GEOCHEMICAL AND ASSAY RESULTS, JENNINGS RIVER MAP AREA (MIDWAY AREA)* (104O/16)

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KEYWORDS: Jennings River map area, analytical data, showings, sedex, Cassiar batholith, manto deposits, epigenetic veins, Midway deposit.

INTRODUCTION

Complete analytical results for rock samples collected in the course of regional mapping of the area around the Midway deposit, northern British Columbia (Nelson and Bradford, 1987) are presented in Table 5-9-1. Samples from known showings were analysed for a variety of elements in order to constrain genetic models and highlight commodities of economic interest. Reconnaissance targets were also sampled. The second column in Table 5-9-1 shows the occurrence type, after the classification used in Nelson and Bradford (1987). The categories are as follows:

I. Sedex-type, hosted by Earn Group clastic sediments (Upper Devonian-Lower Mississippian).
II. Deposits related to the main phase of the Cassiar batholith (probably mid-Cretaceous).
III. Deposits of Late Cretaceous to Eocene age:
   A. Manto lead-zinc-silver.
   B. Lead-zinc-silver veins.
IV. Other.

HIGHLIGHTS

Silver analyses of 1452 and 3802 ppm were returned from grab samples of selected sulphide-rich ore from the Amy property (No. 17) and a quartz vein in the southwestern corner of the map area (No. 47) respectively (Figure 5-9-1). The latter was previously reported in Nelson and Bradford (1987). Gold analyses are generally low, with the exception of 562 ppb in a skarn from the Nancy occurrence (No. 10). A grab sample from a massive sulphide lens near the Blue Light showings (104O-005) in 104O/09 contains 0.89 per cent tin (No. 77). Significantly anomalous tin (Nos. 11, 14, 30) and fluorine values (Nos. 19, 23, 24, 32, 34) are associated with Late Cretaceous felsic dykes (Bradford and Godwin, this volume) and epithermal vein and manto mineralization. Fluorine in particular should be considered as a pathfinder element for these types of deposits.

KNOWN SHOWINGS

GUNNAR BERG (104O-032)

Samples from a quartzite breccia zone, 25 metres in diameter, adjacent to the Cassiar batholith contain significant amounts of silver, lead, arsenic, antimony (No. 2) and molybdenum (No. 3), suggestive of an intrusive-hydrothermal origin.

BERG (104O-015)

Oxidized mineralization in a stratigraphic setting similar to the Midway deposit contains significant zinc (Nos. 7, 8) and elevated lead, barium, mercury and gold values. High barium is typical of oxidized carbonate-hosted mineralization and does not necessarily signify exhalative origin.

NANCY (104O-013)

Pyrrhotite-bearing skarn adjacent to molybdenum mineralization in the Cassiar batholith contains anomalous gold values (No. 10).

SILVERKNIFE (104O-048)

Epigenetic silver-lead-zinc mineralization in Rosella Formation carbonates contains anomalous tin (No. 11), which may be indicative of a cryptic intrusion, as at the Midway deposit.

AMY/MARBACO (104O-004)

In this Kechika carbonate-hosted replacement deposit, high concentrations of silver correlate with high lead and

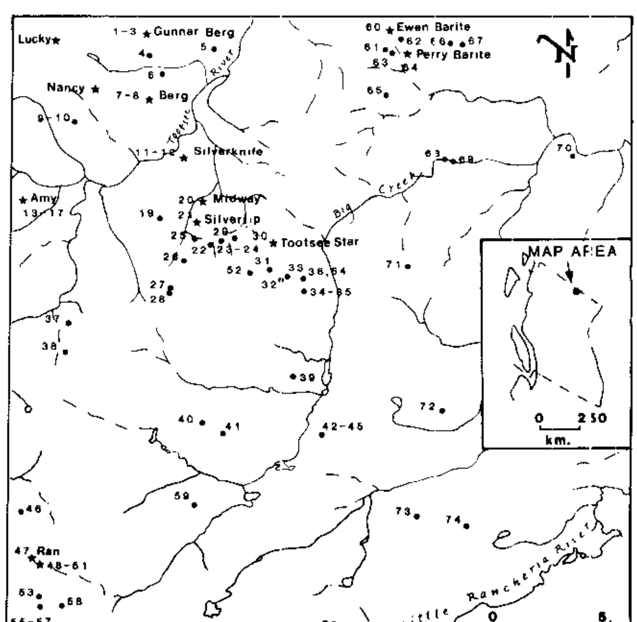

Figure 5-9-1. Locations of analysed samples, map area 104O/16.

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British Columbia Ministry of Energy, Mines and Petroleum Resources, Geological Fieldwork, 1987, Paper 1988-1.

TABLE 5-9-1
GEOCHEMICAL AND ASSAY RESULTS
MAP AREA 104O/16

Samples Taken From Known Mineral Showings 104O-16

(All values in ppm unless indicated as per cent.)

Samp. No.	Showing Name	Type	Au ppb	Ag	Cu	Zn	Pb	Ni	Mo	Hg	As	Sb	Ba	Sn	Bi	Te	F	Sr	Description
1	Gunnar Berg	IV	<15	<10	29	260	10	—	6	—	25	40	<56	—	—	—	—	114	Pyrrhotite in shear zone, Tapioca ss.
2	Gunnar Berg	IV	<15	30	82	249	0.41%	—	27	—	0.29%	295	360	—	—	—	—	33	Skarn: diopside-tremolite-wollastonite-calcite.
3	Gunnar Berg	IV	<15	<10	39	166	327	—	77	—	187	34	114	—	—	—	—	42	Rusty quartz breccia
4	Gunnar Berg	IV	<15	<10	48	22	16	—	5	—	<25	<10	255	—	—	—	—	99	Quartz breccia.
7	Berg	IV	<30	<10	3	620	620	62	3	0.403	33	11	887	—	<5	<5	—	2	Smithsonite, calcite and hydrozincite in brecciated Earn shale.
8	Berg	IV	52	10	56	5.55%	3.34%	153	20	5.38	136	233	>10 000	—	<5	<5	—	79	Fe-Mn oxides with hematite and jarosite.
9	Nancy	II	<15	<0.5	50	26	55	—	0 59%	0.020	<20	<10	383	—	—	—	—	103	Molybdenum and pyrite in quartz veins in altered granite.
10	Nancy	II	562	—	48	271	18	—	32	—	<25	<10	333	—	—	—	—	362	Garnet-idocrase-quartz-diopside skarn with pyrrhotite veinlets.
11	Silverknife	IIIA	103	32	120	5.7%	0.43%	—	<5	—	760	<10	—	350	—	—	155	—	Disseminated galena-sphalerite-pyrite in laminated dolomite.
12	Silverknife	IIIA	32	125	72	5.4%	3.0%	—	<5	—	534	171	—	64	—	—	70	—	Disseminated galena-sphalerite-pyrite in marble.
13	Amy	II	18	10	0.13%	126	140	—	17	0.020	<20	202	<56	46	—	—	—	297	Pyrrhotite-chalcopyrite in marble.
14	Amy	II	18	816	540	17.2%	1.25%	—	4	0.162	<20	28	188	180	—	—	—	80	Hydrozincite-smithsonite
15	Amy	II	43	383	60	860	8.81%	—	—	0.020	<20	202	<56	30	—	—	—	297	Layered galena-sphalerite-siderite.
16	Amy	II	36	280	220	0.22%	380	—	2	0.021	<20	77	63	—	—	—	—	106	Sphalerite-galena-siderite
17	Amy	II	67	1 452	0.14%	2.09%	17.0%	—	6	0 039	<20	0.25%	56	100	—	—	—	20	1.5-metre-wide galena-Fe-oxide zone in marble.
20	Midway	I	<15	4	143	240	56	—	19	—	25	<10	10 000	—	—	—	345	116	Laminated silica-barite exhalite.
21	Silvertip	I	<15	5	126	106	480	—	<5	—	773	52	162	—	—	—	—	43	Siliceous exhalite
30	Tootsee Star	IIIB	74	320	310	600	6.0%	15	3	0.020	0.10%	124	1 400	230	<5	<5	—	7	Galena, plumbojarosite in quartz veins in shear zone.
48	Ran	IIB	<15	5	—	—	—	—	—	—	<25	—	—	—	—	—	—	—	Quartz pods with pyrite boxwork in granite.
49	Ran	IIIB	17	10	—	—	—	—	—	—	<25	<10	—	—	—	—	—	—	Quartz veins with pyrite in granite.
50	Ran	IIIB	<15	13	—	—	—	—	—	—	<25	—	—	—	—	—	—	—	Quartz veins with pyrite.
51	Ran	IIIB	<15	1	—	—	—	—	—	—	<25	—	—	—	—	—	—	—	Quartz veins.
60	Ewen barite	I	<30	<10	5	52	<3	7	<3	<0.020	<25	<5	<10 000	—	<5	<5	—	1751	Grey baritic exhalite.
64	Perry barite	I	<30	<10	5	36	3	6	<3	<0.020	<25	<5	<10 000	—	<5	<5	—	1159	12 × 20-metre baritic exhalite.

Samples Taken From Known Mineral Showings 104O-16

(All values in ppm unless indicated as per cent.)

Samp. No.	Showing Name	Type	Au ppb	Ag	Cu	Zn	Pb	Ni	Mo	Hg	As	Sb	Ba	Sn	Bi	Te	F	Sr	Description
5	Sylvester 7A		<15	0.7	15	23	10	—	<5	—	<25	<10	—	—	—	—	—	—	Shear zone in chert-argillite.
6	McDame		<15	2	15	42	69	—	<5	—	<25	<10	—	—	—	—	—	—	Quartz veining associated with pyrrhotite-rich dyke.
18	Sylvester 7E		—	—	220	137	21	21	<3	0.02	<25	<5	998	—	<5	5	—	—	Malachite in vug in microdiorite.
19	McDame		<30	10	63	573	29	46	<3	0.224	33	<5	>10 000	—	—	—	345	116	Fe-Mn oxides along dyke contact.
22	Earn		<15	1	21	840	14	—	<5	—	733	52	162	—	—	—	—	43	Fe-oxides in trench.
23	Earn		<15	29	173	124	0.26%	—	9	—	156	<10	—	—	—	—	790	—	Quartz veins with galena; strong alteration.
24	Earn		<15	1	42	108	106	—	12	—	—	—	323	—	—	—	—	34	Quartz veins: sericite-pyrite alteration.
25	McDame/Earn		<15	2	129	0.64%	217	—	5	—	40	<10	—	—	—	—	—	—	Fe-oxides on fault contact.
26	Earn		<30	<10	37	65	16	45	<3	0.092	<25	<5	>10 000	—	<5	<5	—	133	Siliceous, baritic, pyritic exhalite.
27	Earn		<30	<10	19	92	10	33	<3	0.046	<25	<5	1 066	—	<5	<5	—	4	Siliceous exhalite.
28	Earn		<30	<10	49	150	12	25	<3	0.066	<25	<5	>10 000	—	<5	<5	—	80	Siliceous, baritic exhalite.
29	Sylvester 7A		103	<10	52	0.27%	117	12	<3	0.507	166	<5	>10 000	—	<5	<5	—	1 167	Fe-Mn oxides adjacent quartz veins in limestone.
31	Sylvester 7A		21	—	260	32	15	51	<5	—	<25	10	—	—	—	—	—	—	Pyrrhotite-rich dyke.
32	Sylvester 7A		<15	3	80	124	21	—	13	—	<25	<10	—	—	—	—	415	—	Sericite-pyrite-altered cherty argillite.
33	Sylvester		<15	<10	—	29	25	—	—	—	<20	—	—	—	—	—	—	—	6-centimetre-wide quartz vein with pyrite and galena.
34	Dyke		—	—	—	—	—	—	—	—	—	—	—	—	—	—	1 220	—	Quartz-orthoclase-biotite dyke with 10% pyrite.
35	Sylvester 7A		<15	<0.6	—	—	—	—	—	—	25	—	—	—	—	—	—	—	Fe-stained pyrrhotite-rich chert.
36	Earn		—	—	—	—	—	—	—	—	—	—	—	25	—	—	—	—	Siliceous exhalite.
37	Road River		<30	<10	19	58	40	25	10	<0.02	33	<5	—	—	<5	<5	—	—	Pyrrhotite-bearing chert.
38	Road River		<30	<10	36	60	11	10	<3	0.023	30	<5	912	—	<5	<5	—	228	Pyrrhotite-bearing chert.
39	Sylvester 7A		<15	0.5	—	—	—	—	—	—	20	<10	—	—	—	—	—	—	3- to 4-metre-wide quartz breccia vein.
40	McDame		<30	<10	3	0.24%	15	500	<3	0.02	72	89	—	—	5	17	—	—	Gossanous sinter.
41	McDame		<30	<10	48	124	192	63	12	0.04	<25	<5	—	—	5	5	—	—	Rusty quartz veins.
42	Sylvester 7B		<15	1	0.37%	—	—	—	—	—	<20	<10	—	—	—	—	—	—	Pyrite and chalcopyrite in altered diabase.
43	Sylvester 7B		15	0.5	—	—	—	—	—	—	<20	<10	—	—	—	—	—	—	Pyrrhotite and calcite veinlets in diabase.
44	Sylvester 7C		15	0.5	—	—	—	—	—	—	<20	—	—	—	—	—	—	—	Pyrrhotite in talc-altered serpentinite.
45	Sylvester 7C		127	1	202	—	—	—	—	—	<20	—	—	—	—	—	—	—	2-centimetre-wide quartz-pyrite-chalcopyrite vein.
46	Cassiar		<15	<0.5	—	—	—	—	—	—	<20	<10	—	—	—	—	—	—	Cockscomb quartz, limonite in sericitized granite.
47	Cassiar		49	3 802	—	—	—	—	—	—	<20	10	—	—	—	—	—	—	Quartz vein with pyrite, argentite.
52	McDame		—	2	87	40	—	—	—	—	—	—	—	—	—	—	—	—	Gossan.
53	Cassiar		<15	5	—	—	—	—	—	—	<25	—	—	—	—	—	—	—	Quartz vein rubble.
54	Sylvester		<15	1	—	—	—	—	—	—	<20	—	—	—	—	—	—	—	Quartz-carbonate alteration with quartz veins.
55	Cassiar		15	6	—	—	—	—	—	—	<25	—	—	—	—	—	—	—	20-centimetre-wide quartz-molybdenum-pyrite vein.
56	Cassiar		<15	114	—	—	—	—	—	—	<25	—	—	—	—	—	—	—	5 to 10-centimetre-wide quartz veins with 20% pyrite, 5% molybdenum.
57	Cassiar		<15	22	—	—	—	—	—	—	<25	—	—	—	—	—	—	—	Quartz vein parallel to dyke.
58	Cassiar		<15	<0.6	—	—	—	—	—	—	<25	—	—	—	—	—	—	—	10-centimetre-wide hematite-stained quartz vein.
59	Atan (Boya)		—	—	—	219	10	—	—	—	—	—	>10 000	—	—	—	—	222	Pyritic bands in siltstone (exhalite?).
61	Sylvester 7A		<30	<10	107	109	13	49	10	—	<25	<5	—	—	5	5	—	1 751	Mn-oxide band (layer?).
62	Earn		<30	<10	95	230	62	43	16	0.076	110	7	3 353	—	5	5	—	158	Gouge zone.
63	Sylvester 7A		90	<10	3	37	58	<5	5	0.020	0.11%	8	7 267	—	<5	<5	—	114	Quartz breccia veins with pyrite molds.
65	Sylvester 7A		—	0.5	—	84	10	—	—	—	—	—	—	—	—	—	—	—	Pyritic chert.
66	Tapioca		<30	<10	350	140	272	<2	<3	0.094	<25	<5	—	—	<5	<5	—	—	Quartz vein with Fe-oxides.
67	Dyke		<30	<10	119	480	0.20%	10	57	0.155	306	58	—	—	12	<5	—	—	Quartz-clay-altered porphyry dyke.
68	McDame		<30	<10	4	114	27	<3	<3	0.090	<25	<5	>10 000	—	<5	<5	—	1 167	Barite vein.
69	McDame		78	<10	31	0 17%	320	87	<3	0.430	55	53	—	—	<5	<5	—	—	Goethite in dolomite.
70	McDame (?)		<15	2	—	—	—	—	—	—	110	—	—	—	—	—	—	—	Gossanous beds in sooty dolomite.
71	Sylvester 7A		<15	19	—	—	—	—	—	—	68	—	—	—	—	—	—	—	Gossan in altered serpentinite.
72	Sylvester 7E		73	<10	0.12%	3.8%	1.78%	<3	3	1.53	42	8	—	—	<5	<5	—	—	Quartz vein with pyrite, malachite stain.
73	Sylvester 7E		<30	<10	34	71	25	95	<3	<0.02	46	<5	—	—	<5	<5	—	—	Carbonate alteration with mariposite, quartz veins.
74	Sylvester 7E		<30	<10	7	14	10	9	3	0.022	52	<5	—	—	<5	<5	—	—	Altered gossan in siltstone
75	Atan		<30	<10	19	34	21	28	5	<0.02	85	<5	>10 000	—	<5	<5	—	—	Massive sulphide vein.

antimony (tetrahedrite). Low tin contents relative to Midway and Silverknife are consistent with the Amy's association with the S-type Cassiar batholith, as opposed to a younger A-type or differentiated S-type granite (Bradford and Godwin, this volume).

BLUE LIGHT (104O-005)

This set of occurrences, beryl in pegmatite, fluorite in open spaces, skarns and massive sulphide lenses, is associated with an Eocene granite body that shows a regional fluorine geochemical signature (NGR-41-1978, Geological Survey of Canada, Open File 561). The presence of nearly 0.89 per cent tin in a massive pyrite-magnetite lens (No. 77) is consistent with the probable A-type or differentiated S-type affinity of the granite. Because these occurrences are located in map-area 104-09, the samples are not shown on Figure 5-9-1.

EARN GROUP EXHALITES

These siliceous to baritic exhalative units are geochemically distinct from unoxidized epigenetic mineralization (Types II and III); they contain significant barium and low lead and silver values (Nos. 20, 21, 26, 27, 28, 60, 54).

REFERENCES

Bradford, J.A. and C. I. Godwin (1988): Midway Silver-lead-zinc Manto Deposit, Northern British Columbia (104O/16), *B.C. Ministry of Energy, Mines and Petroleum Resources*, Geological Fieldwork, 1987, Paper 1988-1, This Volume.

Nelson, JoAnne and Bradford, John (1987): Geology of the Area Around the Midway Deposit, Northern British Columbia (104O/16), *B.C. Ministry of Energy, Mines and Petroleum Resources*, Geological Fieldwork, 1986, Paper 1987-1, pages 181-192.