T. 23 S., R. 22 E.	Tourmaline	Tourmaline-rich quartz porphyry body.
86	78Ms 101	T. 23 S., R. 22 E.	Pyrite	Iron oxide stained hornfels; contains abundant fine-grained pyrite.
87	78Ms 102	T. 23 S., R. 22 E.	Pyrite & tourmaline	Feldspar porphyry dike with disseminated pyrite and tourmaline. Small gossans locally.
88	78Ms 103	T. 23 S., R. 22 E.	Pyrite	Quartz-rich sandstone containing disseminated pyrite.
88	78Ms 103a	T. 23 S., R. 22 E.	Tourmaline	Tourmaline-bearing quartz porphyry dike cutting sandstone.
89	78Ms 104	T. 23 S., R. 22 E.	Tourmaline	Feldspar porphyry dike with abundant tourmaline.
90	78Ms 106 75Pa 170	T. 23 S., R. 22 E.	Tourmaline	Tourmaline-bearing quartz porphyry body in sandstone.
91	79Ms 5, 7	T. 23 S., R. 22 E.	Pyrite, tourmaline	Sandstone with pyrite and tourmaline. Ms 5 - sandstone with fine-grained, weathered pyrite and tourmaline veinlets along bedding, 7 - sandstone with disseminated pyrite and tourmaline lenses.
92	79Ms 8	T. 23 S., R. 22 E.	Tourmaline	Very fine grained feldspathic sandstone containing disseminated tourmaline.
93	79Ms 9	T. 23 S., R. 22 E.	Pyrite	Coarse-grained sandstone with minor pyrite.
94	78Ms 112, 79Ms 11, 11a	T. 23 S., R. 22 E.	Tourmaline	Tourmaline-bearing rocks. Ms 112 - tourmaline-bearing porphyry, 11 - altered feldspar porphyry with disseminated tourmaline and quartz-tourmaline streaks, 11a - fine-grained sandstone containing disseminated tourmaline.
95	79Ms 20	T. 23 S., R. 22 E.	Tourmaline, unidentified sulfides	Quartz-porphyry breccia containing tourmaline crystals and some angular argillite fragments; also contains small tourmaline veinlets and minor oxidized sulfides.
95	78Ms 109	T. 23 S., R. 22 E.	Malachite	Intermixed argillite and quartz porphyry with copper stain (malachite).
95	78Ms 108	T. 23 S., R. 22 E.	Tourmaline	Quartz porphyry containing both disseminated and veinlet tourmaline.
95	78Ms 108a	T. 23 S., R. 22 E.	Tourmaline, malachite	Tourmaline-bearing quartz porphyry with heavy copper stain (malachite).
96	79Ms 12	T. 23 S., R. 22 E.	Tourmaline, pyrite	Feldspar porphyry dike containing disseminated tourmaline and iron oxide spots after pyrite.
96	79Ms 13	T. 23 S., R. 22 E.	Tourmaline	Fine-grained quartz porphyry with disseminated tourmaline and iron oxide stain along fractures.
97	79Ms 14	T. 23 S., R. 22 E.	Tourmaline	Feldspar porphyry containing disseminated tourmaline grains and some small irregular veinlets.
98	79Ms 19	T. 23 S., R. 22 E.	Unidentified sulfides	Dacite porphyry with minor disseminated sulfides.
99	79Ms 17	T. 23 S., R. 22 E.	Tourmaline	Breccia containing clasts of felsic dike and argillite in a fine-grained quartz-tourmaline matrix.
99	79Ms 17a	T. 23 S., R. 22 E.	Tourmaline	Highly oxidized tourmaline-rich feldspar porphyry.
99	79Ms 17b	T. 23 S., R. 22 E.	Tourmaline	Argillite breccia with bands of porphyry in a tourmaline matrix.
99	79Ms 17c	T. 23 S., R. 22 E.	Tourmaline	Feldspar porphyry containing tourmaline and disseminated pyrite.
99	79Ms 18	T. 23 S., R. 22 E.	Tourmaline, unidentified sulfides	Feldspar porphyry with abundant tourmaline and lesser disseminated sulfides (probably chalcopyrite).
100	79Ms 16	T. 23 S., R. 22 E.	Unidentified sulfides	Altered feldspar-biotite porphyry with disseminated sulfides and possible minor tourmaline.
101	79Ms 87, 87a	T. 23 S., R. 22 E.	Pyrite	Iron oxide stained hornfels which locally contains pyrite.
102	76Pa 100aa, 100ab	T. 23 S., R. 22 E.	Pyrite	Rhyolite porphyry containing abundant pyrite.
103	79Ms 86, 86a	T. 23 S., R. 22 E.	Pyrite	Quartz porphyry containing oxidized pyrite.
104	79Pa 50c	T. 23 S., R. 22 E.	Tourmaline, pyrite	Tourmaline-bearing, altered dacite porphyry with iron oxide spots after pyrite.
105	79Ms 90	T. 23 S., R. 22 E.	Pyrite, tourmaline(?)	Oxidized quartz porphyry containing pyrite and possible disseminated tourmaline.
106	79Pa 48	T. 24 S., R. 22 E.	Pyrite	Altered rhyolite with abundant pyrite and iron oxide stain.
107	75Pa 161	T. 25 S., R. 22 E.	Coal	Very thin coaly layers in tilted gravels on Jones Creek.
108	78Ms 79a, 79b	T. 28 S., R. 21 E.	Pyrite	Pyrite-bearing sedimentary rocks. Ms 79a - sandstone containing abundant disseminated pyrite, 79b - manganiferous chert nodules containing veinlets of quartz and pyrite.
109	79Pa 51a, 51b	T. 25 S., R. 23 E.	---	Two small gossans in carbonate rocks.
110	79Pa 52c	T. 25 S., R. 23 E.	---	Altered zone along contact between carbonate rocks and gabbro.
111	78Pa 115a, 115b	T. 24 S., R. 23 E.	---	Iron oxide gossans in carbonate rocks.
112	76Pa 69	T. 24 S., R. 23 E.	---	Brecciated iron oxide stained shaly limestone.
113	79Pa 103d	T. 23 S., R. 25 E.	---	Gossan in limestone and dolomite.
114	79Pa 105b	T. 23 S., R. 25 E.	Hematite	Chert conglomerate near limestone contact contains hematite in veinlets and in float.
115	79Pa 33	T. 27 S., R. 26 E.	Unidentified sulfides	Gabbro containing unidentified sulfides.
116	77Pa 197	T. 18 S., R. 26 E.	Tourmaline	Rhyolite dome containing abundant blue tourmaline.
117	77Pa 109q	T. 18 S., R. 27 E.	---	Limestone with red mineral coating.
118	76Pa 137	T. 17 S., R. 28 E.	Coal	Small amount of lignite coal in seams as much as 15 cm thick interbedded with sandstone and dark shale.
119	78Pa 43	T. 21 S., R. 30 E.	Pyrite	Gabbroic rock containing minor disseminated pyrite.
120	79Pa 67e, 67j, 67b	T. 22 S., R. 30 E.	Tourmaline	Tourmaline-bearing sedimentary rocks. Pa 67e and 67j - limonite-stained quartzofeldspathic sandstone containing disseminated tourmaline, 67b - banded quartz-tourmaline hornfels.
121	79Pa 68	T. 22 S., R. 30 E.	Tourmaline	Recrystallized chert with thin layers of tourmaline; near gabbro contact.
122	78Pa 45a	T. 22 S., R. 30 E.	Tourmaline	Granite containing thin quartz-tourmaline veins.
123	79Pa 7b	T. 22 S., R. 30 E.	Tourmaline	Granite containing abundant tourmaline veins.
124	79Pa 74c	T. 22 S., R. 30 E.	Tourmaline	Tourmaline-bearing calc-silicate hornfels.
125	78Pa 47b	T. 23 S., R. 30 E.	---	Altered gabbro containing unidentified metallic mineral.
126	78Pa 46b, 46c	T. 23 S., R. 30 E.	Tourmaline	Highly altered granite containing tourmaline.
127	78Pa 48c	T. 23 S., R. 29 E.	Pyrite	Phyllite with iron oxide spots after pyrite.

Table 3.--*Geochemical data[2] for mineral occurrences listed in Table 2*

Map No.	Field No.	Ag (0.5)[3]	As (200)	Au (.05)	Cu (5)	Hg (.02)	Mo (5)	Pb (10)	Sb (100)	Sn (10)	Zn (5)	Other elements with anomalous[4] values (ppm)
36	77Pa 182	No chemical data										
37	77Pa 14a	N	N	N	70	0.02	N	100	N	N	40	
38	79Ms 38	N	L	N	10	3.70	N	20	N	N	140	Be - 10
38	79Ms 38a	N	N	N	7	.95	N	10	N	N	55	
38	79Ms 39	N	N	N	10	2.60	.5	10	N	N	35	
39	78Pa 5b	N	N	N	200	.02	N	L	N	N	25	Cr - 1,000, V - 700
39	78Pa 5c	N	N	N	150	.02	N	L	N	N	30	Cr - 700, V - 700
40	78Pa 2	No chemical data										
41	79Ms 32	N	N	N	L	L	N	10	N	N	10	Ba - (G)5,000
42	79Ms 22	N	N	N	200	L	N	15	N	N	45	B - 150
43	79Pa 113f	N	N	N	30	.04	N	10	N	N	55	B - 500, Cr - 500
44	78Ms 21a	N	N	N	10	.40	N	10	N	N	5	B - (G)2,000
44	77Pa 204a	N	N	N	50	.02	N	50	N	N	85	
44	77Pa 204b	N	N	N	20	.02	N	20	N	N	45	
44	77Pa 204c	N	N	N	L	.02	N	30	N	20	10	B - (G)2,000
45	78Ms 41	N	N	N	150	.04	N	150	N	15	110	
46	78Ms 42	N	N	N	50	.04	N	30	N	N	80	B - 150, Ni - 100
47	75Pa 39	No chemical data										
48	78Pa 21a	L	N	N	100	.04	N	20	N	100	320	
49	79Ms 61	N	N	L	20	.02	N	10	N	N	75	Ni - 150
50	78Pa 20e	70	500	N	100	.35	N	7,000	N	N	900	Sb(AA) - 50
50	78Pa 20f	100	N	N	10	.06	N	(G)20,000	700	N	300	
50	78Pa 20g	N	N	N	20	.04	N	150	N	700	360	As(Cm) - 60, Sb(AA) - 5, B - 300
50	78Pa 20h	N	N	N	100	.04	N	200	N	N	320	As(Cm) - 20
50	79Ms 66	20	N	L	20	.10	N	7,000	500	N	110	
50	79Ms 66a	5	N	N	15	.10	N	70	2,000	50	320	B - 200
51	78Pa 61	N	N	N	150	.02	N	30	N	N	45	B - 300
52	78Pa 102e	N	N	N	20	.32	N	L	N	N	10	
53	79Pa 85eg	N	N	N	L	.02	N	15	N	N	20	B - 500
53	79Pa 85d	N	N	N	200	.02	N	10	N	N	85	Bi - 50
53	79Pa 85cg	1	N	N	20	.02	2,000	N	N	N	15	
54	76Pa 82a	N	N	N	10	L	N	L	N	N	10	
55	78Pa 110	No chemical data										
56	79Pa 18	No chemical data										
57	78Ms 85	N	N	N	100	.02	N	20	N	N	100	B - 300, Cr - 200, Ni - 100, V - 500
58	79Pa 138c	N	N	N	5	L	N	N	N	N	15	
59	78Pa 54a	20	1,000	0.1	1,500	.04	N	150	500	N	2,000	Bi - 150
60	76Pa 50	See Throckmorton and Patton, 1978										
61	76Pa 50a	N	N	N	5	L	70	15	N	N	10	
62	76Pa 51	No chemical data										
63	75Pa 60a	No chemical data										
64	78Pa 42a	N	N	N	5	N	N	L	N	N	20	
65	75Pa 71a	N	N	N	15	.02	N	200	N	100	100	As(Cm) - 30, Be - 10, Sb(AA) - 8
66	78Pa 79	L	N	N	200	.30	L	N	N	N	70	B - 700
67	78Pa 119b	N	N	N	20	.02	N	20	N	20	35	B - (G)2,000, Ni - 100
68	77Pa 146	No chemical data										
69	78Ms 66	2	N	.32	L	.48	N	100	N	N	35	B - 1,000
70	78Ms 67	N	N	N	100	.04	N	20	N	N	75	B - 300, Cr - 200, Ni - 100
71	78Ms 69	N	N	N	200	.04	N	10	N	N	30	Cr - 200
72	78Ms 71	10	(G)10,000	N	700	.24	N	1,000	N	100	65	B - (G)2,000, Bi - 30, Cr - 300, Ni - 100
72	78Ms 71a	15	N	L	300	3.70	N	200	N	100	L	B - 200, Bi - 50
73	77Pa 138	N	N	N	50	.06	N	10	N	N	1,000	Ba - (G)5,000, Sb(AA) - 19, Sr - 2,000
74	79Pa 3	0.5	N	N	100	.02	15	10	N	N	15	Ba - 3,000
75	78Ms 57	N	N	N	20	.02	N	10	N	N	60	B - 200
76	78Ms 58	N	N	N	30	.02	N	L	N	N	60	B - 200
77	78Ms 59	N	N	N	20	.04	N	30	N	N	75	B - 2,000
78	78Ms 60	N	N	N	50	.06	N	L	N	N	80	B - 300
79	78Ms 61	N	N	N	50	.02	N	30	N	N	600	B - 2,000
79	78Ms 61a	N	7,000	N	10	.02	N	50	N	50	15	B - (G)2,000
79	78Ms 61b	N	200	N	100	.38	N	20	N	N	30	B - (G)2,000
80	78Ms 51	N	200	N	100	.10	N	100	100	N	320	B - 1,000, Be - 10, Ni - 100
81	78Ms 13	N	N	*	20	.04	*	50	*	N	170	B - 200
82	79Ms 84	N	N	N	10	L	N	15	N	10	15	B - 2,000
82	79Ms 84a	N	N	N	20	L	N	50	L	50	60	B - (G)2,000
82	79Ms 84b	N	N	N	L	.02	N	20	N	20	45	
83	79Ms 85	2	N	N	5	.02	10	70	N	L	35	B - 150
84	78Ms 97	7	N	N	500	N	N	20	N	20	35	B - (G)2,000, Bi - 20
84	78Ms 97a	5	3,000	N	100	.16	N	150	100	20	30	B - (G)2,000, Bi - 100
84	78Ms 98	1	N	N	200	.06	N	30	N	20	45	
85	78Ms 99	7	N	N	70	.04	N	30	N	70	15	B - (G)2,000, Bi - 300
86	78Ms 100	N	N	N	150	N	N	30	N	N	20	B - (G)2,000, Cr - 200, Ni - 100
86	78Ms 100a	1	N	N	150	N	N	30	N	N	15	B - 2,000
86	78Ms 101	5	N	N	500	.04	N	20	N	150	35	B - (G)2,000
87	78Ms 102	N	N	N	100	N	L	20	N	30	55	
88	78Ms 103	N	N	N	50	N	N	20	N	30	30	B - (G)2,000, Bi - 10
88	78Ms 103a	N	N	N	100	.20	N	10	N	30	90	B - 2,000
89	78Ms 104	5	N	.05	20	N	N	30	N	70	50	B - 1,000, Bi - 500
90	78Ms 106	N	N	N	50	N	N	20	N	N	20	B - 2,000
90	75Pa 170	No chemical data										
91	79Ms 5	0.5	N	L	50	*	N	L	N	20	40	B - 1,500
91	79Ms 7	0.5	N	N	10	*	N	L	N	N	50	B - 200
92	79Ms 8	L	N	.05	10	*	N	L	N	N	50	B - 700
93	79Ms 9	0.7	N	N	50	*	N	L	N	N	70	
94	78Ms 112	N	N	N	30	.08	N	20	N	100	10	B - (G)2,000
94	79Ms 11	0.5	N	N	L	*	N	15	N	30	55	B - 500
94	79Ms 11a	L	N	N	7	*	N	L	N	20	50	B - 150
95	79Ms 20	0.7	N	N	20	*	L	30	N	50	5	B - (G)2,000, Bi - 30
95	78Ms 109	20	7,000	L	20,000	.18	N	200	200	200	95	B - (G)2,000, Bi - 700
95	78Ms 108	3	N	N	300	N	N	20	20	30	15	B - (G)2,000, Bi - 500
95	78Ms 108a	10	5,000	L	15,000	.10	N	30	30	100	110	B - (G)2,000, Bi - 200
96	79Ms 12	0.5	N	N	50	*	N	L	L	50	55	
96	79Ms 13	1	N	N	5	*	N	15	15	10	10	
97	79Ms 14	0.7	N	N	10	*	N	20	20	100	10	
98	79Ms 19	5	700	N	700	*	N	15	15	50	40	
99	79Ms 17	0.5	1,000	N	20	*	N	L	L	150	5	B - (G)2,000
99	79Ms 17a	1	1,000	N	30	*	N	15	N	200	35	B - (G)2,000, Ba - 3,000, Bi - 15
99	79Ms 17b	3	1,000	N	15	*	N	150	N	300	20	B - (G)2,000, Bi - 50
99	79Ms 17c	1	N	N	70	*	L	20	N	50	55	B - 500
99	79Ms 18	10	700	N	1,000	*	N	30	N	100	150	B - 150, Bi - 100
100	79Ms 16	0.7	N	L	L	*	N	20	N	30	120	
101	79Ms 87	0.7	N	N	30	L	N	L	N	N	460	Cr - 150
101	79Ms 87a	0.5	N	N	50	.02	N	50	N	N	150	Ni - 100
102	76Pa 100a	5	N	L	L	L	N	200	N	N	30	
102	76Pa 100a	N	N	N	L	L	N	30	N	20	10	As(Cm) - 40
103	79Ms 86	0.5	N	N	L	L	N	20	N	N	20	
103	79Ms 86a	0.5	N	N	7	L	N	20	N	N	20	
104	79Pa 50c	100	3,000	L	300	.90	N	7,000	700	300	800	B - 700
105	79Ms 90	No chemical data										
106	79Pa 48	0.7	N	N	7	.06	N	70	N	N	300	
107	75Pa 161	No chemical data										
108	78Ms 79a	N	N	N	10	.72	N	L	N	N	10	
108	78Ms 79b	N	N	.05	150	.02	N	50	N	200	70	Co - 100, Mn - (G)20,000, Ni - 150, Sr - 1,000, V - 500, Y - 1,000, Zr - 500
109	79Pa 51a	N	N	N	L	.02	N	L	N	N	55	
109	79Pa 51b	N	N	L	L	.02	N	N	N	N	85	
110	79Pa 52c	N	N	N	10	.02	L	50	N	N	15	
111	78Pa 115a	1	N	N	30	.70	10	500	N	N	350,000	Sb(AA) - 5
111	78Pa 115b	N	N	N	10	2.50	L	500	N	N	46,000	Cd - 200
112	76Pa 69	No chemical data										
113	79Pa 103d	N	N	N	30	.22	N	100	N	N	320	
114	79Pa 105b	N	200	N	150	.70	50	10	N	N	110	Cr - 150, Ni - 200
115	79Pa 33	N	N	N	200	.04	N	N	N	N	80	
116	77Pa 197	No chemical data										
117	77Pa 109q	N	N	N	5	.04	N	N	N	N	80	
118	76Pa 137	No chemical data										
119	78Pa 43	N	N	N	200	.10	N	L	N	N	60	
120	79Pa 67e	L	N	N	L	.06	N	N	N	20	75	B - 1,500
120	79Pa 67j	0.5	N	N	100	.02	N	50	N	30	70	B - 700, V - 500, Ni - 100
120	79Pa 67b	0.5	N	N	20	.02	N	10	N	50	120	B - 1,500, Cr - 200
121	79Pa 68	1.5	N	N	10	.10	15	150	N	50	10	B - G(2,000), V - 1,000
122	78Pa 45a	3	N	N	5	.06	N	20	N	100	10	B - G(2,000), Y - 100, Bi - 10
123	79Pa 7b	1	L	N	15	.02	N	30	N	100	60	B - (G)2,000, Bi - 10, Y - 100
124	79Pa 74c	1.5	N	N	100	N	N	70	N	N	35	B - 200, Ba - (G)5,000, Cr - 200, Ni - 150
125	79Pa 47b	N	N	N	150	.08	N	20	N	N	25	
126	78Pa 46b	No chemical data										
126	78Pa 46c	N	N	N	10	.06	N	50	N	N	45	Bi - 50
127	78Pa 48c	N	N	N	50	.04	N	10	N	N	90	

Table 4.--*Bedrock samples containing geochemical anomalies[2] but no visible mineralization*

Map No.	Field No.	Location (Township & Range)	Anomalous[4] geochemical values (ppm)	Rock Description
128	78Pa 15a	T. 18 S., R. 18 E.	Mo - 50, Pb - 100	Altered rhyolite tuff
129	77Pa 34m	T. 19 S., R. 20 E.	Mo - 15, Hg - 4.0	Flow banded rhyolite dome, quartz and sanidine phenocrysts
129	77Pa 34n	T. 19 S., R. 20 E.	Hg - 3.0	Flow banded rhyolite dome
130	79Pa 42	T. 20 S., R. 16 E.	Cu(AA) - 130, Hg - 0.26	Very fine grained cherty tuff
131	78Pa 13a	T. 21 S., R. 17 E.	As(Cm) - 20, Ba - 3,000, Hg - 0.50	Medium-grained sandstone
132	78Pa 11b	T. 21 S., R. 15 E.	Ba - 3,000	Medium-grained feldspathic sandstone
133	78Pa 10b	T. 22 S., R. 15 E.	As(Cm) - 120, Hg - 0.20, Sb(AA) - 380	Quartz vein cutting hornfels
134	78Pa 9a	T. 22 S., R. 15 E.	As(Cm) - 30, Cr - 500, Ni - 200	Dark fine-grained hornfels
134	78Pa 9b	T. 22 S., R. 15 E.	As(Cm) - 20, B - 300, Cu(AA) - 110, Mo - 50, V - 700, Zn(AA) - 180	Hornfels
135	78Pa 7	T. 22 S., R. 15 E.	As(Cm) - 20, Cu - 150, Sr - 2,000, V - 500	Medium-grained monzonite
136	78Pa 22c	T. 23 S., R. 17 E.	Pb - 200, As(Cm) - 30, Sb(AA) - 3	Fine-grained andesite dike
137	78Pa 129a	T. 23 S., R. 17 E.	Zn(AA) - 120, Sb(AA) - 3	Andesite porphyry intrusive
138	79Pa 27	T. 26 S., R. 15 E.	Cr - 1,000, Ni - 300	Andesitic crystal-lithic tuff
139	79Pa 26a	T. 26 S., R. 15 E.	Sn - 10	Andesite porphyry
140	76Pa 91n	T. 27 S., R. 15 E.	Mo - 5	Quartz monzonite
141	79Pa 58b	T. 28 S., R. 18 E.	Cu - 150, Ni - 200	Argillite hornfels
142	78Ms 76	T. 27 S., R. 19 E.	Zn(AA) - 100, As(Cm) - 120, Pb - 100	Slightly altered basalt
143	79Pa 91c1	T. 23 S., R. 20 E.	W - 50	Quartz vein cutting siltstone hornfels
143	79Pa 91c2	T. 23 S., R. 20 E.	Ag - 0.5, Au - 0.22, As - 3,000, Cr - 100	Quartz vein cutting siltstone hornfels
143	79Pa 91dg	T. 23 S., R. 20 E.	As - 500	Micaceous siltstone hornfels
144	78Pa 27a	T. 23 S., R. 20 E.	Hg - 0.34	Quartz monzonite
145	78Pa 24d	T. 23 S., R. 19 E.	Zn - 300	Hornfels, near contact with granite
146	77Pa 93c	T. 23 S., R. 20 E.	As(Cm) - 100, Be - 10, Sn - 50	Aplite dike cutting hornfels
146	77Pa 93d	T. 23 S., R. 20 E.	As(Cm) - 80	Hornfels, near contact with granite
147	78Pa 26d	T. 23 S., R. 20 E.	Mo - 20, Pb - 100	Quartz monzonite
148	78Pa 25a	T. 23 S., R. 20 E.	Pb - 200, Bi - 30	Quartz monzonite
149	78Pa 100b	T. 23 S., R. 20 E.	Au - 0.5	Hornfels, near contact with granite
150	78Pa 102e	T. 23 S., R. 20 E.	Hg - 0.32	Calc-silicate hornfels
151	79Pa 84f	T. 23 S., R. 20 E.	Cu - 200, Mo - 10	Calc-silicate hornfels
151	79Pa 84g	T. 23 S., R. 20 E.	Ag - 0.5	Sandstone hornfels
152	77Pa 147	T. 24 S., R. 21 E.	Ba - 3,000	Flow banded altered trachyte
153	78Pa 41a	T. 20 S., R. 23 E.	Ba - 3,000, Sr - 1,500	Dacite porphyry sill
154	75Pa 90a	T. 21 S., R. 24 E.	Cu(AA) - 280, W - 50	Fine-grained hornfels cut by quartz-biotite porphyry dike
155	75Pa 151a	T. 20 S., R. 26 E.	Cr - 1,000	Gabbro
156	78Pa 53d	T. 20 S., R. 26 E	As(Cm) - 200, Cr - 500, Ni - 100, Pb - 150, Sn - 50	Weathered granite cut by monzonite dike
157	79Pa 78a	T. 22 S., R. 24 E.	Sn - 10	Rhyolite porphyry dike
158	78Pa 135d	T. 22 S., R. 24 E.	Au - 0.25	Porphyry dike cutting hornfels
158	78Pa 135e	T. 22 S., R. 24 E.	Au - 0.05	Granitic dike cutting hornfels
159	78Pa 117d	T. 22 S., R. 23 E.	Ba - 3,000, Sr - 1,500, Zn(AA) - 320	Fine-grained monzonite
160	78Pa 116a	T. 22 S., R. 23 E.	Cu - 150, Cd - (G)500, Mo - 15, Sb(AA) - 3, Pb - 200, Zn(AA) - 2,000, Zr - 1,000	Coarse-grained, highly weathered monzogabbro
161	78Pa 104a	T. 22 S., R. 23 E.	Cr - 700, Ni - 150	Fine-grained quartz monzonite
162	78Pa 120e	T. 23 S., R. 24 E.	Zn(AA) - 250, Ba - 5,000	Altered felsic porphyry dike cutting carbonate rocks
163	79Pa 104	T. 23 S., R. 25 E.	Hg - 0.30	Limestone
164	78Pa 138b	T. 23 S., R. 22 E	Ag - 5.0, Sb(AA) - 3.0	Altered quartz porphyry sill
165	78Pa 139b	T. 23 S., R. 22 E.	Ag - 1.0, Pb - 100	Unaltered quartz porphyry sill
166	79Pa 52a	T. 25 S., R. 23 E.	Ag - 0.7, Cu(AA) - 270, V - 1,000	Coarse-grained gabbro sill or dike
167	75Pa 77a	T. 18 S., R. 26 E.	Mo - 10	Quartz-mica schist
168	79Pa 15a	T. 17 S., R. 29 E.	Be - 15, Hg - 0.30, Sn - 20, Zn(AA) - 140, U(DNA) - 16.5	Rhyolite porphyry (see also Miller and others, 1980)
169	79Pa 14b	T. 17 S., R. 30 E.	Be - 20, Mo - 10, Sn - 30, Y - 100, U(DNA) - 24.1	Rhyolite porphyry with large sanidine phenocrysts (see also Miller and others, 1980)
170	79Pa 13b	T. 18 S., R. 29 E.	Sn - 20, U(DNA) - 25.4	Rhyolite porphyry (see also Miller and others, 1980)
171	79Pa 10b	T. 18 S., R. 29 E.	Mo - 10, Pb - 100, Sn - 50, U(DNA) - 16.4	Rhyolite porphyry (see also Miller and others, 1980)
172	78Pa 35a	T. 18 S., R. 29 E.	As(Cm) - 40, Hg - 1.0, Pb - 100, Sb(AA) - 3	Dacite porphyry
173	78Pa 37a	T. 18 S., R. 29 E.	Mo - 10, Pb - 100	Altered andesite
174	78Pa 45b	T. 22 S., R. 30 E.	As(Cm) - 100	Weathered granite with local tourmaline-quartz veins
175	79Pa 55b	T. 24 S., R. 30 E.	Ba - (G)5,000, Hg - 3.10, Mo - 5, V - 500	Dark, fine-grained argillite
176	78Pa 51b	T. 28 S., R. 30 E.	Cu(AA) - 190, Zn(AA) - 240	Phyllite

Abbreviations used: Standard chemical symbols, Ag - silver, As - arsenic, etc.; N, not detected at limit of detection; L, detected, but below limit of determination; G, greater than value shown; AA, atomic absorption analysis method; Inst, instrumental analysis method; Cm, colorimetric analysis method; DNA, delayed neutron analysis method; Sp, semiquantitative spectrographic analysis method.

* Signifies no chemical analysis made for the indicated element.

[1] Tourmaline included for its association with mineralized areas in this quadrangle.

[2] Semiquantitative spectrographic analysis used for all elements except Au - atomic absorption analysis (AA); Cu, Sb, Zn (where noted) - atomic absorption analysis (AA); Hg - instrumental analysis (Inst); As (where noted) - colorimetric analysis (Cm); U - delayed neutron analysis method (DNA). All values in parts per million.

[3] Lower limits of determination for each element are shown in parentheses. Other elements not shown: As(Cm) - 10, B - 10, Ba - 20, Be - 1, Bi - 10, Cd - 20, Co - 5, Cr - 10, Mn - 10, Ni - 5, Sr - 100, V - 10, Y - 10.

[4] The definition of anomalous values has been arbitrarily made according to background geochemical data obtained in the Medfra quadrangle for individual rock types, and data from Parker (1967) on abundance of elements in the Earth's crust.

This report is preliminary and has not been edited or reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.