GEOLOGY AND MAGNETOMETER SURVEY OF THE SAPPHO GOLD-SILVER-PLATINUM-COPPER PROSPECT (82E/2)

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INTRODUCTION

This report describes results of a geological and magnetometer survey of the Sappho Crown-granted claim located near the International Boundary, approximately 4 kilometres south of Boundary Falls and 5 kilometres east of the town of Midway. The claim is currently undergoing re-examination for copper and precious metal potential by Kettle River Resources Ltd.

HISTORY

According to Minister of Mines reports, 100 tonnes of ore grading approximately 53 ppm silver and 6 per cent copper were shipped to the smelter from the Sappho claim (MI 82E/SE-147) during the period 1916 to 1918. Workings on the property consist of several pits, a shaft, and an adit dating from 1927 and earlier. A grab sample of ore taken from one of the pits assayed 3.2 per cent copper and 0.9 ppm platinum.

Recent work includes trenching, drilling, rock sampling, and geological and geophysical surveys. In the period 1963 to 1964, Triform Mining Ltd. and Coast Exploration Ltd. reported results on their trenching and rock sampling program. Apparently one 15-metre section assayed 0.2 per cent copper, a second section of 6 metres averaged 0.44 per cent copper, and a third section of 6 metres averaged 0.8 per cent copper. The operators also reported a short high-grade sulphide drill hole intersection assaying 28 ppm gold.

Rock sampling performed by Silver Standard Mines, Limited in 1967 apparently yielded 0.7 per cent copper across 9.5 metres in a trench near a north showing and 0.15 per cent copper across 17 metres in a trench on the south part of the claim (*see* Fig. 10).

Additional work was performed in the period 1975 and 1978 by G.O.M. Stewart and McIntyre Mines Limited. They confirmed the presence of platinum, quoting values for this element in the range 0.6 to 1.8 ppm from spot sampling.

Kettle River Resources Ltd. acquired the Sappho claim and the surrounding area in 1981 and renewed exploration activities.

GEOLOGICAL SETTING

Bedrock exposure in the Sappho area is minimal, revealing only fragments of the geological picture from scattered outcrops in trenches, in pits, and on a few hilltops (Fig. 10).

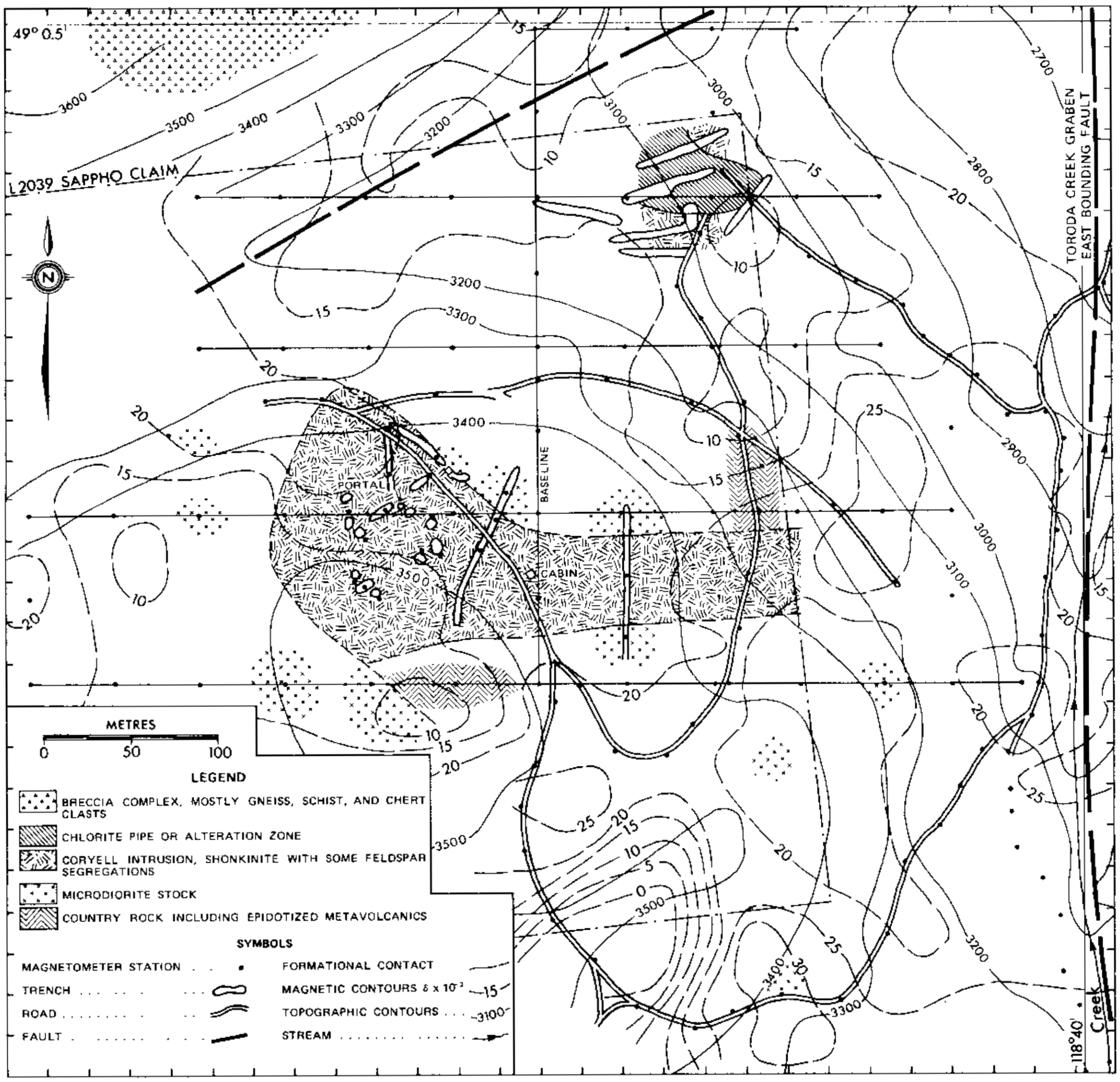

Figure 10. Geology and magnetometer survey of the Sappho prospect.

The principal rock types are a microdiorite, which forms a stock that is exposed in the central area and near the southeast corner of the claim, and younger (Eocene) Coryell-type bodies. Greenstones hosting both intrusions are exposed near the east boundary of the claim and in the south-central area. Scattered occurrences of serpentinite have been reported in the northern area where chloritized rocks with mineralization are also found.

The mineralized area is delineated on the east by the east-bounding fault of the Toroda Creek graben and on the north by a major northeast-trending fracture. Tertiary rocks are found to the north and include a hill of brecciated basement rocks of apparent landslide origin caused by major faulting (Monger, 1968, p. 27).

MINERALIZATION

The Sappho prospect is one of the few known occurrences in the province of lode-type copper-platinum mineralization associated with alkaline intrusions. Other examples are the Maple Leaf showing in the Franklin camp north of Grand Forks and the Copper Mountain deposit near Princeton.

Coryell alkaline intrusions at Sappho host the mineralization both at the central showings and near the northeast corner of the claim. The principal phases of the Coryell rock are pyroxenite (shonkinite) and pyroxene monzonite. Subsidiary phases include small pegmatoid amphibole-rich segregations and alkali feldspar-rich differentiates that commonly occur as dykes or apophyses.

Mineralization consists of pyrite-chalcopyrite disseminated in shear zones and forming irregularly shaped blebs and pods of sulphide in biotite shonkinite and sericitized feldspathic phases. Sulphides are also found locally in skarn-like assemblages of chlorite, epidote, garnet, and magnetite near what appear to be intrusive margins. Veinlets of calcite are common in the mineralized areas, however, quartz veins are few.

Relations between serpentinite and mineralization are uncertain. Serpentinite fragments, which are common in the dumps of some old collapsed excavations in the northeast area, are evidence of shearing and probably a major fault zone.

MAGNETOMETER SURVEY

A magnetometer survey was conducted on the Sappho property to complement the geology, which is poorly understood because of extensive glacial cover. Existing roads and the surveyed line system were utilized for access and geographical control. Standard field methods were employed using a McPhar 700 fluxgate magnetometer with vertical sensor configuration.

The results of a scattering of 146 stations across the area show a range of approximately 4 000 gammas (that is, 36 to -4 scale divisions). The magnetic contours shown on Figure 1 were generated according to the moving average procedure using a computer program described in Geological Fieldwork, 1980 (B.C. Ministry of Energy, Mines and Petroleum Resources, Paper 1981-1, pp. 25-32) using a 50-metre radial integration distance and a radial weighting factor calculated as follows:

the moving average = T/S
S = S + (1/R) the sum of weighted factors and
T = T + [A*(1/R)] the sum of weighted distances,
R being the radius of integration and
A the field readings within the area of integration

Two typographical errors in the original printing of the computer program (Table 1, p. 27) are as follows:

Line 160 statement IF SQR $(A(1) - \emptyset)^2 + (2(2) - Q*1)^2$ should read
IF SQR $(A(1) - \emptyset)^2 + (A(2) - Q)^2$
Line 220 statement P = P + 0 should read P = P + 1.

The survey shows a magnetic low immediately east and south of the northern mineral showings and trenched area, a magnetic trough to the northwest coincident with a topographic lineament, and what appears to be a magnetic dipole in the area of microdiorite exposures near the south boundary of the map-area. The results appear to confirm the previously inferred position of a major fault on the north. They also suggest that the chloritized contact zone extends to the east and south of the northern trenches and may extend to zones of faulting or alteration related to the contacts of the microdiorite. The features offer some new interpretations of the geology and re-evaluation of exploration targets.

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TABLE 1. CHEMICAL ANALYSES OF BASALTS FROM THE OKANAGAN HIGHLANDS

	1	2	3	4	5	6	7	8
Oxides recalculated to 100								
SiO_2	47.84	48.30	48.69	49.77	48.63	49.67	50.09	50.85
TiO_2	2.21	3.21	2.07	2.06	2.00	3.06	2.35	2.48
Al_2O_3	17.08	17.22	15.93	16.44	18.16	17.84	16.21	17.58
Fe_2O_3	4.56	4.62	2.95	5.40	3.34	4.57	4.28	4.14
FeO	8.31	9.01	9.28	9.17	8.90	7.67	8.08	7.79
MnO	0.18	0.20	0.18	0.22	0.19	0.18	0.18	0.23
MgO	6.65	4.40	6.96	3.88	5.22	4.18	6.31	3.95
CaO	8.56	7.51	8.74	6.95	8.14	7.46	6.60	5.86
Na_2O	3.61	4.08	3.88	4.35	4.06	4.18	4.21	5.04
K_2O	1.00	1.45	1.32	1.76	1.36	1.19	1.69	2.08
Oxides as determined								
H_2O+	1.13	1.18	0.60	1.21	0.82	1.11	1.70	1.07
H_2O-	0.68	1.00	0.50	0.79	0.73	0.78	1.03	0.81
CO_2	<0.1	0.06	2.63	0.21	2.08	0.17	<0.07	<0.1
S	<0.01	0.01	0.02	0.04	0.02	0.01	0.02	0.01
P_2O_5	0.42	1.26	0.55	1.05	0.71	0.22	0.32	0.70
BaO	0.02	0.06	0.04	0.10	0.03	0.07	0.06	0.07
SrO	0.06	0.10	0.09	0.07	0.07	0.09	0.07	0.11
Molecular Norm								
Or	5.94	8.69	7.80	10.55	8.06	7.11	10.00	12.32
Ab	32.56	37.14	33.11	39.62	34.31	37.94	37.84	42.42
Ne	-	-	1.02	-	1.34	-	-	1.75
An	27.60	24.75	22.16	20.44	27.40	26.71	20.39	19.26
Wo	6.02	5.21	8.47	5.82	5.24	4.28	4.96	3.95
En	3.42	2.01	-	2.38	-	7.78	3.70	-
Fs	1.23	1.04	-	1.69	-	3.00	1.33	-
Fo	11.27	7.73	14.41	6.36	10.84	2.92	10.31	8.20
Fa	4.06	3.99	7.08	4.50	6.52	1.12	3.71	4.31
Il	3.09	4.53	2.88	2.91	2.79	4.31	3.28	3.46
Mt	4.79	4.90	3.08	5.73	3.50	4.83	4.48	4.34
Cor	-	-	-	-	-	-	-	-

Key to Analyses

1. Pyroxene-olivine basalt on Long Mountain, east of Oyama Lake.
2. Pyroxene-olivine basalt east of Harris Creek.
3. Reversed olivine basalt above King Edward Creek, south of Coldstream (K/Ar whole rock date of 20.4±1.4 Ma).
4. Basalt with bladed plagioclase phenocrysts west of Oyama Lake.
5. Olivine basalt 5 kilometres southeast of Coldstream.
6. Pyroxene-olivine basalt 7 kilometres southeast of Coldstream.
7. Basalt with lherzolite inclusions in the Grizzly Hills area.
8. Olivine basalt west of Daves Creek (K/Ar whole rock date of 14.9±0.9 Ma).