ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
IN COOPERATION WITH THE U.S. BUREAU OF MINES

REPORT OF INVESTIGATIONS 88-8
SHEET 2 OF 2

Base from U.S. Geological Survey Skagway A-2, 1954, A-3, 1954, and A-4, 1961, Quadrangles, Alaska.

SCALE 1:36,200

1 0 1 2 miles

1 0 1 2 3 kilometers

CONTOUR INTERVAL 100 FEET

DATUM MEAN SEA LEVEL

SYMBOLS

○7	Stream-sediment sample locality
33 Au ●	Stream-sediment sample locality, anomalous in one or more elements
8△	Rock-sample locality
2 Cu ▲	Rock-sample locality, anomalous in one or more elements

EXPLANATION

INTRODUCTION

Sheet 2 presents geochemical results from 23 stream-sediment samples (table 1) and 146 rock samples (table 2) collected in the Skagway A-2, A-3, and A-4 Quadrangles as part of a cooperative project between the Alaska Division of Geological and Geophysical Surveys (DGGS) and the U.S. Bureau of Mines to evaluate the mineral resources of the Skagway subdistrict of the Juneau mining district. Analytical techniques used for analyses are reported by Still and others (1987). The reconnaissance geochemical sampling program of this study supplements studies of the magnetite deposit near Klukwan (Robertson, 1956; Still, 1984b) and of nearby anomalies and prospects by Winkler and MacKevett (1970), MacKevett (1971), Still (1984a), Still and others (1985, 1987), Gilbert and others (1987), and Gilbert and others (1988).

ANOMALOUS VALUES

The location and definition of geochemical anomalies requires a comparison of analyzed values for stream-sediment and bedrock samples with normal or worldwide average abundances of the target elements, adjusted for local or regional background levels. The selection of anomalies must also consider the limits of detection for each element and the degree of analytical error associated with various analytical methods. A more complete discussion of establishment of threshold values for the samples in this report may be found in Still and others (1987). Threshold levels for anomalous values reported from samples taken in this study are shown below in ppm:

Sample type	Au	Ag	Cu	Pb	Zn	Co	Ba
Stream sediments	0.07*	0.5	100	50	200	50	1000
Argillaceous rocks and chert	0.07*	0.6	100	35	200	25	2500
Mafic igneous rocks	0.07*	0.5	180	25	160	80	1000
Felsites	0.07*	0.5	150	50	150	50	500
Vein quartz	0.07*	0.6	150	50	160	80	1000
Carbonates	0.07*	1.0	75	30	150	30	500
Granitic rocks	0.07*	1.0	100	50	150	50	1000

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*Limit of detection.

Table 1. Stream sediment sample results
[All values in ppm-anomalous values underlined][a]

Map	Sample	Au	Ag	Cu	Pb	Zn	Co	Ba
7	AJ65V517	N	N	98	6	115	17	170
33	AJ6GV2829	0.1	N	25	2	27	10	330
35	AJ6GV2974	N	N	21	2	44	6	1440
41	AJ6GV2828	N	N	24	8	179	6	1710
50	AJ6GV2826	N	N	4	5	37	3	640
51	AJ6GV2827	N	N	5	4	23	2	570
52	AJ6GV2825	N	N	5	2	21	3	600
56	AJ6GV2822	N	N	10	4	18	2	640
57	AJ6GV2823	N	N	12	2	25	4	580
58	AJ6GV2824	N	N	41	2	25	11	200
61	AJ6GV2975	N	N	21	4	45	9	300
62	AJ7GV6171	N	N	18	2	48	11	240
69	AJ7GV6176	N	N	53	N	42	21	160
73	AJ7GV6175	N	N	4	N	23	5	210
74	AJ7GV6174	N	N	21	3	24	10	160
75	AJ7GV6173	N	0.1	58	3	46	23	200
76	AJ7GV6172	N	0.1	64	3	48	19	130
78	AJ7GV6180	N	N	72	4	78	25	140
81	AJ7WV1722	N	N	59	4	55	16	N
94	AJ7WV1765	N	0.2	75	5	76	28	130
96	AJ7GV6177	N	N	62	5	88	25	230
97	AJ7GV6178	N	0.1	66	2	54	31	110
98	AJ7GV6179	N	N	44	8	84	19	240

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[a] Analyses performed by Bondar-Clegg, Lakewood, Colorado. Au values were determined by fire assay-atomic absorption spectroscopy; Ag, Cu, Pb, Zn, Co by atomic absorption spectroscopy; Ba by X-ray fluorescence.

N = Not detected.

Table 2. Rock sample results
[All values in ppm - anomalous values underlined][a]

Map	Sample	Au	Ag	Cu	Pb	Zn	Co	Ba	Comments
1	AJ7WV1744	0.07	10.8	8000	N	11500	141	N	Iron-stained skarn with chalcopyrite + marble
1	AJ7WV1745	0.17	7.7	2700	5	225	60	N	Skarn with chalcopyrite + marble
2	AJ7SV626	N	N	78	N	40	2	N	Iron-stained skarn
2	AJ7WV1746	N	0.3	158	43	141	10	N	Iron-stained diorite with pyrite
3	AJ6SV505	0.07	0.3	380	2	1070	16	N	Epidote quartz skarn
3	AJ6SV506	0.07	0.7	895	6	280	340	N	Pyrrhotite, pyrite-rich lens in skarn zone
3	AJ6SV507	0.07	3.0	825	5	660	1	N	Gossan
4	AJ6SV509	0.07	4.0	8540	14	335	490	N	Pyrrhotite, chalcopyrite
4	AJ6SV510	0.07	2.4	5040	7	570	620	N	Magnetite with pyrrhotite, chalcopyrite
4	AJ6SV511	0.07	1.6	3430	3	790	152	70	Magnetite with pyrrhotite, chalcopyrite
5	AJ6SV508	N	0.2	37	2	50	13	180	Diorite
6	AJ6SV501	N	0.8	1150	6	750	260	N	Pyrite, magnetite skarn with epidote
6	AJ6SV502	N	2.0	1835	6	920	182	N	Pyrrhotite, magnetite skarn
6	AJ6SV503	N	0.3	69	6	285	12	30	Magnetite
6	AJ6SV504	N	0.4	995	6	770	132	N	Magnetite skarn with chalcopyrite, pyrrhotite, pyrite
6	AJ6SV512	N	N	33	7	43	2	N	Marble with garnets and epidote
6	AJ6SV516	N	0.2	15	4	5	N	N	Marble
8	AJ6GV2955	N	0.2	65	N	24	15	580	Chert
9	AJ6GV2946	N	0.2	29	10	210	26	910	Calcareous, pyritic,iron-stained chert
10	AJ6GV2945	N	N	54	6	70	15	350	Gray pyritic chert
11	AJ6GV2944	N	0.5	58	3	28	39	1690	Massive pyrrhotite layers in chert
12	AJ6GV2958	N	0.2	81	N	55	14	610	Pyrrhotite-bearing argillaceous chert
13	AJ6GV2939	N	N	54	N	29	18	350	Pyrrhotite-bearing metachert
14	AJ6GV2940	N	N	49	2	72	16	410	Pyrrhotite-bearing metachert
15	AJ6SV499	0.07	N	62	5	48	16	780	Chert with pyrrhotite, pyrite bands
16	AJ6GV2949	N	0.3	38	4	110	37	3200	Iron-stained pyrite and pyrrhotite-rich chert
17	AJ6GV2956	N	N	79	2	92	75	790	Pyritic argillaceous chert
17	AJ6GV2957	N	0.3	328	N	50	19	350	Pyrrhotite-rich basalt
18	AJ6SV519	N	0.3	29	10	100	39	740	Chert with pyrrhotite, pyrite
19	AJ6GV2961	N	N	18	6	64	24	360	Iron-stained pyritic chert
20	AJ6GV2947	N	0.2	32	2	184	20	1600	Iron-stained pyrrhotite-rich chert
21	AJ6GV2952	N	0.5	56	3	290	22	1690	Dark gray argillaceous chert with pyrrhotite
22	AJ6GV2941	N	0.3	219	N	24	90	340	Pyrrhotite-bearing metabasalt
22	AJ6GV2942	N	N	12	2	42	3	410	Foliated marble
22	AJ6GV2943	N	0.6	485	N	50	170	390	Massive pyrrhotite in basalt float
23	AJ6GV2951	N	0.3	30	2	88	13	1360	Iron-stained chert
24	AJ6GV2950	N	0.4	49	9	44	31	950	Pyrite-bearing white chert
25	AJ6GV2960	N	0.4	52	5	30	16	230	Gossan
26	AJ6GV2959	N	0.2	49	2	78	16	1950	Iron-stained argillaceous chert
27	AJ6GV2981	N	0.2	40	3	32	16	620	Pyrrhotite-bearing hornfels + diorite
28	AJ6GV2948	N	0.3	135	N	44	39	640	Iron-stained chert
29	AJ6GV2982	N	N	148	4	72	8	N	Hornfelsed greenstone + hornblendite with pyrite
30	AJ7GV6130	N	0.4	74	8	35	15	1800	Random chip of silicified skarn
31	AJ6GV2903	N	0.4	78	7	81	56	150	Iron-stained, pyritic, hornfelsed metasilts
32	AJ6GV2963	N	0.2	62	3	20	14	550	Pyrrhotite-rich diorite
32	AJ6GV2964	N	0.4	37	5	72	8	3660	Iron-stained hornfelsed slate
34	AJ6GV2915	N	0.8	63	10	189	9	3120	Pyrrhotite-bearing black slate
36	AJ6GV2928	N	0.5	26	3	42	2	6730	Iron-stained black slate
36	AJ6GV2929	N	0.8	92	4	124	26	4000	Pyrrhotite-bearing quartz-feldspar dike or vein
37	AJ6GV2962	N	0.8	89	97	340	13	420	Very pyritic black slate
38	AJ6GV2966	N	0.9	67	11	400	18	3200	Pyrrhotite-bearing hornfelsed iron-stained black slate
38	AJ6GV2967	N	1.9	192	325	146	4	260	Very pyrrhotite-rich hornfelsed slate
39	AJ6GV2965	N	0.2	113	13	28	19	15000	Hornfelsed limestone
40	AJ6GV2968	N	0.2	69	11	15	4	7600	Hornfelsed pyrite and chalcopyrite-bearing white marble
40	AJ6GV2969	N	0.7	41	13	180	7	2960	Pyritic hornfelsed gray slate
42	AJ6GV2913	N	0.4	41	4	94	19	190	Pyrrhotite-bearing felsic dike
42	AJ6GV2914	N	0.2	36	4	83	4	1250	Black slate
43	AJ6GV2970	N	1.5	91	26	2000	6	2450	Pyritic black slate
43	AJ6GV2971	N	0.7	165	4	124	38	710	Pyritic diabase dike
44	AJ6GV2972	N	0.4	76	19	346	17	1610	Pyritic hornfelsed slate
45	AJ6GV2973	N	0.9	99	13	312	10	3120	Iron-stained pyritic black slate
46	AJ6GV2983	N	0.2	45	18	660	14	8200	Pyritic hornfelsed argillite
47	AJ6SV434	N	0.9	36	14	310	4	9900	Iron-stained hornfels with pyrrhotite
47	AJ6SV435	0.45	0.7	54	16	1020	2	1500	Marble with sulfides
48	AJ6GV2984	N	0.2	95	3	48	20	1500	Epidote quartz skarn
49	AJ6GV2986	N	N	15	8	75	3	690	Iron-stained slightly pyritic granite
52	AJ6GV2927	N	0.2	49	N	260	4	210	Pyrrhotite-bearing iron-stained slate
53	AJ6GV2985	N	0.4	116	4	24	7	120	Pyritic hornfelsed slate + greenstone
54	AJ6GV2926	N	0.2	44	N	23	6	840	Pyrrhotite-bearing marble
55	AJ6GV2925	N	N	93	N	40	31	190	Pyrrhotite-bearing iron-stained quartz diorite
59	AJ7GV6145	N	N	63	N	48	7	40	Skarn
60	AJ7GV6164	N	1.0	215	N	20	108	30	Pyrrhotite skarn
63	AJ7GV6163	N	0.2	98	3	79	21	80	Actinolite schist
64	AJ7GV6131	N	0.3	53	10	182	10	4400	Iron-stained, pyritic, dark gray schist

Table 2. Rock sample results - Continued
[All values in ppm - anomalous values underlined][a]

Map	Sample	Au	Ag	Cu	Pb	Zn	Co	Ba	Comments
65	AJ7GV6146	N	0.3	265	4	47	42	820	Sulfide veinlets in iron-stained diorite
66	AJ7GV6147	N	0.1	70	3	119	17	880	Iron-stained gneiss
67	AJ7GV6182	N	0.1	34	3	102	12	1800	Iron-stained black schist
68	AJ7SV602	N	4.6	5950	N	178	91	--	Skarn with pyrrhotite (60%) and chalcopyrite
68	AJ7SV603	N	0.7	740	2	40	95	--	Gossan with pyrrhotite
68	AJ7SV604	N	1.3	1350	2	70	93	--	Black schist with pyrrhotite (20%)
68	AJ7WV1726	N	0.4	320	2	18	--	--	Quartz with pyrite in shear
70	AJ7GV6166	0.14	1.3	540	4	67	145	440	Pyrrhotite-rich metabasite with minor chalcopyrite
71	AJ7GV6165	N	N	37	2	7	4	N	Slightly pyritic quartz boudin
72	AJ7GV6167	N	0.2	152	4	45	35	N	Pyrrhotite-rich metabasite
76	AJ7SV649	N	0.5	760	N	134	18	N	Altered metabasite with pyrite, chalcopyrite
77	AJ7GV6189	N	0.1	63	N	164	22	N	Foliated greenstone with disseminated pyrite in avalanche bubble
79	AJ7GV6169	N	N	46	N	167	26	N	Metabasite with pyrite bands
80	AJ7SV653	N	0.2	79	7	75	15	170	Schistose metabasalt
80	AJ7SV654	N	0.1	44	8	103	12	210	Quartz schist with pyrrhotite + pyrite
81	AJ7WV1723	N	0.7	275	385	6400	14	--	Iron-stained quartz vein with slate, pyrrhotite, in gneiss
81	AJ7WV1724	N	0.6	192	23	101	12	--	Iron-stained metasedimentary rock with pyrrhotite + pyrite
81	AJ7WV1725	N	N	36	4	79	240	--	Diorite with pyrite
82	AJ7SV599	N	--	136	N	127	14	--	Iron-stained mafic metavolcanics with 5 percent pyrrhotite
82	AJ7SV600	N	--	42	53	6	14	--	Quartz vein with pyrrhotite + pyrite in metabasite
82	AJ7SV601	N	--	315	N	57	45	--	Iron-stained black schist with pyrrhotite float
83	AJ7GV6162	N	0.2	205	5	86	26	710	Iron-stained amphibolite with pyrite
84	AJ7GV6185	0.07	0.1	41	3	27	12	200	Iron-stained metabasite
84	AJ7GV6186	N	0.3	140	2	36	19	230	Float of iron-stained metabasite
85	AJ7GV6127	N	0.2	400	8	42	41	N	Iron-stained diorite with disseminated pyrite
86	AJ7GV6125	N	1.2	655	4	63	95	90	Massive pyrrhotite cobble-25 percent marble; outwash
86	AJ7GV6126	N	N	68	8	115	28	N	Metabasalt with disseminated magnetite; outwash
87	AJ7SV661	N	0.9	270	19	90	29	470	Hornfels with 10 percent pyrrhotite + chalcopyrite
88	AJ7SV662	N	0.2	43	8	84	6	490	Iron-stained quartz schist with 2 percent pyrrhotite
89	AJ7GV6183	N	0.8	470	27	190	34	90	Pyritic greenschist
89	AJ7GV6184	N	1.5	250	66	290	16	120	Pyritic blackschist
90	AJ7GV6181	N	0.2	107	20	80	9	850	Pyrite-rich felsic schist
91	AJ7SV637	N	1.0	410	6	50	88	280	Massive pyrrhotite 0.1' thick
91	AJ7SV638	N	0.4	126	5	110	38	190	Quartz schist with 30 percent pyrrhotite
91	AJ7SV639	N	0.3	31	8	130	9	130	Iron-stained metafelsite with pyrrhotite
91	AJ7SV640	N	0.4	49	8	95	17	710	Iron-stained quartz schist + gossan
91	AJ7SV641	N	0.2	74	6	195	34	170	Iron-stained quartz schist with 10 percent pyrrhotite
91	AJ7SV642	N	0.2	85	2	160	29	110	Iron-stained quartz schist with 10 percent pyrrhotite
91	AJ7SV643	N	0.3	225	2	265	115	1200	Iron-stained altered schist
91	AJ7SV644	N	0.1	27	N	108	42	320	Gray slate or phyllite
91	AJ7SV645	N	0.2	92	6	143	46	590	Gossan
92	AJ7WV1762	N	0.5	64	3	137	35	510	Felsic schist with banded + disseminated pyrrhotite
92	AJ7WV1763	N	0.3	120	3	95	59	510	Banded felsic schist + pyrrhotite
92	AJ7WV1764	N	0.9	114	3	112	40	1600	Iron-stained felsic schist
93	AJ7SV646	N	0.7	157	4	98	63	1200	Highly silicified rock with pyrrhotite
95	AJ7SV647	N	0.6	420	2	47	62	N	Iron-stained highly silicified rock with pyrrhotite (25%) and chalcopyrite
95	AJ7SV648	N	0.3	780	N	34	215	N	Hornblendite with pyrrhotite, pyrite, chalcopyrite
95	AJ7WV1766	N	6.3	1300	N	68	78	N	Felsic schist with chalcopyrite + pyrrhotite
99	AJ7SV650	N	0.2	113	4	60	18	260	Iron-stained skarn
100	AJ7GV6168	N	0.3	30	8	31	4	3100	Iron-stained skarn
101	AJ7GV6160	N	0.1	17	3	8	1	N	Iron-stained white quartz vein
102	AJ7GV6159	N	0.3	31	9	47	1	500	Schistose metatuff
103	AJ7GV6161	N	0.3	67	16	74	7	500	Iron-stained metatuff
104	AJ7GV6124	N	N	69	4	64	52	1300	Float of pyrrhotite-bearing metabasalt
105	AJ7GV6123	N	0.1	66	4	126	34	N	Metabasalt
106	AJ7GV6188	N	0.2	64	4	31	5	280	Iron-stained calcareous gray slate
107	AJ7GV6122	N	0.4	67	4	52	13	N	Diorite dike with disseminated pyrite
108	AJ7GV6121	N	1.1	88	27	132	13	380	Pyritic light green metavolcanic
109	AJ7GV6156	N	0.7	28	17	136	3	1900	Iron-stained black slate
110	AJ7GV6154	N	0.4	240	N	16	6	870	Iron-stained pyritic hornfels
111	AJ7GV6157	N	0.6	53	13	77	7	300	Iron-stained slate
112	AJ7GV6187	N	1.1	134	14	596	64	730	Pyrrhotite-bearing schistose meta-andesite
113	AJ7SV659	N	0.2	3	7	N	N	110	Iron-stained chert
113	AJ7SV660	N	0.1	84	10	24	7	6000	Gossan
114	AJ7GV6158	N	0.9	33	17	96	N	1300	Iron-stained black slate
115	AJ7GV6128	N	N	101	7	45	5	130	Iron-stained felsic schist
116	AJ7SV655	N	1.3	530	2	25	66	50	Skarn with pyrrhotite-rich band
116	AJ7SV656	N	0.6	280	4	180	9	270	Massive pyrrhotite with chalcopyrite
117	AJ7SV657	N	N	9	3	N	2	N	Quartz boulder with pyrite filling fractures
117	AJ7SV658	N	0.3	4	2	2	11	90	Quartz vein with pyrite
118	AJ7WV1767	N	0.1	9	4	20	2	N	Yellow-stained intrusion with sulfides
119	AJ7GV6155	N	0.3	30	N	19	4	750	Iron-stained marble skarn with disseminated pyrite

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[a] Analyses performed by Bondar-Clegg, Lakewood, Colorado. Au values were determined by fire assay-atomic absorption spectroscopy; Ag, Cu, Pb, Zn, Co by atomic absorption spectroscopy; Ba by X-ray fluorescence.

N = Not detected.

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PRELIMINARY GEOCHEMISTRY OF THE NORTHERN CHILKAT RANGE, SOUTHEASTERN ALASKA

by

W.G. Gilbert

1988